The MIT Dictionary of Modern Economics

FOURTH EDITION
edited by David W. Pearce

The MIT Dictionary of Modern Economics is an up-to-date, authoritative reference designed primarily for students of economics but invaluable also to students of business and other social sciences and ideal for anyone who wants a brief explanation of an economic concept or institution.

In this fourth edition one entry in ten has been revised and one entry in twenty is new. Whereas the third edition increased the coverage of American institutions, this edition breaks new ground by including entries considered important from an Eastern European perspective. It also supplies comparative statistics on major economic variables for selected countries, describes the origins of widely used acronyms, and includes bibliographic references at the end of featured entries.

The dictionary answers in a clear and concise way the enduring questions, which economists have considered for two centuries or more, as well as the issues of the moment, such as economic change in Europe, the problems of pollution, or the prospects for greater freedom of trade. With close to 2,800 entries it is comprehensive in its coverage of theory, national and international institutions, schools of thought, and important economists, including recent Nobel Prize winners.

Printed in Great Britain
THE MIT DICTIONARY OF MODERN ECONOMICS

FOURTH EDITION

edited by
David W. Pearce
Lexicographer
'A Writer of dictionaries - a harmless drudge'
Samuel Johnson (1755)

'Letter to Lord Chesterfield',
*Boswell, Life of Johnson.*
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Preface to the First Edition

The idea for this dictionary of economics originated within the reference books division of Macmillan Press. When we were approached to put that idea into practice there was widespread agreement that there was a need for something different in this area of reference studies, despite the excellent contributions that already existed. The dominant thought was that the 'average undergraduate' (for which no entry will be found in this dictionary or, we suspect, any other) needed to be led, sometimes gently, sometimes a little more forcibly, into realms that lay beyond the conventional first year economics course. Hence the coverage of the current dictionary. It extends significantly beyond what the first year student will need. At the same time, and here we can only hope we have succeeded, it covers all that the traditional market has aimed at. In short, we felt that there was a demand for coverage of the words and phrases, concepts and institutions that a first year student might want, and more. Economics is undergoing yet another 'revolution', albeit one that is difficult to secure great perspective on at the time of writing. We have therefore done our best. In so doing, all the authors are conscious that they have been selective in choosing entries, that the 'balance' in a book authored by no less than fourteen people must inevitably be open to criticism and that they will have omitted something, somewhere which others will see as being far more important than many of the entries chosen. To this end all criticism and suggestions for improvement are welcomed. For the moment, we believe that the dictionary we offer is unique, tempting and useful.

Each entry contains cross references except in the few cases where a word or phrase is 'self contained'. To build a picture of a given area of economics, the reader is therefore encouraged to pursue the cross references indicated at the end of each entry. We have also included many business terms which some will argue do not belong in a dictionary of economics. The growth of courses in business finance and analysis, however, testifies to the need to make such an excursion in a dictionary of this kind. We have also included 'potted' bibliographies of celebrated economists. It is not too difficult to decide who deserves mention when they are dead - although students of the history of thought will dispute that statement - but it proved decidedly controversial as to whom among the living should deserve an entry. We therefore followed a general rule, again which some will dispute, that those who have received the Nobel Prize for Economics should automatically gain mention. Others, perhaps no less deserving, receive mention because they have lent their names to a particular growth model, a theory of this or a theory of that. We have not eschewed the use of simple mathematical symbolism. When used, it is explained in each entry. Where the axe had to fall, for reasons of time and space, was in the area of institutions. International institutions of note are therefore included, but institutions peculiar to one country are generally not always excluded. It proved impossible, for example, to explain some words in current
usage without reference to UK banking institutions. Against this, we are very
conscious that many important Acts of Parliament, Royal Commissions, com-
mittees of investigation and so on are excluded. If future editions allow, that is one
area we would seek to remedy.

The ready enthusiasm with which we greeted the initial idea for a new dictionary
of economics contrasted somewhat with the falling tempers that characterized the
indecent haste of the final preparation of the manuscript. That most of the ill
temper focused on the so-called 'editor' was predictable, and apologies are owed to
all other authors in this respect. The work share in the dictionary is virtually
impossible to allocate. Everyone gave freely of their time and it is best to think of
each author as being equally responsible, or equally at fault. The more than
occasionally bewildering task of typing the manuscript was begun by Mrs Pearl
Watson in truly efficient style, subsequently to be equalled by Mrs Betty Jones.
That the task was beyond one secretary towards the end was quickly realized.
Entries flew faster into the 'in tray' than they appeared in the 'out tray'. Winnie
Sinclair, Phyl McKenzie, Aileen Fraser, June Begg and Sandra Galbraith all shared
the final dash to the final furlong. We owe them everything in terms of seeing the
book actually materialize. We also owe a debt of thanks to Shaie Selzer of
Macmillan for being very patient, for extending at least one deadline and for
providing encouragement in the form of nearly threatening letters towards the end
of the preparation period. It would be a miracle if such an enterprise were not full
of errors and omissions. We make no claim to miracles, merely to having done the
best that we can in the time available.

David W. Pearce

*General Editor*
Preface to the Fourth Edition

Compared to the previous edition about one sixth of the content has been changed in some way with revisions being the most common form of alteration. To make way for the new entries there have been deletions, largely of little-quoted international organizations or of terms deemed less important now than they were a decade ago. The overall result is a modest growth in the size of the dictionary to some 2,800 entries.

It was suggested that the changes in Eastern Europe deserved greater recognition in the dictionary. The Polish economist Professor Adam Gwiazda kindly supplied entries considered important from an East European perspective. His task was difficult, for he was aiming at a moving target as the economies of the region daily assimilated to a market structure. The existing entries will assume increasing relevance for Eastern Europe as the economies make the transition from the centrally planned model to a free market economy. We are also grateful to Ross LaRoe, Associate Professor of Economics at Denison University, for supplying updated or new material on American entries.

This edition also contains the innovations of a list of acronyms, data about the economic performance of some major countries and bibliographic references at the end of the more important entries. For those who wish a fuller state-of-the-art account of any of the theoretical entries, we can do no better than offer the general rule that they consult The New Palgrave: A Dictionary of Economics, published by the Macmillan Press in 1987.

Finally it remains for those responsible for the bulk of the work in this revision to declare their identities: they are John Cairns, Robert Elliott, Ian McAvinchey and Robert Shaw.

Robert Shaw  
Aberdeen, April 1992
**abatement cost.** The cost of abating a nuisance such as pollution or congestion. In terms of pollution the cost curve will typically slope upwards at an increasing rate as pollution is progressively reduced. This is because it is usually comparatively cheap to 'clean up' some part of a polluted environment but extremely expensive to remove the last units of pollution. An example would be noise where engines can be muffled thus reducing noise by a noticeable amount. Further reductions in noise, might, however, require expensive engine redesign or wholesale changes in road structures, locations etc.

**ability and earnings.** Measures of ability and levels of education ('schooling') are highly correlated, raising the possibility that much of the estimated return to education is in fact a return to ability. Until recently, however, it was not thought that allowance for ability much reduced the rate of return to education. But studies of identical twins, who presumably do not differ in ability, have yielded much reduced estimates of the rate of return to education; the true RATE OF RETURN may be as low as 5 per cent rather than the usual estimate of 10 per cent and above, although there are disputes over the findings. Persistence of schooling expenditures in such circumstances might be attributable to the consumption value of education. Even so, schooling does influence earnings - even for identical twins - and thus schooling can continue to be viewed as an investment. (See HUMAN CAPITAL.)

**ability to pay theory.** An approach to taxation which states that the burden of taxation should be distributed in accordance with ability to pay. The theory is based on the concept of EQUAL SACRIFICE. Sacrifice refers to the loss of UTILITY which is incurred when tax payments are made. There are three possible measures of equal sacrifice - equal absolute, equal proportional and equal marginal (or least aggregate). No definition is obviously conceptually superior. Whether the tax system is progressive, proportional or regressive depends on which measure is employed and on the assumed slope of the MARGINAL UTILITY OF INCOME schedule(s). Any one definition is actually consistent with all three tax structures when different assumptions are made about the slope of the marginal utility of income schedule. If the latter is assumed to be declining the three measurements do not always give consistent conclusions about the appropriate tax structure. The equal marginal sacrifice definition produces the most progressive tax structure. The validity of the theory depends on the ability to make INTERPERSONAL COMPARISONS OF UTILITY. This is denied in modern WELFARE ECONOMICS. The theory, although superficially attractive, thus has several major limitations and defects.

**abnormal profits.** See SUPER-NORMAL PROFITS.

**abscess.** The value on the horizontal (or X) axis of a point on a two-dimensional graph. (See also ORDI NATE.)

**absenteeism.** Failure to report for work although the terms of the labour contract require the worker to do so and the contract is still operational. The OVER-EMPLOYED WORKER will resort to this where control of the terms of the labour contract is lax or where sanctions for non-compliance are negligible. In particular employers who are currently experiencing labour shortage may be reluctant to use the ultimate sanction of SACKING.

**absentee landlord.** An owner of land or property who lives away from his estate, collecting rents and administering his business through some intermediary or agent.

**absolute advantage.** See COMPARATIVE ADVANTAGE.
absolute cost advantage. A concept referring to those advantages possessed by established firms which are as a consequence able to sustain a lower average total cost than new entrants irrespective of size of output. Examples of sources of absolute cost advantages are: control of the supply of key factor inputs, patents and superior techniques available only to established firms. (See BARRIERS TO ENTRY)

absolute income hypothesis. This hypothesis states that consumption expenditures \( C \) are a function solely of current personal disposable income \( Y_d \): \( C = C(Y_d) \). This view of the determinants of consumption was detailed in The General Theory by KEYNES who hypothesized that consumption would be functionally related to income in the following way. First for any change in income the corresponding change in consumption would be in the same direction but of a smaller magnitude, the MARGINAL PROPENSITY TO CONSUME would be less than 1; 

\[
0 < AC/Y < 1
\]

where 'A' means 'small change in'. Second, the marginal propensity to consume would be less than the AVERAGE PROPENSITY TO CONSUME:

\[
\frac{AC}{AY} < \frac{C}{Y}
\]

Finally, the rate of change of the marginal propensity to consume would be negative; that is, the slope of the CONSUMPTION FUNCTION will become flatter as income rises. While short-run time series and cross-section evidence on the form of the consumption function broadly support Keynes' hypothesis, long-run evidence contradicts it. In consequence this form of consumption function enters only the most simple models. (See also SHORT-RUN CONSUMPTION FUNCTION, CROSS-SECTION CONSUMPTION FUNCTION, LONG-RUN CONSUMPTION FUNCTION, RELATIVE INCOME HYPOTHESIS, LIFE-CYCLE HYPOTHESIS, PERMANENT INCOME HYPOTHESIS, ENDOGENOUS INCOME HYPOTHESIS.)

absolute monopoly. See MONOPOLY.

absolute prices. MONEY PRICES as opposed to RELATIVE PRICES; that is the price of goods and services expressed directly in terms of a quantity of the monetary unit. (See PRICE.)

absolute scarcity. See SCARCITY.

absolute value. (Also known as modulus). The value of a variable ignoring its sign. Thus the absolute value of a positive number is just that number, while the absolute value of a negative number is itself multiplied by minus one.

absorption approach. A method of analysing the effects of a DEVALUATION or DEPRECIATION of a country's EXCHANGE RATE on its BALANCE OF TRADE. The approach focuses attention on the relationship between NATIONAL PRODUCT \( Y \) and national absorption \( A \), where the latter is defined as the use of goods for the purposes of CONSUMPTION and INVESTMENT by the private and public sectors of the economy. The balance of trade \( B \) can only be positive (i.e. in surplus) if \( Y \) exceeds \( A \). Thus in its simplest form the relationship may be written as \( B = Y - A \).

If the balance of trade is to improve then devaluation or depreciation must raise \( Y \) relative to \( A \). In an economy with unemployed resources this is possible, since the decline in the exchange rate should be a greater stimulus to \( Y \) than \( A \). At full employment, however, \( Y \) cannot be increased, so that \( B \) can only improve if \( A \) falls. The merit of the approach is that it draws attention to the need for complementary action, e.g. some degree of DEFLATION, if a decline in the exchange rate is to improve the balance of trade in conditions of full employment.

abstinence. A term which describes the necessity of foregoing present consumption in order to allow capital accumulation. It was first used by Nassau SENIOR in his theory of the RATE OF INTEREST. For Senior, the creation of CAPITAL GOODS involved saving from current income in order to augment the CAPITAL STOCK, and create a greater future stream of consumption goods. As such it implies that a reward for such behaviour is required if capital accumulation is to continue. Interest is the reward for abstemious behaviour, and the rate of interest reflects the scarcity of capital.
J. S. MILL extended the notion of abstinence to include a reward for foregoing consumption of capital itself. Since capital goods take time to produce commodities for consumption the individual must wait for some period before benefiting from an investment. Abstention in this sense of 'waiting' is scarce and requires a reward or payment in the form of interest.

These two elements of abstinence provide a theory of the supply of savings which can be used in conjunction with a demand for investment to explain the existence of a positive rate of interest.

accelerated depreciation. See DEPRECIATION.

accelerating inflation. An increasingly sharp rise in the rate of INFLATION. If government attempts to hold unemployment below the NATURAL RATE OF UNEMPLOYMENT this will result in accelerating inflation.

accelerator. See ACCELERATOR PRINCIPLE.

accelerator coefficient. The multiple by which new INVESTMENT increases in response to a change in output. New investment is hypothesized to be some multiple greater than one of the change in output because the value of a machine is usually well in excess of the value of its annual production. (See ACCELERATOR PRINCIPLE.)

accelerator principle. The theory that the level of aggregate net INVESTMENT depends on the expected change in output. In its naive form, it can be expressed

\[ I_t = a \Delta Y_{t-1} + b \]

where 'a' is the accelerator coefficient, 'A' means 'small change in', and \( \Delta Y_{t-1} \) means the change in the level of output in the previous year. \( A Y_{t-1} \) thus becomes a proxy for the expected change in output, and \( b \) is REPLACEMENT INVESTMENT. The theory hypothesizes that firms attempt to maintain a fixed ratio of desired CAPITAL STOCK to expected output. In the naive version there is no role for the interest rate and it is therefore an extreme Keynesian view of the determinants of investment. In the more sophisticated form, known as the flexible accelerator, the ratio 'a' is affected by the USER COST OF CAPITAL while further flexibility is introduced in those versions which take account of the substantial construction lag some investment projects entail. As a result only a proportion of any gap between actual and desired capital stock will be made up in any one period. The principle plays an important role in explanations of the TRADE CYCLE e.g. through MULTIPLIER-ACCELERATOR INTERACTIONS, and in the theory of economic growth - notably the HARROD-DOMAR MODEL. (See also CAPITAL STOCK ADJUSTMENT PRINCIPLE.)

acceptance. Strictly the act of 'accepting' a BILL, performed by the person or body on whom the bill is drawn, consists of signing it, usually across the face. However, the term is commonly used to mean a BILL OF EXCHANGE that has been 'accepted' by an ACCEPTING HOUSE or BANK on behalf of a customer who requires CREDIT to cover a purchase of goods, or to enable him, as a seller, to extend credit. Such acceptances can be readily traded in SECONDARY MARKETS in major financial centres.

accepting house. One of a group of London-based MERCHANT BANKS which, for a commission, 'accepts' BILLS, that is, engages to meet payment of them on maturity. The house accepts on behalf of customers whose transactions, e.g. importing, give rise to bills, and from whom it eventually recovers payment. Bills accepted by a recognized accepting house may be discounted at the finest rates in the London bill market, and have always been ELIGIBLE PAPER at the BANK OF ENGLAND. Because of their 'eligible' status the accepting houses have traditionally been required by the Bank to meet certain capital and operating conditions. The Accepting Houses Committee to which recognised houses belong currently has sixteen members. (See BANK BILLS, LENDER OF LAST RESORT.)

accession rate. The number of new hires per month as a percentage of total employment, compiled monthly by the US Department of Labor. It is an important leading indicator of business conditions in the US. An initial increase in demand is met with OVERTIME. Once higher levels of
demand are relatively certain, new workers are hired. The opposite sequence of events occurs when demand starts to dwindle. The number of workers per month who are separated from the labour market and the number of workers per month being hired (accessions) is normally around four to five percent of total manufacturing employment in the US.

accessions tax. A TAX levied on gifts and inherited property. Such receipts are not usually classified as income but as they confer spending power they are arguably a legitimate subject of taxation. An accessions tax is levied on the recipient and, as it is related to his economic circumstances, is superior from an EQUITY viewpoint to the UK INHERITANCE TAX where liability is on the donor. Proponents of an accessions tax normally argue that it should be levied at PROGRESSIVE RATES on the lifetime cumulative amount of gifts received. This is to prevent the situation arising where one person receives a very large sum in small, annual parcels and pays little or no tax because the receipts are spread over a long period.

access/space trade-off model. A theoretical model used (principally) in the analysis of residential location in urban areas which explains location patterns as the outcome of a trade-off between accessibility of a site to the centre of the area and the spaciousness of the site. The model assumes that all employment is at the centre of the area, thus sites close to the centre can command a higher price than those further away since travel costs are reduced by locating near the centre. In EQUILIBRIUM, the price or rent of land will fall with increasing radial distance from the centre, the difference in rent exactly reflecting differences in travel costs. Further, since land becomes relatively cheaper as one moves away from the centre, the size of the site purchased by a household will increase with distance from the centre. Although extremely unrealistic, particularly in its assumption that employment is found only at the centre, the model forms the basis of more sophisticated analyses of location patterns and is consistent with at least some empirical evidence. (See BID-RENT FUNCTION, CENTRAL BUSINESS DISTRICT, DENSITY GRADIENT, URBAN ECONOMICS.)

accommodating monetary policy. See VALIDATED INFLATION.

accommodating transactions. In the BALANCE OF PAYMENTS, a type of capital transaction implemented or engineered by the MONETARY AUTHORITIES to offset a net credit or debit situation arising in the AUTONOMOUS TRANSACTIONS. If the autonomous items are tending to surplus or deficit accommodating capital flows will counterbalance the pressures on the EXCHANGE RATE. Examples are private short-term CAPITAL MOVEMENTS stimulated by interest rate policy, official short-term lending and borrowing and changes in the EXTERNAL RESERVE. Accommodating transactions are essentially monetary in nature: there is no accompanying movement of goods, services or FIXED ASSETS, only money (including gold) or short-term liquid claims.

account. 1. A running record of transactions between two transactors, who may be two departments of one business, and a basic element in all systems of recording business transactions. In retail trading the term is widely used to denote the CREDIT facility automatically extended to a customer with whom an account is operated. In banking, customers’ accounts have a particular significance in that some or all of the outstanding credit balances in them are regarded as forming part of the MONEY SUPPLY. (See ASSET, BANK, CHEQUE, CURRENT ACCOUNT, LIABILITIES.)

2. The periods, normally of two weeks duration, into which the business year of the London STOCK EXCHANGE is divided, and over which the settlement of all transactions except those in GILT-EDGED SECURITIES is deferred. Unless there is an arrangement to carry it over to the next Account, a settlement must be concluded on the fifth day, called Account Day, after the close of the Account.

accrued expenses. An entry in a company’s account which records as a LIABILITY the cost of services used but not yet paid for.

Achieving Society, The. This was the title of a book published by Professor David C. McClelland of Harvard University (Princeton, NJ, 1962) in which he defines the con-
additive utility function

The formation of EXPECTATIONS about the future value of a variable based only on previous values of the variable concerned. Economic agents adapt their future expectations about a variable in the light of their recent experience of the value of the variable. Though less logically satisfactory than the assumption of RATIONAL EXPECTATIONS, it is used in economic models for its ease of handling. (See VERTICAL PHILIPS CURVE.)

adding up problem.
See EULER’S THEOREM.

Additional Worker Hypothesis. On this argument, the fall in family real incomes during a cyclical down-turn will exert an INCOME EFFECT: additional workers from the family will enter the labour force in the hope of finding a job so as to maintain family income. Thus LABOUR FORCE PARTICIPATION RATES will move counter-cyclically. In fact, the evidence reveals that on balance labour force participation rates move pro-cyclically (see DISCOURAGED WORKER HYPOTHESIS). However, the added worker effect is discernible among certain low income groups for whom need is more important than price.

addition rule. A rule for the determination of the DERIVATIVE of a function with respect to a variable, where the function consists of the linear sum of two or more separate functions of the variable. Thus, in the function

\[ Y = u + v \]

where \( u \) and \( v \) are separate functions of say \( X \), then

\[ \frac{dY}{dX} = \frac{du}{dX} + \frac{dv}{dX} \]

active balance. In monetary theory some models postulate a division of the money supply into active balances, which are money stocks that turn over actively within periods determined by the intervals between payments, and IDLE BALANCES, which are money stocks not employed in the circuit of regular payments. In the QUANTITY THEORY OF MONEY, changes in the VELOCITY OF CIRCULATION, in conditions other than HYPER-INFLATION, are conceived to occur mainly through transfers between active and idle balances, and only to a lesser extent through changes in the rate at which money moves round the payments circuit. Empirically, the distinction between active and idle balances is elusive since the 'activity' of money is a matter of degree. But for practical purposes active balances are frequently defined as CURRENCY in circulation plus CURRENT ACCOUNT deposits in BANKS.

activity analysis.
See LINEAR PROGRAMMING.

activity rate.
See LABOUR FORCE PARTICIPATION RATE.

across-the-board tariff changes. A situation when all TARIFFS in a country are increased or decreased by an equal percentage. (See CONCERTINA METHOD OF TARIFF REDUCTION.)

action lag. The lag between a policy decision (particularly in macroeconomics) and its implementation. The action lag is usually preceded by a DECISION LAG. Also a component of INSIDE LAG.

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additive utility function. A UTILITY FUNCTION of the form

\[ U = U_a + U_b + U_c \]

where \( U \) is utility and \( a \), \( b \) and \( c \) are goods, in LINEAR EXPENDITURE SYSTEMS, GROUPS of goods between which substitution is not possible.

Since the utility of good \( a \) is independent of the utility of good \( b \), then the MARGINAL

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Since the utility of good \( a \) is independent of the utility of good \( b \), then the MARGINAL
UTILITY of good \( a \) is dependent upon the amount of good \( a \) alone and on no other good. If then each good is subject to DIMINISHING MARGINAL UTILITY it will be the case that the INDIFFERENCE CURVE will be convex - i.e. bent 'inwards' - to the origin. That is, provided the utility function is additive and diminishing marginal utility exists for each good then the indifference curve will be convex. Proof is given in the diagram. An indifference curve relating to two goods \( X \) and \( Y \) is shown. Consider point \( A \) on the indifference curve, and then consider the move to point \( B \). At \( B \) there is more of \( X \) and less of \( Y \). So long as the marginal utility of \( X \) depends on the amount of \( X \) alone, we know that the marginal utility of \( X \) must be less at \( B \) than it was at \( A \) simply because the consumer has more of \( X \). Since he has less of \( Y \) his marginal utility of \( Y \) will be more than at \( A \), hence the ratio of the two marginal utilities, which defines the slope of the indifference curve (its MARGINAL RATE OF SUBSTITUTION), must fall so that the indifference curve at \( B \) has a shallower slope than at \( A \). It follows that additive utility functions imply convexity of the indifference curve.

A further feature of such utility functions can be illustrated on the same diagram. Consider the move from \( A \) to \( C \), where \( C \) is directly 'north' of \( A \) on a near but parallel BUDGET LINE. If the marginal utility of \( X \) is dependent upon the amount of \( X \) alone, and similarly for \( Y \), then we know that the ratio of the marginal utilities at \( C \) must change in such a way as to make the indifference curve steeper at \( C \) than at \( A \). This is simply because we have more of \( Y \) (its marginal utility has fallen) and the same amount of \( X \) (its marginal utility is the same). Parallel analysis will show that the indifference curve through \( D \) is less steep than it is at \( A \), where \( D \) also lies on the new parallel budget line and where \( D \) is directly 'east' of \( A \). It follows that the indifference curve which is tangential to the new budget line will be at a point between \( C \) and \( D \), say \( E \). But this implies that a change in income will, provided utilities are independent, always cause more of both commodities to be bought. In short each good must be a NORMAL GOOD. One of the properties of additive utility functions, therefore, is that they always imply that the goods entering into the utility function are normal.

**address principle.** In a PLANNED ECONOMY such as the former USSR each target has an organization or 'address' which is responsible for carrying it out.

**adjustable peg system.** This was instigated by the INTERNATIONAL MONETARY FUND (IMF) at the BRETTON WOODS conference and refers to a set of fixed, or 'pegged' EXCHANGE RATES which are basically static, but allowed to adjust or change by small amounts in either direction. Adjustable peg systems have three main problems: finding the necessary reserves to meet short term fluctuations in foreign receipts and payments to keep the rate fixed, adjustments to long run trends and crises due to speculation on changes in the peg. **adjusted \( R^2 \)** (also known as \( R^2 \), \( R \) bar squared).

The COEFFICIENT OF DETERMINATION adjusted for DEGREES OF FREEDOM, bearing the relationship to the unadjusted coefficient.

\[
\tilde{R}^2 = 1 - \left( \frac{n-1}{n-k} \right) (1 - R^2)
\]

where \( n \) is the number of observations, and \( k \) is the number of explanatory variables. While it is not possible for the unadjusted \( R^2 \) to decline as more explanatory variables are
added, if the latter do not significantly add to the explanatory power of the equation, then $R^2$ will decrease. This figure thus provides a valid way of comparing the explanatory power of equations containing different numbers of explanatory variables. (See GOODNESS OF FIT.)

**adjustment lag.** The time taken for a variable such as CAPITAL STOCK to adjust to changes in its determinants. (See PARTIAL ADJUSTMENT, CAPITAL STOCK ADJUSTMENT PRINCIPLE.)

**adjustment process.** The generic term for the adjustment mechanisms which operate in the international economy to remove imbalances in foreign payments. The most important mechanisms which have been advanced to explain the process are those involved in the GOLD STANDARD, the GOLD EXCHANGE STANDARD, the FOREIGN TRADE MULTIPLIER and the FLOATING EXCHANGE RATE.

**administered prices.** Prices which are established by the conscious decision of some individual or agency rather than by the impersonal play of market forces. Administered pricing is generally possible where a good is sold by a MONOPOLY firm or public body.

**administrative lag.** One of the lags in time affecting the impact of a MONETARY POLICY. It is the time between the recognition by the authorities that action is necessary and the actual taking of the action. Its length depends on the efficiency of the authorities and whether they believe in prompt action or infrequent but more major changes. (See INSIDE LAG.)

**ad valorem tax.** A tax based on the value of a transaction. It is normally a given percentage of price at the retail, wholesale or manufacturing stage and is a common form of SALES TAX. Examples are the retail sales tax which is common in the USA, the VALUE-ADDED TAX widely employed in Europe and the PURCHASE TAX formerly employed in the UK. Another common example is ROYALTIES levied on the production of minerals. Frequently, the INCIDENCE of this type of sales tax will be at least partly on the consumers of the products concerned and as everyone pays the same amount of tax on a unit purchase irrespective of his income this type of taxation is said to be REGRESSIVE.

**advance.** A loan, whether against an identified or an expected inflow of cash. (See BANK LOAN.)

**Advance Corporation Tax (ACT).** When a company in the UK makes a distribution of dividends it has to pay advance corporation tax at the rate of 1/3 of the distribution (in 1990-91). As the name suggests it is an advance payment of CORPORATION TAX and is credited against its liability for that tax. It is a device to collect some corporation tax earlier than otherwise would be the case. It is noteworthy that when taxable profit is not big enough to 'cover' all dividend payments ACT cannot be fully recouped against corporation tax. The existence of ACT in this situation means that imputation credit cannot be claimed by shareholders without corporation tax being paid by the company. The maximum ACT which can be set off against corporation tax liability is the amount which after being added to the dividend equals the taxable profit. The rules allow a surplus of ACT to be carried backwards for two years against taxable income and forward without limit. In recent years many firms in the UK have experienced unrelieved ACT because of low profits and high capital allowances.

**advance refunding.** A new DEBT MANAGEMENT technique used by US federal, state, and local governments. The US Treasury may want to extend the average maturity of its marketable securities. This can be done by offering owners of shorter issues the opportunity to buy new longer issues. To coax security owners to make the exchange, slightly higher yields are offered. While the higher yields increase the cost of servicing the debt, the longer maturity of the debt reduces the number of times the Treasury must borrow. State and local governments use this technique when their bond ratings have improved and they are able to take advantage of lower interest rates. State and local governments call in their old higher-yield, lower-rated securities in exchange for new lower-yield, higher-rated securities.
8 advanced countries

advanced countries. The dividing line between advanced countries and DEVELOPING COUNTRIES is usually based on per capita income. Those with per capita incomes of less than one-fifth of the level of those in the US are considered ‘underdeveloped’. It is not an absolutely clear definition as there are some countries, for example, Middle East oil producing countries which on this criterion would be advanced countries, but which, when the INCOME DISTRIBUTION and availability of various services are taken into consideration, are obviously not very advanced. (See UNDERDEVELOPMENT)

adverse balance. A BALANCE OF PAYMENTS DEFICIT.

adverse selection. The problem encountered in the INSURANCE industry that the sub-population taking out insurance is likely to have less favourable characteristics than the population in general. In establishing the rates of premium for e.g. life insurance a company may use the age-specific mortality rates for the population as a whole. Non-smokers know that their mortality rates are less than the population as a whole and that they are subsidising smokers in the premium payment. They will, therefore, be reluctant to insure themselves. Smokers have higher mortality rates than the population as a whole and are aware that they are being subsidised by non-smokers. They have an incentive to insure themselves. The insurance company ends up with an adverse selection of people with higher than average mortality rates. The problem can be overcome by the introduction of policies targeted at specific sub-populations with different premia for each such population.

advertising. Action by a firm to promote the sales of its products, the basic aim being to increase the number of consumers who prefer these products to those of its competitors. This can be achieved in two different ways. Firstly, advertising can be used to inform consumers of the existence and location of the product(s) to which it is directed. Secondly, advertising can influence the nature of consumers' preferences to the benefit of the firm's products. It has been argued that advertising is a source of MARKET IMPERFECTION, in particular, by contributing to BARRIERS TO ENTRY and PRODUCT DIFFERENTIATION, established firms are given an element of discretion over price. In this way, advertising can sustain existing levels of concentration within the industry. Further, N. KALDOR has argued that because advertising is not a marketable product, consumers are not given the opportunity to determine the volume of advertising they wish to consume. On the other hand, advertising is a source of information on prices and product attributes available to potential buyers. In this way, advertising enhances information flows between traders and thereby strengthens competitive market forces. By enhancing sales, advertising may also enable firms to secure a MINIMUM EFFICIENT SCALE and thereby acquire ECONOMIES OF SCALE. Recent theoretical and empirical work has suggested that advertising be treated as a CAPITAL EXPENDITURE. This suggestion recognizes that advertising expenditures contribute to a stock of GOOD-WILL which decays gradually over time.

advertising-sales ratio. The ratio of firms' advertising expenditure to total sales revenue. Rivalry in more highly concentrated market structures tends to take the form of non-price competition, hence we can expect CETERIS PARIBUS, the intensity of advertising (as measured by the advertising-sales ratio) to increase as we move from a perfectly competitive market structure to oligopolistic market structures. (See ADVERTISING.)

AFL-CIO. See AMERICAN FEDERATION OF LABOR.

age-earnings profile. The relationship between earnings and age. The simplest age earnings profile would be a horizontal line stepping up from zero at the age of leaving school with the size of step being determined by the quantity of schooling. In fact the typical post-school age-earnings profile is more complex than this: the pattern for annual earnings is for a steep increase on leaving school followed by a slower increase until a plateau is reached in the mid-forties, after which a slow and then a faster descent occurs. The modern explanation of the parabolic path of earnings is that after leaving school the individual does not cease to invest in his HUMAN CAPITAL. He is still willing to
certain fraction of his potential earning power, thereby reducing current earnings, so as to accumulate capital and raise his earnings at later stages of his life cycle. Because the period over which the investment can be amortized becomes shorter as the individual approaches retirement, he will devote a smaller and smaller proportion of his potential earnings to investment and his stock of human capital will grow at an ever decreasing rate. Eventually investment will no longer exceed depreciation and the stock of human capital will actually shrink and subsequently observed pay will decline.

Agency for International Development. See INTERNATIONAL DEVELOPMENT Co-OPERATION AGENCY.

agency shop. The requirement that workers entering employment do not have to join the trade union but do have to pay union dues. The arrangement is a compromise, frequently found in the US between those who argue that the worker should be free to join a union or not, and those who argue he should not enjoy the benefits that union representation ensures without paying for them. (See CLOSED SHOP.)

agglomeration economies. Cost savings in an economic activity which result from enterprises or activities locating near one another. Examples of such savings include the clustering of retail establishments which permits consumers to make price comparisons without multiple journeys, the efficient use of information where contact between buyers and sellers is facilitated, the spreading of costs of public services and the development of specialized input suppliers serving a number of consumers in the surrounding area. In the last case, cost reductions arise through ECONOMIES OF SCALE and SPECIALIZATION in the supplying firms, thus they are said to be internal to these firms. Agglomeration economies are an example of EXTERNAL ECONOMIES where one firm's activities confer benefits on other firms. (See also URBANIZATION ECONOMIES, CONGESTION COSTS.)

aggregate concentration. The degree to which production within a sector of the economy or the economy as a whole, is concentrated in the largest few corporations. (See CONCENTRATION, CONCENTRATION RATIO.)

aggregate demand curve. The schedule detailing the quantity of NET NATIONAL PRODUCT that would be purchased at each general price level as shown below. The curve shows the combinations of output and the price level at which the commodity and money markets are simultaneously in equilibrium. In contrast to the individual DEMAND CURVE the aggregate curve does not reflect the ordinary SUBSTITUTION EFFECT of a rising price reducing demand. Rather in this case the rising price reduces the equilibrium level of output demand by reducing the REAL MONEY SUPPLY and thus raising INTEREST RATES and lowering INVESTMENT. (See also AGGREGATE SUPPLY CURVE, AGGREGATE EXPENDITURE.)

\[ Y = C + I + G + (X - M) \]

In the simple INCOME-EXPENDITURE MODEL the volume of aggregate expenditure determines the volume of output and employment. The volume of these expenditures
aggregate income may vary systematically with changes in the general price level. (*See Aggregate Demand Curve.*)

**aggregate income.**
*See National Income.*

**aggregate output.**
*See National Income.*

**aggregate production function.** A functional relationship between the flow of output in the whole economy (Y) and the total labour (L) and total capital (K) inputs actually engaged in production. This is usually written as

\[ Y = F(K, L) \]

It may be extended to include LAND as an input, and technology.

Such a relationship is usually taken as referring to the maximum flow of output associated with the factor inputs. While K and L are stocks it is the flow of capital and labour services which are considered as inputs to the process of production. The aggregate production function in common with aspects of the microeconomic Production Function is usually assumed to have one of two forms:

1. Fixed coefficient, which does not allow Capital-labour substitution and allows either some labour or some capital to be unused. Along any EXPANSION PATH the ratio of aggregate capital stock used to labour force actually used is constant.

2. Continuous, which allows for the substitution of aggregate capital for labour in the production of output.

Great controversy has surrounded the use of aggregate production functions particularly of the continuous variety. Criticism has come in particular from the Cambridge School who question the existence of such a phenomenon, at least at the aggregate level, and the corresponding use of the Marginal Productivity Theory of Distribution as an explanation of the economy-wide distribution of income between capital and labour. In the view of the Cambridge School, to be acceptable the aggregate production function should not suffer from the problem of RESwitching of techniques while Perfect Competition is necessary for a marginal productivity theory of distribution to account for the shares of income. (*See well-behaved, Euler's Theorem, Cobb-Douglas Production Function, Constant Elasticity of Substitution Production Function.*)

**aggregate supply curve.** The schedule detailing the quantity of Net National Product that would be supplied at each general price level given constant price expectations, as shown below. In the short run the positive slope derives from the hypothesis that workers do not adjust their expectations about the future level of prices to take account of the current movement in prices. In consequence the rise in nominal wages that accompanies the rise in prices is mistaken for a rise in real wages and hence more labour is offered and more output produced. The rise in nominal wages follows from the increase in the Marginal Revenue Product of output due to the rise in prices which encourages employers to increase output. In the short run the only way this can be accomplished is by employing more labour and hence they offer higher wages to secure this. The rise in wages does not match the rise in prices and the real wage therefore falls, a necessary condition on this view for increased employment. In the long run, however, increased labour will only be forthcoming if the real wage rises - labour supply is assumed to be a function of the real wage -
agricultural reform

and therefore this situation cannot be sustained. Workers revise their expectations to take account of the movement in prices and the aggregate supply curve moves upwards with output and employment falling back to their previous levels. In the long run the aggregate supply curve is vertical above the full employment level of output which corresponds to the natural rate of unemployment. (See also aggregate demand curve and vertical Phillips curve).

aggregation problem. The problem of deriving predictable macroeconomic behaviour from the behaviour of the underlying microeconomic units. Any attempt to derive macroeconomic or aggregate consumer behaviour from individual consumer preferences runs into problems treated by the impossibility theorem, while attempts to derive aggregate firm behaviour encounter the problems associated with the aggregate production functions. (See composite commodity theorem).

agrarian revolution. The situation where agricultural output is substantially increased due to changes in organization and techniques. Economic development is usually associated with both industrialization and an agrarian revolution. The latter may require a change in social or legal arrangements, such as the abolition of the communal ownership of land, and the introduction of capital in the form of machinery and of improved strains of animals and plants. The associated rise in productivity per worker makes available a surplus of food for export to the growing cities or to foreign countries for cash and also releases labour for re-employment in the industrial sector. (See Lewis-Fei-Ranis model, Todaro model.)

agricultural earnings. The earnings of those engaged in the agricultural sector: in developing countries there is a major disparity between urban and rural wages. The problem of large numbers of people moving away from the rural areas can be largely explained by the very low agricultural earnings compared to urban wage levels. Often agricultural earnings cannot easily be quantified, especially in subsistence agriculture or where earnings are paid in kind, i.e. in agricultural produce.

agricultural exports. Agricultural products produced specifically for export and not for subsistence purposes or home markets.

agricultural lag. This is the time gap between actual and potential agricultural production in developing countries. With an increasing number of people in these countries moving to the cities, the supply of food and other agricultural raw materials has to expand in order to satisfy the needs of the increased urban population. If there is a shortfall, food will have to be imported, increasing the burden on the industrial sector and producing a lag in the development process.

agricultural levies. See EC agricultural levies.

agricultural reform. One of the major obstacles to economic development is the use of primitive and inefficient methods of agriculture. The rural sectors in less developed countries have to support an increasing urban population in terms of supplying basic foodstuffs. The old primitive methods are inefficient, yet new modern mechanized techniques are usually unsuitable, so one of type of reform is the implementation of an appropriate style of agricultural technology. For example, hand-drawn ploughs, though widely used, are very inefficient, yet the small farmer cannot afford a tractor and even if he could he does not have the knowledge or equipment to maintain it. However, bullock-drawn ploughs have been introduced as a kind of intermediate level of technology; with great success in many situations.

Furthermore, there is great need for reform in the system of land ownership, where often one of two extremes can exist: the land is sometimes too fragmented in terms of ownership, with no-one owning enough to implement any efficient production methods or produce food for marketing in excess of his subsistence requirements. The other extreme is the situation of excessively large estates, sometimes owned by absentee landlords so that arable land is not even being utilized. Useful reforms here are the setting up of co-operatives in the first instance, and
setting ceilings on land-holding in the latter case so that the available land becomes more equally distributed amongst the population.

Other agricultural reform has included government assistance in the form of seeds, fertilizers, advice from agricultural experts and cheap loans to buy equipment. *(See LAND REFORM AND TENURE, TECHNOLOGY, CHOICE OF.)*

**agricultural sector.** The sector or part of a population that is involved in agricultural work, providing food or raw materials such as cotton or timber for home consumption or export. There is a tendency, which although present in some ADVANCED COUNTRIES, is much more marked in DEVELOPING COUNTRIES, for this to be the lowest paid sector of the economy, or to consist of subsistence agriculture to a major extent.

**Agricultural Stabilization and Conservation Service (ASCS).** The local administrative arm of the US COMMODITY CREDIT CORPORATION. This agency relies heavily on county, state, and regional offices. The county level organizations are run by three- to five-person committees elected by local farmers. These local committees have broad powers, within guidelines set nationally, to determine appropriate patterns of compliance with specific commodity programme decisions. There is a Soil Conservation Service and an Agricultural Conservation Service, both of which are part of the ASCS.

**agricultural subsidies.** Payments made to farmers for the purpose of encouraging food production and supporting the incomes of farmers. As a consequence of the UK’s entry into the EUROPEAN COMMUNITY, the pre-existing British system of agricultural subsidies has been replaced by the operation of the COMMON AGRICULTURAL POLICY which supports agricultural producers’ incomes principally through direct intervention in markets to maintain the prices of agricultural products.

**Agricultural Wages Boards.** Statutory bodies which determine minimum rates of pay for agricultural workers in England and Wales and in Scotland in the same manner as WAGES COUNCILS.
allowances and expenses for income tax. Income tax systems contain a system of allowances and expenses. These are subtracted from gross income to determine taxable income. In the UK there are many allowances in the personal income tax system. For 1991-2 there was a single person's allowance of £3295, and a married couple's allowance of £1720. In both cases individuals born before April 1927 are entitled to higher allowances. There are various other allowances such as those for blind persons, dependent relatives and housekeepers. The income tax system also permits certain expenses to be claimed and similarly deducted. These depend on the pattern of expenditure and on the type of expense. Thus expenditure on special clothing required for a particular job may be allowed as this may qualify as a necessary expense in pursuing that employment. The main reliefs not related to the nature of the employment are contributions to superannuation schemes.
Almon lag

and interest paid on mortgages or other loans for house purchase up to a maximum of £30,000. (See ALLOWANCES AND EXPENSES FOR CORPORATION TAX.)

Almon lag. A DISTRIBUTED LAG formulation in which the weights on successive values of the lagged variable follow a pattern dictated by a POLYNOMIAL. For instance, a second degree polynomial may result in an inverted U-shape of weights over time.

alpha coefficient.
See CAPITAL ASSET PRICING MODEL.

alternative technology. One of the names usually given to a type of technology which has some or all of the following attributes: minimum usage of NON-RENEWABLE RESOURCES; minimum interference with the environment; either regional or local self-sufficiency; and the absence of exploitation or ALIENATION of individuals. (See INTERMEDIATE TECHNOLOGY, APPROPRIATE TECHNOLOGY, INTERMEDIATE TECHNOLOGY DEVELOPMENT GROUP.)

altruism. Concern for the well-being of others. Thus, the UTILITY FUNCTION of an individual may exhibit the form:

\[ U_i = U(X, Y, U_j) \]

where \( X \) and \( Y \) are goods consumed by individual \( i \), and \( U_j \) is the UTILITY of another individual, \( j \).

amalgamation.
See MERGER.

American Depository Receipt (ADR). A security issued by a US bank normally to a US resident against a holding by the institution of ORDINARY SHARES in a foreign company. The holder of the ADR acquires the right to the DIVIDENDS etc. of the foreign company. The ADRs are themselves traded. The advantages of the arrangement are that the CAPITAL MARKET is widened for non-US companies, while the American desire for an easily-traded ‘heavy’ share can be satisfied. (An ADR may be packaged so that it is title to many ordinary shares).

American Federation of Labor (AFL).
own portfolio. Second, members supply commission BROKERS who buy and sell for their clients and floor brokers who buy and sell for other brokers not on the floor of the exchange. Some members are specialists in a particular stock while a few are odd-lot traders.

The American Stock Exchange is very old and began when brokers met out in the street to trade shares of stock. That is the source of its other name, the 'curb exchange'. Hand signals were used to inform the clerk of the transaction. Not until the twentieth century did the American Stock Exchange move indoors. (See STOCK MARKET.)

amortization. The method of liquidating a debt on an instalment basis; for example an amortized loan would be one where the principal amount of the loan would be paid back in instalments over the life of the loan. Sometimes used as an alternative term for DEPRECIATION.

amplitude. The term used in a TRADE CYCLE to describe the distance between the PEAK and TROUGH of any one cycle. Amplitude may be constant in successive cycles, may diminish, in which case the cycle is said to be damped or it may increase, when the cycle is said to be explosive or anti-damped.

Amtorg. The foreign trading agency of the former USSR. The agency has branches in roany countries. The Russian name for this agency is the root of the acronym.

analysis of variance. (also known as ANOVA). The breakdown of the total variation in a dependent variable (with total variation defined as the sum of squared deviations from its mean) into the proportions which are accounted for by variation in individual variables, or groups of EXPLANATORY VARIABLES, and the unexplained or RESIDUAL variation. This can provide the basis for testing hypotheses about the significance of either individual variables, or subsets of explanatory variables in REGRESSION analysis.

anarchy. The doctrine that social and economic affairs of individuals ought not to be restricted by any government interference. It is a more extreme view than that of LAISSEZ-FAIRE or LIBERALISM which allow the usefulness of authoritarian power to regulate those activities which individuals cannot accomplish efficiently by themselves. Mikhail Bakunin (1814-76) is regarded as the leading proponent of such a system of social organization based on individual self-control. In recent years a synthesis of the theory of anarchy and private ownership has emerged in the USA and it is argued that private control of most of the functions performed by governments in capitalist countries is both possible and desirable. One view put forward by David Friedman is that government taxation is a form of theft.

anchor argument. One of the issues relating to freely fluctuating EXCHANGE RATES is the argument that free exchange rates would eliminate external deficits and so deprive MONETARY AUTHORITIES of a (political) anchor to restrain monetary expansion. The other side of the argument is that to remove this monetary anchor of fixed exchange rates is a good thing as it only hinders newly elected policy-makers by not allowing them complete freedom with MONETARY POLICY.

animal spirits. An explanation of INVESTMENT which rejects mathematical models as of little use, and instead analyses investment as deriving from the animal spirits or whims of entrepreneurs. The term was first used by J.M. KEYNES in The General Theory of Employment, Interest and Money (1936), but has since been much popularized by Joan ROBINSON.

Annecy Round. The second round (1949) of trade negotiations under the GENERAL AGREEMENT ON TARIFFS AND TRADE.

annual allowances. See CAPITAL ALLOWANCES.

annual capital charge. A technique of appraising capital projects which employs DISCOUNTING and recognizes that the use of capital involves interest on the amount employed and depreciation. To discover whether a project is acceptable it is necessary to discover whether the net cash flows cover both the minimum required interest cost (or COST OF CAPITAL) and the DEPRECIATION of the asset. The method involves
the calculation of the average annual charge or depreciation plus interest and comparing this with the annual net cash flow. If the net cash flow is greater than the capital charge the project is acceptable. The annual capital charge method charges depreciation on a SINKING FUND basis - its distinctive feature - and does so in such a way that the full capital invested is recovered at the end of the project's life. Interest is charged on the whole initial capital throughout the project's life, the idea being that only then is it recovered. On some projects where the NET PRESENT VALUE and INTERNAL RATE OF RETURN criteria both indicate acceptability the annual capital charge method does the same.

**annuity.** A promise to pay a given sum each period over a number of periods, the sum in each period being constant. If the payments are made over an infinite period of time the annuity is called a perpetuity and has a PRESENT VALUE of

\[ \frac{P}{r} \]

where \( P \) is the sum paid each period and \( r \) is the discount rate.

**anomalies, pay.** A break in the formal linkages between the pay of different bargaining groups as a result of the introduction of an INCOMES POLICY. For example, the imposition of a freeze may prevent some occupations in a JOB CLUSTER from achieving a settlement in line with the KEY RATE because their settlement date falls after the starting date of the new policy. (See also RELATIVITIES; WAGE DIFFERENTIALS.)

**anticipated inflation.** 
See EXPECTED INFLATION.

**antilogarithm.** The inverse function of a LOGARITHM, simply the base of the LOGARITHM; raised to the power of the number whose antilogarithm is required.

**anti-trust.** An American term for legislation to control the growth of market power exercised by firms. The term relates not only to anti-monopoly policy but also to restrictive practices operated by individual firms, groups of amalgamated companies (TRUSTS) and groups of cooperating firms (CARTELS). In the US the intent to possess monopoly power by means of merger and acquisition, and its exercise through non-normal business practices is declared illegal. Non-normal business practices or RESTRICTIVE PRACTICES include such behaviour as PRICE DISCRIMINATION, PRICE LEADERSHIP, and exclusive dealing. Such a policy has been called 'non-discretionary anti-trust' in contrast to the UK legislation on monopolies and restrictive practices where collective agreements and mergers are considered on the grounds of public interest, and a balance is sought between their merits (such as economies of scale) and demerits (such as restrictive practices and X-INEFFICIENCY.) (See CELLAR-KEFAUVER ACT, CLAYTON ACT, FEDERAL TRADE COMMISSION ACT, ROBINSON-PATMAN ACT, SHERMAN ACT).

**appreciation.** A rise in the value of an ASSET, the opposite of which is DEPRECIATION. An asset may appreciate in value because its PRICE and hence its market value has risen because of INFLATION or a change in DEMAND for the asset which leads to increased scarcity value. (See also CURRENCY APPRECIATION).

**apprenticeship.** 
See GENERAL TRAINING.

**appropriate products.** Generally discussed with reference to products which are appropriate for USE in DEVELOPING COUNTRIES. It is argued by some economists that through INTERNATIONAL TRADE and MULTI-NATIONAL COMPANIES inappropriate products are often introduced into less developed countries as well as inappropriate technology. Multinational companies will have developed products suitable for the conditions pertaining in Western economies. They tend to use the same materials in developing countries where they will often be inappropriate. For example, building materials suitable for cold weather conditions and for sustaining twenty-floor blocks of flats may not be the most appropriate to employ in the construction of single- or two-storey houses in Africa. The use of APPROPRIATE TECHNOLOGY often goes hand in hand with appropriate products.
appropriate technology. The application of technology which is appropriate for the ENDOWMENTS that exist. Underdeveloped countries usually have a large labour force and relatively little investment capital, thus making LABOUR-INTENSIVE industry the most appropriate. (See ALTERNATIVE TECHNOLOGY, INTERMEDIATE TECHNOLOGY, INTERMEDIATE TECHNOLOGY DEVELOPMENT GROUP.)

appropriation account. Businesses keep accounts showing how profits after taxes are allocated or appropriated. Normally the bulk of such funds will be paid out in DIVIDENDS and/or transferred to reserves. This account indicates how net profits are utilized. None of the items in this account are thus deductible in the calculation of taxable profits. (See ALLOWANCES AND EXPENSES FOR CORPORATION TAX, ALLOWANCES AND EXPENSES FOR INCOME TAX, TAXABLE INCOME.)

approval voting. A form of decision-making in which each individual votes for each of a set of alternatives of which he 'approves'. The alternative which receives the highest number of approval votes is then chosen. Approval voting is one of a number of mechanisms of COLLECTIVE CHOICE which have been proposed as alternatives to the simple system of majority voting in which any alternative obtaining more than half the number of possible votes is chosen. Unlike a simple MAJORITY RULE system, approval voting does not give rise to the inconsistent results known as the PARADOX OF VOTING. (See BORDA COUNT, CONDORCET CRITERION, SOCIAL DECISION RULE, SOCIAL WELFARE FUNCTION.)

a priori. A term which describes a process of deductive reasoning from initial premises to conclusions. Such an approach may be contrasted with one based on induction from observed facts. In some cases, the results of a priori reasoning may be compared with empirical evidence in order to test a hypothesis. However, many of the theorems of welfare economics cannot be tested against evidence and their validity rests upon the correctness of the premises from which they are logically deduced. Thus, welfare economics is often described as being a priori.

Aquinas, St Thomas (1225-74). An Italian scholar, he was the major contributor to economic thought of the Schoolmen or Scholastics.

In terms of economics, he accepted much of the theory advanced by ARISTOTLE, including the concept of a JUST PRICE. He made a distinction between PRICE and VALUE which is subject to various interpretations. The idea of value or just price meant no more than the normal (competitive) price inherent in a good and a price charged above it was a breach of the moral code. Trade is inherently evil but is justified by the good of the public. Similarly wealth, property and state action are justified with reference to the public good. Usury is condemned as payment for the use of money which has no use value.

His major contributions to the history of economic thought are contained in his Summa theologica.

arbitrage. An operation involving simultaneous purchase and sale of an asset, e.g. a commodity or currency, in two or more markets between which there are price differences or discrepancies. The arbitrageur aims to profit from the price difference; the effect of his action is to lessen or eliminate it.

arbitration. Intervention in an INDUSTRIAL DISPUTE at the request of the parties to the dispute by an independent and impartial third party who makes a recommendation for resolving the dispute which is then binding on both parties. (See also CONCILIATION, FINAL OFFER ARBITRATION.)

arc elasticity of demand. See ELASTICITY OF DEMAND.

ARIMA forecasts. Forecasts generated from 'Autoregressive Integrated Moving Average' TIME SERIES models. These models rely on capturing all of the time series characteristics of a variable (its trend, cyclical properties and other systematic elements) by relating its current value to its own lagged values in a variety of ways. (See also BOX-JENKINS.)

ARCH. This refers to Autoregressive Conditional heteroscedasticity which is a test to distinguish between serial correlation in
ARCH effect

the disturbance term and an effect arising from the variance of the disturbances called the ARCH EFFECT. Thus in a model having disturbances which are free of serial correlation the DURBIN-WATSON STATISTIC may indicate significant serial correlation, an effect which arises from the time dependence of the variances of the disturbances. The ARCH test attempts to distinguish between true serial correlation and an ARCH effect arising from intertemporal dependence of the variances. (See R.F. Engle, 'Auto-regressive conditional heteroscedasticity with estimates of the variance of UK inflation', *Econometrica*, Vol. 50, 1982, pp 987-1007)

ARCH effect.
See ARCH.

Aristotle (384–322 BC). Greek philosopher whose work also covered economic matters and in whose writings can be found analyses of production, distribution and exchange. In analysing exchange he distinguished between USE VALUE and EXCHANGE VALUE and offered a theory of money as a conventional device for indirect exchange. His condemnation of the use of money to produce more money had a great influence on the medieval debate on usury. He defended the institution of private property against the Platonic scheme of communism, largely for its influence on character and the promotion of responsibility.

arithmetic mean.
See MEAN.

arithmetic progression. A series of numbers or algebraic terms in which each element bears an additive relationship to its predecessor and successor. The series

\[ a, a + d, a + 2d, \ldots, a + nd \]

is an arithmetic progression. (See also GEOMETRIC PROGRESSION.)

Arrow, Kenneth J. (1921– ). American economist, joint winner of Nobel Prize in Economics in 1972 with Sir John Hicks. He is best known for his work on GENERAL EQUILIBRIUM systems and for the statement of the mathematical conditions necessary for such a system to have a unique and economically meaningful solution. He has also done pioneering work on decision-making under conditions of uncertainty. In his *Social Choice and Individual Values* (1951) he presented WELFARE ECONOMICS with a dilemma when he demonstrated on the basis of assumptions which broadly secure consumers' sovereignty plus rationality, that it is normally impossible to define a social ranking of alternative choices which will correspond to individual rankings, so that it may be impossible to devise a SOCIAL WELFARE FUNCTION that is positively related to individual choices; society might be unable to make up its collective mind as to what it wants. Arrow is also responsible for the introduction into growth theory of the hypothesis of learning by doing as a source of productivity growth. His major publications are *Studies in Mathematical Theory of Inventory and Production* (1958); *Social Choice and Individual Values* (1951); *Essays in the Theory of Risk-bearing* (1970); *General Competitive Analysis* (with F.H. Hahn) (1971).

'A' shares.
See FINANCIAL CAPITAL.

Asian Development Bank. The United Nations Economic Commission for Asia and the Far East recommended the creation of this bank to encourage economic growth and co-operation in Asia and the Far East and to accelerate economic development in the developing countries in the area. It was established in 1966. The capital was provided by the countries within the region with the help of the US, West Germany, UK and Canada.

assessable income or profit.
See TAXABLE INCOME, ALLOWANCES AND EXPENSES FOR INCOME TAX, ALLOWANCES AND EXPENSES FOR CORPORATION TAX.

assessable profits.
See TAXABLE INCOME.

asset. An entity possessing market or exchange value, and forming part of the WEALTH or property of the owner. In economics an important distinction is made between 'real' assets, which are tangible resources like plant, buildings and land yielding services in production or directly to
consumers; and financial assets, which include MONEY, BONDS and EQUITIES, and which are claims or titles to receive income, or to receive value from others.

asset stripping. The sale by a predator company of some of the ASSETS of the VICTIM COMPANY after a TAKEOVER. This can be done at a considerable PROFIT, where, as is often the case, the assets have been undervalued on the STOCK EXCHANGE.

assignment problem. The name given to the question of whether it is possible always to assign one policy variable, e.g. MONETARY POLICY, uniquely to the attainment of one policy end, e.g. foreign balance, under all EXCHANGE RATE regimes. The conclusion is that it is impossible to do so.

assisted areas. Regions of a country within which economic activity is supported by government tax and expenditure policies which do not operate in non-assisted areas. The operation of such discriminatory policies is known as REGIONAL POLICY. In Britain, assisted areas have generally been designated as a result of such areas having UNEMPLOYMENT RATES significantly above the national average, but other criteria may be and have been used, such as income per head or rates of economic growth. Assisted Areas were first established in Britain in 1934 as the SPECIAL AREAS. These were subsequently reorganized and extended as the 'development districts' before becoming consolidated as the DEVELOPMENT AREAS in 1966. The category of SPECIAL DEVELOPMENT AREAS was added in 1967 and the INTERMEDIATE AREAS in 1970. In 1984 there was yet another restructuring into a two-tier system of Development Areas and Intermediate Areas, with considerable reclassification of individual areas and changes in the application of regional financial assistance. From April 1988 the Department of Trade and industry (DTI) abolished regional developments grants, so that regional assistance available in development and intermediate areas is now purely discretionary and is only provided, if the DTI is convinced that the investment would not otherwise take place. Enterprise initiatives were introduced in 1988 and are intended to help small and selected firms pay for consultancy advice. A distinct set of policies has always operated in Northern Ireland. (See DEPRESSED AREAS, REGIONAL EMPLOYMENT PREMIUM, REGIONAL DEVELOPMENT GRANT.)

Association of International Bond Dealers. An institution founded in 1969 which compiles and publishes current market quotations and yields for EUROBOND issues.

Association of South East Asian Nations (ASEAN). An association established in 1967 by the foreign ministers of Indonesia, Malaysia, the Philippines, Singapore and Thailand. The general aims of the association are the acceleration of economic growth, social progress and cultural development in the South East Asian region. Economic activities of the association include the co-ordination of regional industrial development projects and the introduction in 1978 of margins of TARIFF preference on basic commodities such as rice and oil. The association also collaborates with the United Nations Economic and Social Commission for Asia and the Pacific.

assurance. A type of INSURANCE relating to a situation where the cover is against an event that is inevitable. This can be because the contract is related to paying the specified sum on a particular date or on the death of the assured.

asymmetric information. Differences in information possessed by the parties to a market transaction. Buyers and sellers have unequal knowledge of the relevant information. This absence of PERFECT (i.e. equal) INFORMATION on the part of buyers and sellers precludes PERFECT COMPETITION. Perfect competition requires symmetric information. Asymmetric information is frequently encountered in labour markets where firms and workers often have unequal knowledge of the information necessary to set wages. Unequal knowledge of the productivity of existing and potential employees is one reason why firms may prefer their existing employees, called insiders, to new applicants for jobs, called outsiders. (See INSIDER-OUTSIDER MODELS.)

asymptote. A value to which the DEPENDENT VARIABLE of a function tends as the
asymptotic distribution. The probability distribution to which a statistic tends as the sample size approaches infinity. The concept is useful in assessing the large sample properties of econometric estimators.

atomistic competition. A market structure in which the number of firms is very large and hence each firm competes independently. (See perfect competition.)

attribute. A feature or 'characteristic' of a good. Thus a house may have as its attributes the number of rooms, the presence of a garage, central heating, proximity to shopping or business districts, a clean environment and so on. Note that attributes extend beyond the features of the good itself and can include features of the location in which the good exists. For other goods, such as electrical heating, say, the attributes may be those of convenience, cleanliness and comfort. Rather than speak of the demand for a good, therefore, some economists prefer to speak of the demand for attributes or characteristics. (See characteristics theory.)

augmented Dickey Fuller test (ADF). This test is a version of the Dickey Fuller test for a unit root when the disturbance term is serially correlated after differencing has been carried out in a difference stationary process (DSP). If the Dickey Fuller test (DF) for a unit root implies testing the null hypothesis $\beta = 0$ in

$$\Delta y_t = -\beta y_{t-1} + \epsilon_t$$

where $\Delta y_t = y_t - y_{t-1}$, where $\epsilon_t$ is serially correlated then the ADF test is testing the same null as for the DF in

$$\Delta y_t = -\beta y_{t-1} + \sum_{i=1}^{k} \gamma_i \Delta y_{t-i} + \epsilon_t$$

where $k$ is chosen to remove the serial correlation from $\epsilon_t$. A similar test, but with a different distribution, can be applied to the equilibrium error arising from a regression model which includes only a cointegrated set of variables (see cointegration). See R.F. Engle and C.W.J. Granger, 'Cointegration and error correction: Representation, estimation and test-
augmented Phillips curve. Introduction of a price variable into the basic PHILLIPS CURVE effectively transforming the theory from an explanation of money wages to one cast in real terms. Now:

\[ \Delta W_t = F(U_t) + a\Delta P_t^e \]

where \( \Delta W \) is the change in nominal wages, \( U \) the unemployment rate, and \( P^e \) the expected price change, all in period \( t \). That is, the wage determination equation suggested by Phillips has been augmented by the introduction of a price expectations variable. At low levels of inflation the distinction between money and real wages may be trivial so that the COEFFICIENT on price expectations may be close to zero. At high rates of price inflation the coefficient will rise until at the extreme, \( a = 1 \). The hypothesis that \( a = 1 \) forms the basis of the Phelps-Friedman approach which argues that the Phillips curve is vertical above the NATURAL RATE OF UNEMPLOYMENT. (See VERTICAL PHILLIPS CURVE.)

Austrian School. This name is applied to economists from Menger, Wieser and Bohm-Bawerk onwards who studied largely in Vienna, and who subscribed to a particular type of analysis. The school, through the writings of Menger, dissociated itself from the German HISTORICAL SCHOOL and subscribed to a belief in deduction and theory.

It developed a subjective theory of VALUE based on MARGINAL UTILITY in contrast to the prevalent cost of production (especially LABOUR THEORY OF VALUE) approach. The Austrian treatment of capital, whose productivity is held to arise from ROUNDABOUTNESS, is original and distinctive. Bohm-Bawerk’s work on capital and interest (the latter explained in terms of a relationship between TIME PREFERENCE and physical PRODUCTIVITY) has been a source of stimulus and controversy up to the present time. While Bohm-Bawerk devised his theory to establish conditions of long-run equilibrium, von Hayek adapted it to explain the cycle, in which the period of production falls in the upswing and increases in the downswing, since the period of production varies directly with the REAL WAGE and inversely with the RATE OF INTEREST. Modern Austrians include von Mises, von Hayek, Haberler and Machlup. The school is currently characterized by the attention it pays to market processes and RELATIVE PRICES, a feature which distinguishes it from the widely-accepted Keynesian aggregative approach.

autarky. A situation where a country isolates itself from international trade by restrictions such as tariffs, in an attempt to be self-sufficient, usually for reasons of employment or politics.

autocorrelation. See SERIAL CORRELATION.

automatic stabilizers. Relationships which reduce the amplitude of cyclical fluctuation in the economy without any direct action by government, FIRMS or individuals. One of the major benefits of automatic stabilizers is that their INSIDE LAG is zero. One of the most important stabilizers is a progressive INCOME TAX which, through its effects on saving, reduces the value of the MULTIPLIER as it operates on EXOGENOUS changes in AGGREGATE DEMAND.

automation. While used in various ways, the term 'automation' is generally regarded as being synonymous with the displacement of labour by some automatic process, e.g. controlling machine parts by other machines, automatic paint spraying and so on. Automation is typically associated with TECHNOLOGICAL UNEMPLOYMENT, but no such direct linkage need occur if automation permits increases in LABOUR PRODUCTIVITY which in turn permits the generation of ECONOMIC GROWTH.

autonomous expenditures. Expenditures which are considered to be independent of the level of income in the INCOME-EXPENDITURE MODEL. Government EXPENDITURE, certain types of INVESTMENT EXPENDITURE and EXPORTS are the principal examples. (See AUTONOMOUS INVESTMENT.)

autonomous investment. Capital investment which is unrelated to changes in income levels. Public investment, investment which occurs in direct response to in-
autonomous transactions. A term used in the theory of the BALANCE OF PAYMENTS to define those transactions, which take place spontaneously for reasons of gain or profit on the part of firms or increased utility on the part of individuals, e.g. the import of a foreign good, the taking of a holiday overseas. These transactions are to be contrasted with ACCOMMODATING or compensatory transactions which are related to the overall balance of the autonomous transactions. If the outcome of the autonomous transactions is an excess or deficiency of inward over outward payments the difference must be covered by a compensatory transaction, such as a change in foreign reserves or a foreign loan arranged specifically to meet the payments difference.

autonomous variables. See EXOGENOUS VARIABLES.

autoregression. The REGRESSION of a variable on its own lagged value, or values. (See also SERIAL CORRELATION and ARIMA.)

availability effects. The effects of changes in the quantity of CREDIT available, other than those effects operating through prices, i.e. rates of interest. These effects occur when for institutional reasons or other imperfections in the CAPITAL MARKET the availability of credit (loans) is regulated by non-price means, e.g. by banks restricting their advances by rationing or similar means. Monetary authorities may make use of such institutional factors to affect credit conditions in important sections of the capital market. (See ROOSA EFFECT.)

average. See MEAN.

average cost. Cost per unit of output, where the cost of all INPUTS (FACTORS OF PRODUCTION) are included. Thus, average (total) cost ($ATC$) may be written

$$ATC = \frac{TC}{X}$$

where $X$ is output and $TC$ is TOTAL COST. Average total cost will be comprised of average fixed costs ($AFC$) and average variable costs ($AVC$). Thus,

$$ATC = AFC + AVC$$

In the SHORT RUN the average cost curve will tend to have the shape shown in the diagram. This 'U' shape is accounted for by the fact that $AFC$ declines as output expands and initially more than outweighs the rise in $AVC$. $AFC$ falls since a fixed total cost is being spread over a larger and larger output. $AVC$ rises because of the operation of the LAW OF DIMINISHING RETURNS. Eventually the rise in $AVC$ more than outweighs the fall in $AFC$ and $ATC$ begins to rise. In the LONG RUN the shape is determined by the existence or otherwise of ECONOMIES OF SCALE. (See LONG-RUN AVERAGE COST.)

average cost pricing. A pricing rule which postulates that firms add a mark-up onto AVERAGE VARIABLE COSTS ($AVC$) so as to cover its AVERAGE TOTAL COSTS. Hence price ($P$) can be written as

$$P = AVC + GPM = AC$$

where $GPM$ is the gross profit margin mark-up and is comprised of an overhead element and a fixed net profit margin thought 'normal' or 'fair' for the industry. Given adoption of this rule supply considerations will be the predominant consideration in the price setting process. (See FULL COST PRICING.)

average expected income. See PERMANENT INCOME.
average fixed costs. The FIXED COST per unit output. In the short run, some costs will change regardless of the level of output. These fixed costs expressed per unit of output will then decline as output expands. Thus

\[ AFC = \frac{TFC}{X} \]

where \( AFC \) is average fixed cost, \( TFC \) is total fixed cost and \( X \) is output. Since \( TFC \) is a constant amount and \( X \) is variable, the equation for \( AFC \) is that of a rectangular hyperbola. (See AVERAGE COST.)

average product. The total output from using a set of inputs divided by the amount of any one of the inputs being used. Thus the average product of labour would be total product divided by the total amount of labour being used, and so on.

average productivity. See PRODUCTIVITY.

average propensity to consume. The proportion of aggregate income, \( Y \), that is spent on all consumption, \( C \). The average propensity to consume = \( \frac{C}{Y} \). It can be stated as a propensity to consume out of either NATIONAL INCOME or DISPOSABLE INCOME. (See also CONSUMPTION FUNCTION, MARGINAL PROPENSITY TO CONSUME.)

average propensity to save. The proportion of aggregate income, \( Y \), that is saved, \( S \). The average propensity to save = \( \frac{S}{Y} \). It may be stated as a propensity to save out of either NATIONAL INCOME or DISPOSABLE INCOME. (See also SAVINGS FUNCTION, MARGINAL PROPENSITY TO SAVE.)

average rate of tax. (also known as effective rate of tax.) Generally discussed with regard to personal INCOME TAX but could be applied to other types of taxes. Usually taken to mean total income tax payments as a proportion of income. The definition of income is normally the gross income, i.e. before allowances. With regard to company taxation the effective tax take is most usefully stated as tax payments as a proportion of resources generated (i.e. revenue minus capital and operating costs). The concept can also be applied to WEALTH TAXES or to an EXPENDITURE TAX system and to total tax burdens where total tax payments are expressed as a proportion of income.

average revenue. Revenue per unit of output. If output is denoted by \( X \) and TOTAL REVENUE by \( R \), then

\[ AR = \frac{P \cdot X}{X} = P. \]

That is, average revenue equals price. This means that any curve relating average revenue to output is the same as the DEMAND CURVE which relates price to output.

average revenue product. The average physical product of an input (factor of production) multiplied by the AVERAGE REVENUE. Since average revenue equals price, it is possible to write

\[ ARP = P \cdot APP \]

where \( P \) is the price of the product and \( APP \) is the average physical product.

average total cost. See AVERAGE COST.

average variable costs. The VARIABLE COST per unit of output. Thus, if \( TVC \) is total variable costs, average variable costs, \( AVC \) may be written

\[ ABC = \frac{TVC}{X} \]

where \( X \) is output. For the relationship to average cost see AVERAGE COST.

Averch-Johnson Effect. Refers to the profit-maximizing response of regulated firms which, in facing a given allowance rate of return on capital, have the incentive to choose input combinations which are more capital intensive than would have been employed in the absence of a set rate of return.

axiom of completeness. See AXIOMS OF PREFERENCE.
axiom of continuity.
See AXIOMS OF PREFERENCE.

axiom of convexity.
See AXIOMS OF PREFERENCE.

axiom of dominance.
See AXIOMS OF PREFERENCE.

axiom of selection.
See AXIOMS OF PREFERENCE.

axioms of preference. In CONSUMER DEMAND THEORY, individuals are assumed to obey axioms of RATIONALITY and other axioms of behaviour which, combined, form a testable theory of consumer behaviour. Although terminology varies, some six axioms are usually cited as being required for consumer theory based on indifference curve analysis. These are:

1. The axiom of completeness which simply states that the consumer is able to order all available combinations of goods according to his preferences.

2. The axiom of transitivity which states that if some combination of goods $J$ is preferred to another combination $B$, and $B$ is preferred to $C$ then (by transitivity) $J$ is preferred to $C$. Transitivity also applies to indifference relationships. Violation of the transitivity axiom is widely construed as an indication of irrationality.

3. The axiom of selection which simply states that the consumer aims for his most preferred state.

Axioms 1 to 3 are usually regarded as axioms of rationality. The remaining axioms are really assumptions about behaviour. They are:

4. The axiom of dominance. This states that consumers will prefer more of all goods to less. Also known as the axiom of 'greed', non-satiation (see SATIATION) or monotonicity.

5. The axiom of continuity. Effectively, this states that there is a set of points which form a boundary (an indifference curve) dividing those combinations of goods in COMMODITY SPACE which are preferred from those that are non-preferred. More easily thought of as an axiom which ensures that the indifference curve is a curve or line rather than a 'smudge'.

6. The axiom of convexity (of preferences). The assumption that the indifference curve is convex to the origin. Similar axioms are needed for REVEALED PREFERENCE.
backdoor financing. The practice under which a US government agency borrows from the US Treasury rather than requesting Congressional appropriations. Backdoor financing originated with the Reconstruction Finance Corporation in the 1930s. This agency was the first to be authorised to borrow from the Treasury. In recent years, other Federal agencies have increased their use of this financing technique.

back-haul rates. Freight or transport charges for some route, which are lower for movement in one direction than in the other. Most forms of transport require containers or vehicles which must be returned to the point of origin after each trip. Since it is unlikely that there will be exactly equal demand for transport in both directions, excess capacity will exist on the 'back' journey. It will be in the transport operator's interest to attempt to fill this capacity by charging lower rates for the 'back' journey.

backstop technology. A substitute technology, which becomes economically feasible once the price of a NON-RENEWABLE NATURAL RESOURCE has risen to a certain level as a result of cumulative extraction. For example solar energy may represent a backstop technology for oil and set an upper limit to the price of oil.

backward bending supply curve of labour. A negative relation between the supply of labour, however defined, and the real wage. The outcome may be viewed as signifying the dominance of the negative INCOME EFFECT over the positive SUBSTITUTION EFFECT (with respect to the particular supply measure). Historically, the supply curve of hours has followed this configuration. Even though at first sight it might appear that hours of work are largely influenced by institutional factors in the shape of trade unions and labour standards legislation, the latter may be thought of as being the institutional embodiments through which the preferences of the work force are registered. (See SECULAR SUPPLY CURVE.)

backward integration. See VERTICAL INTEGRATION.

backward linkage. The relationship between an industry or firm and the suppliers of its inputs. A change in the output of the industry will be transmitted backwards to the supplier of its inputs by a change in demand for inputs.

backwash effects. Backwash effects are said to operate where the economic growth in one region of an economy has adverse effects on the growth of other regions. These effects are said to consist principally of flows of FACTORS OF PRODUCTION (usually labour and capital) from slow growing to fast growing regions. The CUMULATIVE CAUSATION approach to regional economic growth argues that if one region's growth rises above that of its neighbours, backwash effects will reinforce the initial advantage, resulting in a widening gap between regional growth rates. Backwash effects are claimed to result from increased efficiency in production arising from the geographical concentration of activity. (See also AGGLOMERATION ECONOMIES.)

bad. A commodity or product which generates DISUTILITY for its consumer. While obviously ungrammatical, the term 'bad' is now quite widespread as a noun in economic literature. Especially used for EXTERNAL COSTS. (See EXTERNALITY.)

'Bad money drives out good'. See GRESHAM'S LAW.

Bagehot, Walter (1826-77). He was editor and co-editor of the Economist from 1860-77. An extremely influential commentator in his day, he is still widely quoted. His best known publication is Lombard Street: A Description of the Money Market (1873).
balanced budget. Current income exactly equals current expenditure. Most frequently used to describe the situation where government income, TAX RECEIPTS, exactly equals GOVERNMENT EXPENDITURE. (See also BALANCED-BUDGET MULTIPLIER.)

balanced-budget multiplier. The ratio of the change in real income to the change in GOVERNMENT EXPENDITURE when government expenditure and TAX REVENUES are changed by equal amounts. Thus where an increase of £1000 in government expenditure is financed by an extra £1000 in taxes and this leads to an increase in national income of £1000, then the balanced budget multiplier is 1. In general, however, we might suppose that the act of transferring £1000 from the private sector to the government would, in the framework of the simple INCOME-EXPENDITURE MODEL, lead to an increase in national income, some of the £1000 that was previously in the hands of the private sector will have been WITHDRAWN, saved, and not passed on in the CIRCULAR FLOW OF INCOME. In contrast the government has spent all of the £1000 and it is therefore a net INJECTION into the circular flow.

balanced economic development. The idea that all sectors of an economy should be developed simultaneously to achieve a balanced type of development. Some argue that it is not easy to define what constitutes the correct balance and that planned careful but unbalanced development is more appropriate. (See BALANCED GROWTH, BIG PUSH.)

balanced growth. In GROWTH THEORY a dynamic condition of an economy where all real variables are growing at the same constant proportional rate (which may be zero or negative). (See STEADY STATE GROWTH.)

balance of payments. This term is used in more than one sense, the two commonest interpretations being the 'market balance of payments' and the 'accounting balance of payments'. Used in the sense of a 'market balance' the term signifies the current or ongoing relationship between the two flows of payments, one coming in, one going out, in which a country is continuously involved. Much theoretical analysis of the balance of payments is concerned with 'balance' in this sense. It should be noted, however, that by its nature the 'market balance' is observable only in its effects, e.g. on the EXCHANGE RATE or the level of EXTERNAL RESERVES. AS an accounting balance the 'balance of payments' is a statistical statement summarizing all the external transactions in which a country is involved over a given period of time, say a year. The form of presentation of the balance of payments accounts varies between countries, and between different times for the same country, but most presentations divide the balance of payments items into two sections or sub-accounts. In the present UK presentation these divisions are termed 'current account', and 'transactions in UK assets and liabilities'. In the current account are placed all transactions involving currently produced goods, or currently rendered services. They include 'visible' trade transactions on merchandise account, and 'invisibles' which, broadly, cover payments for services like insurance, shipping and tourism; transfers of interest, profits and dividends currently earned on assets held abroad; and other transfers such as gifts and migrants' remittances. Often referred to as the capital account transactions in UK assets and liabilities include all payments arising from transfers of capital or ASSETS (plus all extensions of credit), official or private, which - roughly speaking - arise from considerations unrelated to the position of the balance of payments as a whole, e.g. profit possibilities and relative interest rates. A final 'balancing item' is shown in the accounts. This reconciles the discrepancy between the outturns on the current and capital accounts, as statistically recorded, and the actual total of official financing undertaken. The item arises from unrecorded transactions and from timing discrepancies between the recorded movement of goods (from which the trade items in the account are derived) and the actual payments for them. But it also points to the fact that since the accounts are constructed on the double-entry principles, so that every transaction is - in principle - recorded in two accounts, once as a debit, once as a credit, they must, given complete and accurate recording, produce a 'balance' in the sense of an equality of debits and credits.

It should be noted that the official accounts use a sign convention whereby in
### Summary Balance of Payments for the UK

<table>
<thead>
<tr>
<th>£ million</th>
<th>1988</th>
<th>1989</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CURRENT ACCOUNT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visible balance</td>
<td>-21,078</td>
<td>-23,840</td>
</tr>
<tr>
<td>Invisibles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services balance</td>
<td>4,502</td>
<td>4,709</td>
</tr>
<tr>
<td>Interest, profits and dividends balance</td>
<td>4,971</td>
<td>4,582</td>
</tr>
<tr>
<td>Transfers balance</td>
<td>-3,546</td>
<td>-4,577</td>
</tr>
<tr>
<td>Invisibles balance</td>
<td>5,927</td>
<td>4,714</td>
</tr>
<tr>
<td>Current balance</td>
<td>-15,151</td>
<td>-19,126</td>
</tr>
<tr>
<td>Transactions in UK assets and liabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK external assets</td>
<td>-56,244</td>
<td>-86,253</td>
</tr>
<tr>
<td>UK external liabilities</td>
<td>63,258</td>
<td>90,255</td>
</tr>
<tr>
<td>Net transactions</td>
<td>7,015</td>
<td>4,002</td>
</tr>
<tr>
<td>Balancing item</td>
<td>8,136</td>
<td>15,124</td>
</tr>
</tbody>
</table>

The current account a plus (+) indicates an outflow and a minus (−) an inflow of currently produced goods and services; while in the capital and 'official financing' sections a minus (−) indicates a flow (e.g. an 'export' of capital) which increases UK foreign assets (including external reserves) or decreases UK liabilities to non-residents. The examples here show figures for two years. See Johnson, C, *Measuring the Economy*, Penguin, Harmondsworth (1988).

**Balance of trade.** This normally means the balance on 'visible' trade, that is trade in goods on merchandise account, over a given period. Thus if exports of goods exceed imports the trade balance is said to be 'favourable' whereas an excess of imports over exports yields an 'unfavourable' trade balance. In fact the balance of trade is only one element, the other being invisibles, within the 'current balance' which is itself only one part of the total BALANCE OF PAYMENTS of a country.

**Balance principle.** A basic method of Soviet planning, which involves double-entry book-keeping in physical or price units. There are material balances for the production and distribution plans, labour balances for the labour plans, energy balances for the energy sector and financial balances for the financial plan. The purpose of the balances is to ensure consistency in the plans. The balances, which are less sophisticated than INPUT-OUTPUT tables, fulfil a similar role in planning. For a separate meaning see MATERIALS BALANCE PRINCIPLE.

**Balance sheet.** A statement which shows the WEALTH of a trader or company at a given date. Traditionally, a balance sheet was set out in two halves, the ASSETS on the right and the LIABILITIES on the left. However, a more common format today is the single column presentation showing the net asset position, followed by the method of financing that position. The example given
below shows this. The 1981 Companies Act, in order to incorporate the EC Fourth Directive, has a requirement for companies to produce accounts for shareholders in a specified format, with fuller disclosure than in the past. The example here does not attempt to follow this strict format, but illustrates the general principles.

**bancor.** The name given by KEYNES to an international currency which he proposed should be created by an international bank, used for settling international debts and which would constitute part of international liquidity. These proposals were part of the KEYNES PLAN for international monetary reform which were put forward at the BRETTON WOODS Conference in 1944. His proposals were rejected at that conference, but the Special Drawing Rights (SDRs) introduced by the INTERNATIONAL MONETARY FUND in the 1970s are a similar concept.

**bandwagon effect.** The effect whereby as the price of a good falls and demand by some sections or individuals in the community expands other individuals or sections 'imitate' the reaction and expand their demand also. If it exists it may mean that the MARKET DEMAND CURVE cannot simply be an aggregation of individual demand curves. Instead, demand will expand more than expected as additional consumers 'join the bandwagon', giving the market demand curve a gentler slope than would otherwise be the case.

**bank.** A FINANCIAL INTERMEDIARY which takes in funds principally as deposits repayable on demand or at short notice, and which it employs to make advances by OVER-

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**Balance Sheet of AB Ltd as at 31 December 1986**

<table>
<thead>
<tr>
<th></th>
<th>£</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed Assets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premises</td>
<td>10,000</td>
<td></td>
</tr>
<tr>
<td>Plant &amp; Machinery</td>
<td>6,500</td>
<td></td>
</tr>
<tr>
<td>Vehicles</td>
<td>3,500</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>20,000</td>
<td></td>
</tr>
<tr>
<td><strong>Current Assets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock</td>
<td>4,500</td>
<td></td>
</tr>
<tr>
<td>Debtors</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Cash at bank</td>
<td>1,000</td>
<td></td>
</tr>
<tr>
<td>Cash in hand</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6,250</td>
<td></td>
</tr>
<tr>
<td><strong>Less Current Liabilities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank loan</td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td>Sundry Creditors</td>
<td>750</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>(5,750)</td>
<td></td>
</tr>
<tr>
<td><strong>Financed by</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share Capital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10,000 Ordinary shares at £1 each</td>
<td>10,000</td>
<td></td>
</tr>
<tr>
<td>9,000 10% Preference shares of £1</td>
<td>9,000</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>19,000</td>
<td></td>
</tr>
<tr>
<td><strong>Reserves</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit &amp; Loss Account</td>
<td>1,500</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>20,500</td>
<td></td>
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</tbody>
</table>
RAFTS and LOANS, and by discounting BILLS, and to hold other, mainly financial assets such as marketable securities. An important banking function is to maintain a money transmission system by accepting deposits on CURRENT ACCOUNT and operating a system of transferring funds by CHEQUE, GIRO transfer or electronic transfer. Other important banking activities are providing FOREIGN EXCHANGE services for customers, financing foreign trade, operating in wholesale MONEY MARKETS and providing a wide range of financial advisory services. In a developed financial system only certain institutions cover all or most of these operations. In the UK the CLEARING BANKS satisfy this criterion, but the term 'bank' is by convention, and subject to regulation, applied to institutions like savings banks and MERCHANT BANKS which engage in some of these activities (along with others not listed). Yet other institutions, such as BUILDING SOCIETIES and FINANCE HOUSES in the UK, and SAVINGS AND LOAN ASSOCIATIONS in the US, engage in some of them but conventionally have not been termed 'banks'. In the UK the clearing banks occupy a central position in the financial system by virtue of their control of the money payments mechanism and because their deposit liabilities form a major component of the money stock. These facts, coupled with their earlier predominance as short-term lenders to business, caused them to be subjected to special control under monetary policy arrangements. In recent years, with the widespread diversification of many financial institutions and the growth of competition between them, the position is now recognized to have changed; and while the quantity of bank deposits does attract special attention as part of monetary control, present credit control arrangements do not concentrate, as formerly, on the clearing banks. The regulation of the banking system, in the sense of sustaining the strength and soundness of banking institutions, became a matter of heightened concern, following the SECONDARY BANKING crisis of 1974-6. In the UK while such regulation had been by no means absent, it had not been comprehensively applied under a single bank Act. This situation has now been remedied by the Banking Acts of 1979 and 1987.

The former Act made it illegal for a new institution to be established to take deposits unless licensed by the BANK OF ENGLAND; and all authorized deposit-taking institutions were divided into two classes, 'recognized banks' and LICENSED DEPOSIT TAKERS, with differing powers and conditions of operation. One consequence of this Act was to provide at least a formal definition of a 'bank' since only banks 'recognized' under the Act could so describe themselves. The second Act established a single category of authorized institution eligible to carry out banking business. Again authorization has to be obtained from the Bank of England, which has to be supplied on a regular basis with statistical information. The Bank of England has as part of its supervisory duty laid down minimum standards of capital adequacy and of liquidity.

Finally it should be noted that in other countries with different banking traditions, or in the international context, the term 'bank' is applied to a variety of institutions which provide funds, by no means always or even usually derived from deposits, for a variety of capital purposes, e.g. 'development banks', 'investment banks', 'mortgage banks' and so on. An international example is the INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT (the 'world bank').

(See COMPETITION AND CREDIT CONTROL, RETAIL BANKING, WHOLESALE BANKING.)

bank advance. A general term for any form of bank lending. In the UK the term is normally restricted to lending by way of OVERDRAFT or by an outright loan made on various terms. In the case of some European countries where bank lendings is conducted to a large extent through the DISCOUNTING of BILLS the use of the term may be extended to include such finance. In the UK the term does not normally include bill finance, though bankers do extend some CREDIT through this medium. (See BANK LOAN.)

bank bill. Traditionally, in the London bill market, a BILL which has been accepted by an ACCEPTING HOUSE, a CLEARING BANK, or one of a group of other British or ex-Dominions banks on behalf of a customer for whom an acceptance credit has been opened. By accepting a bill the institution concerned engages to pay it on maturity and because of the acceptor's standing such a bill may be discounted in the London market at the most favourable rates. Bank bills have
also traditionally constituted ELIGIBLE PAPER in terms of the operation by the BANK OF ENGLAND of its LENDER OF LAST RESORT function. Since the new monetary control arrangements, introduced in August 1981, greatly extended the list of banks whose name on a bill established it as ELIGIBLE PAPER to include all the major overseas banks operating in London, bills carrying their names must now be classed as bank bills. (See ACCEPTANCE, DISCOUNT HOUSE.)

Bank Charter Act. Usually refers to the Bank Charter Act of 1844 passed under Sir Robert Peel's administration. While renewing the BANK OF ENGLAND'S charter this Act introduced a major reform of the currency based on the monetary principles of the CURRENCY SCHOOL. The Bank's activities as a banknote issuer were separated from its other banking business, at that time extensive, and its powers of issue were limited to the amount of a fixed FIDUCIARY ISSUE plus notes equal in value to the gold held in the Issue Department which was set up to administer its issuing business. The profits of note issue, i.e. the income from the securities held against the fiduciary issue minus the costs of issue, were reserved to the Treasury. The same Act prohibited the setting up of any new banks of issue in the UK, put fixed limits on the note issues of the provincial banks of issue in England and Wales and provided for the lapse of their note issuing rights when they merged with others (as all eventually did).

Bank deposits. In simple terms, funds deposited in BANK accounts. In reality they are simply records of indebtedness of a bank to the depositor, and they arise from the character of banks as FINANCIAL INTERMEDIARIES. Deposits are held in various types of accounts, involving varying conditions of use or withdrawal. In the UK the two main types are termed current accounts - deposits which are withdrawable or transferable by cheque without notice - and DEMAND ACCOUNT balances which - in England and Wales, though not in Scotland - are formally subject to seven days' notice of withdrawal (though this is not strictly enforced). In the US the terms 'demand deposits' and 'time deposits' are used to denote balances in these two types of account. Current account deposits are universally regarded as forming part of the money stock, and in financially developed countries are the major component of it. Deposits in deposit accounts (time deposits) are excluded from certain definitions of the MONEY SUPPLY, e.g. M1 in the UK, but included in others, e.g. M3.

Bank for International Settlements. An intergovernmental financial institution originally established in 1930 to assist and co-ordinate the transfer of World War I reparations payments among national CENTRAL BANKS. Although a moratorium on reparations payments emerged soon after the bank began operations, it continued to provide facilities for international financial transactions and gradually emerged as a bank for central banks. The creation of the INTERNATIONAL MONETARY FUND following the BRETTON WOODS conference in 1944, however, constrained the subsequent expansion of the bank's international monetary role and activities. Nonetheless, the increasing reliance on SWAP ARRANGEMENTS by the US to finance BALANCE OF PAYMENTS deficits and the growth of the EUROCURRENCY market increased the importance of the bank as an international financial institution. Current activities of the bank, in addition to its traditional role as a bank which assists central banks in managing and investing their monetary reserves, include acting as agent for the EUROPEAN MONETARY CO-OPERATION FUND and the Committee of Governors of the Central Banks of the Member States of
the European Community. The bank is also the official depository for the EUROPEAN COAL AND STEEL COMMUNITY. A board of directors comprising the governors of the central banks of Belgium, France, the Federal Republic of Germany, Italy, the Netherlands, Sweden, Switzerland, the UK and the US and six representatives of commerce, finance and industry, is responsible for the administration of the bank's activities. The board of directors also provides a forum for the bank to encourage co-operation among central banks in controlling short term international monetary fluctuations arising from speculative activity. The bank also collects and disseminates information on macroeconomic topics and international monetary affairs.

banking panic. An episode in which a failure of confidence in one or more BANKS produces a sudden and widespread 'run' by the public on banks in general, to withdraw DEPOSITS, or in times when private BANKNOTE issues were common, to demand payment of such notes in another medium. Such panics may and did cause bank failures, not necessarily restricted to unsound banks. The last true banking panic in the UK was in 1866 following the failure of Overland, Gurney & Co., though there have been banking crises unaccompanied by panic since then, including the crisis of 1973-4 when a number of SECONDARY BANKS failed or had to be supported. (See LENDER OF LAST RESORT, 'LIFEBOAT'.)

Banking School. A body of opinion concerned with the debate over the regulation of note-issue by the BANK OF ENGLAND in the first half of the nineteenth century. In opposition to the CURRENCY SCHOOL this group argued that regulation was largely impossible and any attempt to limit the issue of banknotes would have undesirable effects on the financial system. The banking system itself, they argued, was the best judge of the needs of the economy for banknotes. All that was required was strict convertibility of notes into gold; this would automatically ensure that banks supplied notes in the correct amount according to the needs of the Public and the state of the economy. They Placed faith in the competition between banks to ensure that the note issue was kept within these bounds. They further denied that the government could control the money supply since it had no control over BILLS OF EXCHANGE and BANK DEPOSITS. Although in the framing of the BANK CHARTER ACT of 1844 their doctrines were rejected in favour of those of the Currency School, some of their views, e.g. on the monetary significance of BANK DEPOSITS and of CREDIT instruments, have been vindicated by financial developments.

bank loan. This commonly means any advance by a bank, but there is a distinction in bank lending between OVERDRAFT terms and loan terms. A BANK ADVANCE specifically in the form of a loan is credited in full to the borrower's account at the outset and the interest liability may be a fixed sum calculated on the initial loan and its duration. In some cases, e.g. personal and term loans, there is provision for repayment by regular instalments.

banknote. A form of currency issued by a bank, and in essence a 'negotiable' (i.e. transferable simply by delivery) evidence of the bank's indebtedness to the value of the note. The banknote developed from the BILL, and is in principle a bill payable 'at sight' (on demand) in some other medium. Originally the other medium was FULL-BODIED COIN (silver or gold coin), or in practice, BANK OF ENGLAND notes which were themselves so payable. When sterling finally went off the GOLD STANDARD in 1931, Bank of England notes ceased to be convertible into any other medium, and became practically, if not legally, FIAT MONEY.

Bank of England. The CENTRAL BANK of the UK. It was promoted as a commercial bank by London merchants and established by Act of Parliament in 1694. In return for a loan to government it was granted the privilege of incorporation as a JOINT STOCK COMPANY, and retained a monopoly of joint stock banking in England and Wales until 1826. This gave it an early dominating position in English banking and it became the de facto repository and manager of the country's EXTERNAL RESERVE. In the 19th and 20th centuries its public role developed so that by
the time it was nationalised, by the Bank of England of 1946, it had long conducted itself as a public and not a private institution. The Bank is banker to the government and to the banking system, but above all is the institution responsible, in consultation with the TREASURY, with implementing financial and MONETARY POLICY. As the government's banker it holds the accounts of central government departments, receiving revenue proceeds and making payments; manages the national debt through the issue and retirement of TREASURY BILLS and longer-term SECURITIES; and makes advances to government by WAYS AND MEANS ADVANCES.

The Bank implements monetary policy through its daily management of the MONEY MARKET (using OPEN MARKET OPERATIONS), through debt management and other operations in GILT-EDGED SECURITIES, and through other controls over the liquidity of the financial system. Since 1981 it has operated on interest rates by these indirect means, not directly via MINIMUM LENDING RATE or the older BANK RATE. The Bank is also responsible for managing the EXCHANGE EQUALISATION ACCOUNT and for market interventions to influence the EXCHANGE RATE.

Following the BANK CHARTER ACT of 1844 the Bank's activities were divided between an Issue Department responsible for note issue, and a Banking Department to conduct other business. The provisions of the Act led to the concentration of all note issue in England and Wales on the Bank, and to the effective basing of the Scottish and Northern Irish banks' issues on the Bank's notes. The assets of the Issue Department, once almost entirely government securities, but now largely bills and local authority debt, form the Bank's masse de manoeuvre for money market and debt management operations. The Banking Department conducts the Bank's business as banker to the government and other public bodies, to the COMMERCIAL BANKS, to overseas central banks and international organisations, and to a small residuum of private bodies and individuals.

The 1946 Act gave the Bank wide formal powers to control the commercial banks, but for monetary policy purposes the Bank has relied mainly on informal influence. The Bank has long assumed responsibility for the security and sound operations of the banking system, extending this to the DISCOUNT HOUSES, through which it has traditionally performed the function of LENDER OF LAST RESORT by loans or rediscounting BILLS, and the ACCEPTANCE HOUSES whose ACCEPTANCES figured in these operations. This concern embraces the interests of the depositing public. With the rapid development of the financial system the Bank has been increasingly concerned with the efficient operation, and with the development of suitable regulatory mechanisms. The Banking Acts of 1979 and 1987 have laid upon the Bank the duty of authorizing institutions to carry out banking business and of establishing appropriate standards to be maintained by banks with regard to liquidity and capital. (See 'BIG BANG', 'LIFEBOAT', MONETARY MANAGEMENT.)

Bank of the United States. From 1791-1811, and from 1816-1836 some central banking functions in the US were carried on by the First and Second Banks of the United States respectively. The First Bank was a private corporation, chartered for 20 years and initially capitalized at $10 million of which 20 per cent was provided by the federal government. At its inception it was the largest private corporation in the United States. The head office was in Philadelphia with eight branches in major cities. It served as the federal government depository institution as well as providing private banking services. The Bank was so large that its lending activities had a powerful impact on the reserves and hence monetary expansion capabilities of state banks. The Bank was not rechartered in 1811 because the growing numbers of state banks resented the Bank's conservative policies.

After five years with no central banking functions and the financial chaos resulting from wildcat banking, Congress chartered the Second Bank of the United States in 1816, with an initial capitalization of $35 million. It performed most of the same functions as the First Bank, but it experienced serious political difficulties as a result of differences between its president, Nicholas Biddle, and the US president, Andrew Jackson. Jackson led a populist agricultural faction of the Democratic party which was opposed to any form of centralized financial control. When its charter ran out in 1836, the Second Bank was also not renewed. For
a period of almost thirty years (until the National Banking Act of 1864), there was virtually no central banking function in the United States. In fact, it was not until the Federal Reserve Act of 1913 that the US had a true central bank.

**Bank Rate.** Before September 1971, the minimum rate at which the BANK OF ENGLAND would rediscount ELIGIBLE PAPER brought to the Discount Office by the institutions to which this facility was available, namely the DISCOUNT HOUSES. The need for such rediscounting arose when there was a general shortage of LIQUIDITY in the banking system, and the banks were 'calling' (i.e. recalling) money lent at call to the houses. If the position was not relieved by the BANK itself, operating through the 'BACK DOOR', the houses were compelled to turn to the Bank as LENDER OF LAST RESORT. Bank rate was an administered rate which the Bank moved as its policy needs directed. Such movements were significant in that they influenced other short-term rates through their effect on the rates at which the discount houses were prepared to deal; but also, more directly, in that under the pre-September 1971 arrangements the CLEARING BANKS altered their own deposit and lending rates in step with Bank rate, a practice which had wide effects on financial institutions and markets. In 1971 Bank rate was replaced by MINIMUM LENDING RATE, a rate which fulfilled some of its functions but which for a time at least was operated in a different way and was itself suspended in changes introduced in August 1981. (See COMPETITION AND CREDIT CONTROL, MONETARY POLICY.)

**bankruptcy.** A legal proceeding under which the property of an insolvent debtor is taken for the benefit of his creditors generally. In the UK control of a bankrupt's property is initially in the person of the official RECEIVER, who is an officer of the courts. Subsequently a trustee is appointed and it is his duty to realize the property and to distribute it among the creditors in proportion to their claims and in accordance with certain priorities laid down by the law. Ultimately the bankrupt may be granted a discharge which, subject to certain exceptions, releases him from his past debts and liabilities.

**bargaining theory of wages.** Wages are commonly fixed in a collective bargaining process, an arrangement that differs mechanically from the orthodox demand-supply adjustment process. The bargaining theory of wages refers to models of the bargaining process applicable to union-management relations that seek to go beyond the BILATERAL MONOPOLY model, in which the final outcome of bargaining is indeterminate, to deduce a determinate solution. In most of these models it is assumed that each side attempts to maximise some quantity which may be subjective, e.g. UTILITY, or objective, e.g. the discounted values of future profit or wage income streams; and that bargaining behaviour is then subject to factors such as product demand, and the perceived bargaining strategy of the other party. Since it is conventionally assumed that a settlement achieved after a stoppage is IIIOI-PARETO OPTIMAL, the orthodox bargaining models argue that there will be a tendency for the parties to reach agreement without a stoppage; such stoppages as are observed in practice are attributed to mistakes or even irrationality.

Three types of conventional bargaining models are represented by those of De Menil (Bargaining: Monopoly Power Versus Union Power, MIT Press, Cambridge, Mass., 1971), Zeuthen (Problems of Monopoly and Economic Warfare, Routledge and Kegan Paul, London, 1930), and Hicks (The Theory of Wages, 2nd Edn, Macmillan, London, 1963). De Menil builds upon GAME THEORY to produce a deterministic theory of wage bargaining. Assuming that both union and management are RENT maximizers, he derives the prediction that they will act so as to maximize the revenue surplus of the enterprise which they will divide between them in some proportion. Zeuthen's model emphasizes RISK, with the parties continually comparing the options of accepting the opponent's offer or holding out at risk of a stalemate. A process of successive concessions ensues which in the limit reaches the point of maximum joint utility of the parties. Hicks adopts a COST-BENEFIT
Bargaining unit. Either party will choose or threaten a strike in preference to a concession if it expects the strike to cost less than the concession, and Hicks argues that there is some unique wage rate that both parties associate with a strike of a given length.

All these models attribute strikes to mistakes or irrationality. More recent models have reverted to less sophisticated interpretations of the bargaining process. Thus the political bargaining model of Ashenfelter and Johnson ('Bargaining Theory, Trade Unions and Industrial Strike Activity', American Economic Review, 1969) is based on the notion of three-party involvement in the process - management, union leadership, and rank and file union members. Differences of awareness and expectations between union leaders and rank and file may have to be eroded by a strike in which the wage aspirations of the membership are scaled down. Management for its part in making concessions balances foregone profits against increased labour costs after the strike since in this analysis the union's behaviour is quasi-mechanical, the model is widely acknowledged as not constituting a theory of bargaining. In practice, unions and employers do bargain, and most bargaining sessions reach a conclusion without a stoppage. That said, it has proved difficult to move from theory to application with the more traditional bargaining models. It should be noted that although the collective bargaining process differs from that assumed in neo-classical demand-supply analysis, the two approaches are conformable to the extent that demand and supply conditions establish the context within which bargaining takes place. (See Strikes, Wage Theory.)

Barlow Report. The findings of a British Royal Commission which analysed the geographical distribution of British Industry and had a strong influence on the development of postwar regional policy in Britain (HMSO: Royal Commission on the Industrial Population, Cmd.6153; London, 1940). The report urged that policies be adopted to promote a more even geographical distribution of industry and population on the grounds that this would:

1. reduce congestion in the cities
2. improve economic conditions in the less prosperous regions, and
3. be beneficial in terms of national defence strategy.

Barometric price leadership.

See Price Leadership.

Barriers to entry. Factors which place new entrants at a cost disadvantage relative to established firms within an industry. As long as established firms then price at a level just below the minimum point of the long-run average cost curve of the best placed potential entrant, these established firms can earn super-normal profits in the long run without fear of new entry. Sources of entry barriers are Absolute Cost Advantages, Economies of Scale, Large Initial Capital Requirements and Product Differentiation. (See Limit Pricing.)

Barter. A method of exchanging goods and services directly for other goods and services without using a separate unit of account or medium of exchange. A successful transaction requires the existence of a double coincidence of wants.

Barter agreements. Agreements between countries, usually with balance of payments troubles, for the direct exchange of agreed quantities of goods without the mediation of international finance. (See Countertrade.)
barter economy. An economy where the exchange of goods and services is achieved by the method of BARTER, which would lead to very little specialization or DIVISION OF LABOUR due to the requirement of DOUBLE COINCIDENCE OF WANTS.

base period. A point in time used as a reference point for comparison with some later period. For example, in the theory of PRICE INDEXES the LASPEYRES PRICE INDEX uses the earlier of the two years over which prices are compared for purposes of weighting the relative price changes. This earlier year is then the base period and the price index is a base period weighted index.

base rate. After the abandonment of their agreements on deposit and lending rates in 1971, the UK CLEARING BANKS adopted the practice of individually determining and announcing a 'base rate'. This is essentially a reference rate which forms the 'base' to which the structure of lending rates applied to different classes of borrowers is related, and to which the rate paid on interest bearing DEPOSITS is also linked. (See COMPETITION AND CREDIT CONTROL.)

basic activities. See ECONOMIC BASE.

basic exports. The name given to the primary products produced by underdeveloped countries for export; it includes basic raw materials, such as copper, tin, cotton, timber, tea, coffee, etc.

basic industries. See ECONOMIC BASE.

basic needs philosophy. A development strategy which has received much discussion in recent years. It rejects conventional accumulation theories and states that there are a number of targets which should receive priority. These are (1) the provision of basic consumer goods such as food, clothing and shelter, (2) access to basic services such as water, education and health facilities, (3) the fight to employment which would yield an income sufficient to meet the basic consumption needs, (4) an infrastructure capable of meeting the requirements to obtain the basic goods and services and (5) participation in decision-making. The strategy is production oriented. The philosophy has been supported by both conservative and radical thinkers. It has been criticized as having an inadequate theoretical framework and as saying nothing which is really new.

basic wage rates. See WAGE RATES.

basing-point system. A type of pricing in which the various sellers in a market agree that the price to be charged for a good will be calculated by the sum of a fixed price, and an agreed transport charge which is related to the distance between the consumer and the nearest of a number of agreed locations known as 'basing points'. The 'basing point' may be nearer to the consumer than the seller, in which case the customer pays less than the 'true' transport cost, or further away, in which case he pays more than the true transport cost. As a consequence of this system all producers will offer each good at the same 'delivered' price to each consumer - the net return to the producer will, of course, vary with the amount of transport cost he bears. The system is most generally found where

1. sellers are few (i.e. in OLIGOPOLIES)
2. production is CAPITAL INTENSIVE - there are high FIXED COSTS
3. demand fluctuates over time and space, and
4. transport costs are a large element of price.

These features are characteristic of the steel industry which has been a notable user of this system. The principal object of the system is to reduce price competition in the market place. Since the share of the true transport costs paid by the purchaser varies from place to place firms are in fact charging different prices for the product (as opposed to the price for product plus transport) to consumers in different locations. It is thus a form of SPATIAL PRICE DISCRIMINATION.

Bayesian techniques. Methods of statistical analysis (including ESTIMATION and STATISTICAL INFERENCE) in which prior information is formally combined with sample data to produce estimates, or test hypotheses. The techniques provide a way of including subjective impressions and/or
36 bearer bonds

Theoretical elements in quantitative analyses. (See also Restricted Least Squares, Prior Distribution, Posterior Distribution, Classical Techniques.)

Bearer bonds. A type of bond which does not require a transfer deed because the holder has legal ownership.

Bears. Individuals who believe that stock or bond prices are likely to decline and thus sell expecting to be able to buy back at a lower price. A 'covered' or 'protected' bear is one who possesses the securities that he is selling. One selling securities that he does not have is said to be 'selling short'. When prices are falling the term can also be applied to the state of the stock market itself, i.e. the market would be described as 'bearish'. A speculator with converse expectations is known as a bull.

Beggar-my-neighbour policies. Economic measures taken by one country to improve its domestic economic conditions, normally to reduce unemployment, and which have adverse effects on other economies. A country may increase domestic employment by increasing exports or reducing imports by, for example, devaluing its currency or applying tariffs, quotas, or export subsidies. The benefit which it attains is at the expense of some other country which experiences lower exports or increased imports and a consequent lower employment level. Such a country may then be forced to retaliate by a similar type of measure.

Behavioural equation. A mathematically specified relationship in an economic or econometric model which reflects the reaction of an individual or set of individuals to economic stimuli (e.g. a consumption function). The name is used to distinguish this type of equation from technical relationships (e.g. production or cost functions), institutional relationships (e.g. total tax revenue as a function of income), and identities which serve to define variables.

Behavioural expectations. A view on the formation of expectations based on social and psychological factors. It emphasizes the role of interpersonal contacts and of mass communications. Of its nature, considered less rigorous than rational or adaptive expectations.

Behavioural theories of the firm. A group of theories that view the firm as a coalition of subgroups whose goals are inherently contradictory. Organization theory is drawn upon to analyse the process by which decision rules are learned, and the manner in which these rules are changed in the light of feedback from the environment; for instance, goals are regarded as the outcome of a bargain-learning process within which each group has aspiration levels which they attempt to 'satisfice'. Conflict is reconciled by the distribution of side payments and the adjustments of aspiration levels in the light of experience. Principal exponents of this approach are H. Simon, R.M. Cyert and J.G. March. A significant contribution of their work has been to focus attention on the internal organization of the firm and in particular, the internal efficiency of the firm as opposed to the more familiar question of allocative efficiency. (See also X-efficiency.)

Benefit-cost analysis. See cost-benefit analysis.

Benefit-cost ratio. See cost-benefit analysis.

Benefit principle. A traditional theory of taxation which states that tax burdens should be allocated among taxpayers in accordance with the benefits they receive from the provision of public goods. The aggregated pseudo-demand curves of the population along with the supply curve determines the amount of a public good that is to be produced and the individual pseudo-demand curves determine the distribution of the tax burden among tax payers. The operation of the theory depends on the willingness of tax payers to reveal their true preferences for the goods in question. As the exclusion principle does not apply to public goods there is an incentive for individual consumers to understate their true preferences as this will reduce their contributions while the reduction in supply resulting from a change in demand by one person is imperceptible. In aggregate, however, the consequences are that total output is less than
Another criticism of the model is the lack of any conceptually sound basis for determining the optimal distribution of public and private goods. The principle has undergone a revival in recent years especially in the writings of economists at the University of Chicago and in the publications of the Institute of Economic Affairs in London. Its proponents have indicated areas of public expenditure where it can be applied. They have shown that schemes can be devised which force consumers to pay for public goods in accordance with the benefits they derive from their provision. The benefit principle has only very limited applicability to the DISTRIBUTION FUNCTION of public finance.

Benelux Economic Union. A CUSTOMS UNION, established initially by the Convention of Ouchy in 1932, between the governments of Belgium, Luxembourg and the Netherlands. The present organization was created by the Benelux Economic Union Treaty in 1958. The union seeks to develop tighter economic and social links among its members by encouraging the free movement of LABOUR, goods and CAPITAL between the member countries and establishing a common policy with respect to foreign trade. The union has succeeded in abolishing internal passport controls and labour permits, removing intra-union import tariffs and most import quotas, decreasing the VALUE ADDED TAX among member countries and implementing a common system of EXCISE tax. A uniform external TARIFF on non-EC imports is levied by the union which also concludes uniform trade and emigration agreements with non-EC countries.

Bentham, Jeremy (1748-1832). An English social scientist, he was a passionate advocate of quantitative methods of observation at a time before data were available. He aimed to extend the experimental method of reasoning from the physical branch of knowledge to the moral. Though not the first utilitarian radical philosopher he is the best known and his schemes for social reorganization were guided by the Principle of Greatest Happiness, i.e. those actions should be undertaken which led to the greatest net sum of happiness for society. Bentham is credited with being the instigator through his writings of the great social reforms carried out in the UK in the first half of the nineteenth century.

Bergsonian Social Welfare Function. The Bergsonian SOCIAL WELFARE FUNCTION is a real value function, the arguments of which consist of magnitudes representing different aspects of a social state, usually the utility of each individual or household. The social welfare function assigns index numbers to each social state, such that if social state A is preferred to social state B the value of the function is higher for A than for B.

Bernoulli Hypothesis. Daniel Bernoulli, a mathematician of the eighteenth century, proposed a solution to a celebrated paradox, the so-called 'St Petersburg paradox'. The problem was one of explaining why individuals would not pay extremely large sums to play the following game. A coin is tossed until, say, a head appears. If the head appears on the second toss the player receives $2^2$ units of reward (e.g. £4). If the head appears on the third toss, the payment would be $2^3$ units, on the fourth toss $2^4$ units, and so on. The sum of the probabilities of the prizes occurring must sum to unity but for an infinite number of tosses the EXPECTED VALUE of the prize is infinite. Thus one would expect players to gamble very large sums of money on such a game. To explain why the gamble is not accepted, Bernoulli argued that gamblers were less interested in the money rewards than in the UTILITY of those rewards. By hypothesizing DIMINISHING MARGINAL UTILITY of income Bernoulli showed that the game may well have an expected money value of infinity but a finite expected value of utility. The hypothesis is therefore of prime interest as an early attempt to substitute UTILITY maximization for some monetary objective in contexts of RISK or UNCERTAINTY.

Bertrand's duopoly model. A model of a two firm market developed by J. Bertrand in 1883. The model differs from the COURNOT DUOPOLY MODEL in that each firm is assumed to maximize profits on the presumption that the other firm will not change its price. Bertrand's model results in a stable equilibrium for the two firms. This can be shown in a diagram illustrating the reaction curves of
Bertrand's duopoly model

The two firms. For firm A we can plot a locus of points of maximum profits which it can obtain by charging various prices \( P_A \), given the price which firm B charges \( P_B \). A similar process gives the reaction curve for firm B. A stable equilibrium is reached at point E where the two reaction curves cross and each firm charges the same price for the product. The model may be criticized on the grounds of its naive assumptions concerning conjectural behaviour, and that it ignores production costs, and does not allow for entry of new firms.

Best Linear Unbiased Estimator (BLUE). That ESTIMATOR which has the smallest VARIANCE of all LINEAR ESTIMATORS, which are also unbiased (i.e. whose EXPECTED VALUE is equal to the true parameter value). This property is usually taken to indicate that the estimator is the most desirable. (See also GAUSS-MARKOV THEOREM, ORDINARY LEAST SQUARES.

Beveridge Report. A report on British social policy entitled 'Social Insurance and Allied Services' prepared for the wartime coalition government in 1942 by Sir William Beveridge, which formed the basis of post-war social security policy in Britain. Beveridge argued that poverty was the result of specific factors such as ill-health, unemployment or old age and proposed a system under which benefits would be paid to individuals experiencing such disadvantages without regard to income but depending on payment of NATIONAL INSURANCE CONTRIBUTIONS. Certain non-contributory, income-related benefits were to be provided as a fall-back, notably 'National Assistance', later called 'SUPPLEMENTARY BENEFIT'. Since 1988 there have been four major categories of means tested benefits in the UK. These are Income Support (payments made to take a person's or family's income up to a government-set target income and which mostly help the unemployed or part-time worker), Family Credit (a tax-free benefit to anyone on a low income, who is supporting a child but works too many hours to be eligible for Income Support), loans from the Social Fund (repayable loans, replacing payments which were formerly grants, to pay for large items, e.g. of furniture or to deal with crises such as the need for temporary accommodation) and Housing Benefit (a grant to help pay rent or rates). The first two are general support benefits and the second two represent specific purpose payments. As envisaged by Beveridge and as has occurred in practice the scheme was to be financed partly by the contributions, partly by the taxpayer. In practice income-related benefits have come to assume far greater importance than was intended by Beveridge, partly because other benefits were set at levels below those originally proposed by him. One consequence of this situation is the so-called POVERTY TRAP.

bias. The degree to which the EXPECTED VALUE of an ESTIMATOR differs from the true parameter value. (See also BEST LINEAR UNBIASED ESTIMATOR.)

bid. An offer of payment which an individual or organization makes for possession or control of assets, inputs, goods or services. A maximizing decision-maker will equate his marginal WILLINGNESS TO PAY with the OPPORTUNITY COST of the funds required for the payment.

bid-rent function. A relationship which indicates the amount a household or firm will be able to pay for the use of a given quantity of land (the bid-rent) at varying distances from the centre of an urban area while maintaining a constant level of UTILITY
of PROFIT. In general it is argued that bid-rents are higher the nearer one is to the central point. This follows as accessibility is held to be a desirable attribute in terms of utility or profitability while the centre of an area is the most accessible point. If the bid-rent functions of various individuals and activities are known, the bid-rent for each activity at each distance can be compared with market rents to determine which activity will occupy each location. (See also ACCESS/SPACE TRADE-OFF MODEL.)

Bifurcation Hypothesis. The hypothesis that while the availability and cost of EXTERNAL FINANCE are important determinants of INVESTMENT in the BOOM, RETAINED EARNINGS are most important in the RECESSION.

'Big Bang'. A popular term used to describe the changes in institutional and regulatory practices in the City of London, i.e. the financial centre in the UK, in October 1986. Against a background of increased international competition in financial services and the revolution in communications effected by micro-electronics, firms in the CAPITAL MARKET were permitted to have 'dual capacity', i.e. the right to be both STOCKBROKERS and JOBBERS or market-makers as they are now called, activities which had previously been rigidly divorced. There were also changes in the ownership rules, which allowed firms which were non-members of the Stock Exchange to buy member firms, so that most Stock Exchange firms are now part of large financial services conglomerates where formerly they were small individual firms. In the interests of increased competition the charging of a fixed scale of commissions by stockbrokers came to an end.

A new body, the Securities and Investments Board (the SIB) was established to regulate the overall financial sector, while particular sectors of the financial market operate their own Self-Regulatory Organizations (SROs). The 'Big Bang' also saw the entry to the UK financial sector of many foreign firms, particularly American and Japanese.

'Big Push'. This refers to one of the contributions to a debate which took place in the 1950s and 1960s as to whether balanced or unbalanced growth was the most appropriate development strategy for developing countries to adopt. The 'big push' concept, originated by Rosenstein-Rodan, supported the balanced growth philosophy and suggested that a large investment programme on many projects would surmount the indivisibilities in demand and supply. There are constraints on the demand side in developing countries because of the small size of markets. If a number of industries were simultaneously established, each could create demand for the products of the others. Total demand would increase so that industries which otherwise would be uneconomic became viable. The difference between social and private MARGINAL PRODUCTS is thus reduced or removed. Critics have suggested that the strategy would lead to rapid inflation and that it is unrealistic to hope for a massive investment programme taking place simultaneously across many industries in developing countries. (See BALANCED ECONOMIC DEVELOPMENT.)

bilateral assistance. Assistance or aid which is based on a direct arrangement between two countries; this differs from MULTILATERAL AID which can come from a group of countries or an international organization. (See FOREIGN AID, TIED AID.)

bilateral monopoly. A market in which a single buyer faces a single seller. Economic analysis of bilateral monopoly suffers from the same difficulties as DUOPOLY, for perceived interdependence in decision making is an important feature.

bilateral trade. Trade, usually the subject of government negotiation, between two countries, whereby one exports a given quantity or value of goods to the partner in exchange for an agreed quantity or value of imports from the partner. Such arrangements may take the form of BARTER of specified goods on each side. Bilateral trade is often arranged for political reasons or because of BALANCE OF PAYMENTS problems and usually ignores the international DIVISION OF LABOUR on the basis of COMPARATIVE ADVANTAGE.
bill. A short-term instrument in the form of a document ordering the drawee (i.e. the debtor) to pay the drawer (the creditor) a stated sum at a specified date, or 'at sight' which means on demand. Once accepted, i.e. signed by the drawee (who may be an ACCEPTING HOUSE or bank); and 'endorsed', i.e. signed on the back by the acceptor, a bill becomes negotiable and may be discounted, i.e. sold at a discount on its face value, at a rate which reflects current short term rates of interest. A bill normally has a maturity of up to six months and historically was used extensively to finance trade (especially the shipment period of goods) and the WORKING CAPITAL needs of manufacture and agriculture. An 'inland bill' is one drawn to finance domestic business; a 'foreign bill' or bill of exchange is drawn in the course of foreign trade transactions. The inland bill was largely supplanted by the BANK ADVANCE or TRADE CREDIT, but has had some revival in the UK, first in the finance of hire purchase contracts, but latterly as a means of raising finance for general purposes on the part of major companies. In the US major corporations make very large and continuous use of short-term 'paper', in effect bills, to meet their general financial needs. In the UK another important bill is the TREASURY BILL, issued by the government as a short-term instrument of borrowing. (See BANK BILL, BILL BROKER, DISCOUNT HOUSE.)

bill broker. A person who specializes in bringing together, for a commission, buyers and sellers of BILLS. In the nineteenth century, before the emergence of DISCOUNT HOUSES, bill brokers performed a key role in the financial system since the initial discounter (buyer) of a bill, frequently a bank, might not have the resources to hold it to maturity, and the broker found someone, frequently another banker, who had surplus funds. Today in the London discount market, whilst there is a small number of 'running' or 'discount brokers' who carry out some bill broking of this kind, most bills are absorbed by institutions which are either dealers in, or firm holders of, bills. (See DISCOUNT HOUSE.)

bill of exchange. A BILL drawn to finance a foreign trade transaction.

bills only. The doctrine, prevalent in the US in the 1950s, that in engaging in OPEN MARKET OPERATIONS, the FEDERAL RESERVE SYSTEM should operate only in BILLS. This was based on the view that by being concentrated at the short end of the capital market, these operations would achieve their intended effect on bank liquidity with the minimum disturbance to financial markets in general. At the same time the induced changes in short term interest rates would influence other markets through the 'normal' means of portfolio adjustments by ASSET holders.

binary variable. A variable which can only take two values (e.g. 0 and 1), normally used to account for qualitative, or non-quantifiable influences in REGRESSION analysis. (See also DUMMY VARIABLE.)

biological interest rate. A value for the interest rate in GROWTH THEORY where, amongst all BALANCED GROWTH paths, the highest per capita CONSUMPTION is achieved and sustained by the path on which the marginal productivity of capital (equal to the rate of PROFIT under PERFECT COMPETITION) is equal to the constant EXOGENOUSLY determined rate of growth of the labour force. (See GOLDEN RULE OF ACCUMULATION.)

birth rate. This is defined as the average number of live births per 1000 of population per year. Although it appears to be declining in advanced countries, it is a major problem in underdeveloped countries where it is very high, such that very poor countries find it more and more difficult to support an ever-increasing population. There are various reasons for high birth rates in less developed countries. First, people in rural areas need a large family to help on the land to produce food for subsistence and to provide income. Second, without a welfare state, people want children to look after them in their old age. Third, people, especially in rural areas, are ignorant of and have no provided source of effective methods of birth control. There has also been a fall in infant mortality rate, meaning more live births due to the spread of health measures by the World Health Organization and other international agencies. (See POPULATION EXPLOSION, POPULATION POLICY.)
bivariate analysis. An analysis involving only two variables.

black market. Any illegal market established in a context where prices have been fixed at minimum or maximum levels, usually by government. Thus, if maximum prices have been fixed, trading may take place at prices above the maximum. Black markets are common in times of rationing, e.g. in wartime.

bliss point. Usually refers to a CONSUMER EQUILIBRIUM in which the consumer experiences total SATIATION with respect to the goods consumed and which point of satiation is within his BUDGET CONSTRAINT. Such a point can only occur if the consumer does not act in accordance with the axiom of DOMINANCE - that is, if he does not always prefer more and more of all goods. In such circumstances the relevant INDIFFERENCE CURVES cease to have their usual (convex) shape and become complete circles. For an exposition see A.J. Ryan and D.W. Pearce, *Price Theory*, Macmillan, Basingstoke (1977), Chapter 1. (See also AXIOMS OF PREFERENCE.)

block grant. A general, unhypothecated grant from government to local authorities. It is thus not related to specific services or classes of rate-payer.

blue chip. A term referring to first-class EQUITIES which have a very low risk of depreciation of earnings. They are usually shares of major companies such as Shell or ICI.

Blue Book. The familiar name for the Central Statistical Office Publication presenting the UK annual National Income and Expenditure accounts. (See also NATIONAL INCOME.)

blue-collar workers. Workers engaged in certain employments which are essentially manual in nature, and who are distinguished from white-collar workers. (See MANUAL WORKERS.)

BLUS residuals. Residuals which are best, linear, unbiased and with a scalar covariance matrix. They were developed by H. Theil and others since ORDINARY LEAST SQUARES (OLS) RESIDUALS do not have the property of a scalar COVARIANCE MATRIX. Thus, even if the underlying true errors in a regression model are independent the OLS residuals from the estimated equation will not be independent even if the estimated model is correctly specified (see SPECIFICATION ERROR); this means that OLS residuals may be a poor basis on which to base tests for AUTOCORRELATION (such as the DURBIN WATSON statistic) or HETEROSCEDASTICITY. BLUS residuals belong to the class of LUS residuals as also do RECURSIVE RESIDUALS.

Böhm-Bawerk, Eugen von (1851-1914). Austrian economist and statesman, he was the most celebrated member of the AUSTRIAN SCHOOL. He added little to the doctrines of MENGER and WIESER on value and price, but he developed a comprehensive model of the economic process in his major work, *Capital and Interest*, for which he has been called 'the bourgeois Karl MARX'. In this work he produces a simultaneous determination of the stock of goods, the period of production, wages and interest. Most attention has been focused on capital and interest. He explains the rate of interest as an interaction between TIME PREFERENCE and the PHYSICAL PRODUCTIVITY OF INVESTMENT. He gives two reasons for the former: people expect to be better off in the future and they also underestimate future wants, both of which reduce the marginal utility of future goods. The physical productivity of capital Böhm-Bawerk explains in terms of the superiority of roundabout methods of production, e.g. to catch fish it is more efficient to make a rod first than to use one's hands directly. ROUNDABOUTNESS he assumes is productive but subject to diminishing returns. Roundaboutness is extended until the marginal productivity from the last permissible lengthening of the productive process equals the rate of interest that must be paid to obtain the funds for the wage goods of the workers lengthening the productive process. The notion of roundaboutness, which is characteristic of the Austrian theory of capital, has been the subject of much controversy, since there is no unambiguous measure of it.
bond. Although it has some narrower and more precisely legal meanings, this term is used generally and more loosely to denote any fixed-interest (debt) security, e.g. a GILT-EDGED stock or a DEBENTURE. The asset is negotiable (saleable) and contracts to pay the holder a certain fixed money sum at regular intervals (the coupon payments) until maturity, that is until such time as the liability is discharged and the outstanding sum (the principal) is repaid. The yield, a percentage rate of return, is calculated in the following manner. Let C be the coupon payments, which are paid annually for t years until repayment of the principal P. Then the yield, r, is that unique rate of discount which equates this income stream to its present selling price V. That is

\[ V = \frac{C}{(1 + r)^t} + \frac{C}{(1 + r)^2} + \frac{C}{(1 + r)^3} \cdots \frac{C + P}{(1 + r)^t} \]

In the case of a perpetual bond, a CONSOL, this simplifies to

\[ V = \frac{C}{r} \quad \text{or} \quad r = \frac{C}{V}. \]

That is, the yield is inversely related to the price of the bond. At any one time coupon rates will differ widely across different securities for these will have been issued in different years. However if we abstract from the risk in holding financial assets of different maturities the pure yield will tend to equality across all securities. ARBITRAGE will bring the yields of all securities into line and thus a single rate of return, or INTEREST RATE, is determined. The market interest rate is thus established and varies inversely with the price of bonds.

Economists make wide use of the term, bond, in theoretical analysis to denote an asset which 'stands for' the whole range of non-monetary financial assets. For example, macroeconomic models examining the determination of INVESTMENT or of the rate of interest may assume (as KEYNES did, in his 'General Theory') a financial world in which money and 'bonds' are the only assets. Such an abstraction from reality allows one to isolate the pure capital-providing function in the purchase of a financial asset, divorced from the entrepreneurial (business risk-bearing) elements in holding, say, equities. Alternatively, the significance of LIQUIDITY or the lack of it - in relation to the rate of interest can be examined by postulating one non-liquid alternative to holding money, in place of the real choice which is exercised over a spectrum of assets of more or less liquidity.

bond market. The term describing any place, or incidence of transactions, in which any kind of BOND changes hands: the obvious example is the STOCK EXCHANGE.

bonus issue. This refers to shares issued by a company to existing shareholders not in respect of the subscription of new capital but as a CAPITALIZATION of reserves. The extra shares are issued free on a PRO RATA basis. They should not by themselves confer any benefits to shareholders. They bring the issued capital more into line with the real capital employed by the company.

book value. A term used in accounting. To determine the book value of a share, all the company's assets are added up, all debts and liabilities deducted, including liquidation prices of preference shares. This total is divided by the number of ordinary shares issued to obtain book value per share. This value may well have little relationship to market value.

boom. The EXPANSIONARY PHASE of the TRADE CYCLE. The term is usually only applied to particularly fast rates of upward divergence from the SECULAR TREND. It is usually characterized by a SPECULATIVE BOOM. Its opposite is a SLUMP.

Borda Count. A system of COLLECTIVE CHOICE in which each voter ranks each of a set of, say, n, alternatives, giving n points to the proposal ranked first down to one point for the proposal ranked last. The points awarded to each alternative by each voter are summed and the proposal obtaining most points is chosen. This system, first proposed in 1781 by J.C. de Borda, avoids the possible inconsistency known as the PARADOX OF VOTING which arises with a simple MAJORITY RULE system. (See APPROVAL
boulwarism. The process of collective bargaining over terms and conditions of employment is normally one of compromise and concession; the two parties bargain and approach one another until a point somewhere between their original or opening positions is attained that is mutually satisfactory to them. In the US General Electric Company, however, it was once the practice to make a firm offer to the union and refuse to bargain thereafter. This approach to bargaining is named after Lemuel Boulware, a former GE vice-president for industrial relations. The practice has since been declared contrary to the legal requirement to bargain in good faith by the US National Labour Relations Board. However, bargaining sequences within the US public sector show that Boulwarism is not yet dead, despite its abandonment by GE.

bounded rationality. A notion, developed by H.A. Simon, which proposes that although individuals behave rationally, in that their preference ordering is complete, consistent and transitive, their ability to obtain and process information is bounded, i.e. it is limited by the computational capacity of the human mind. In consequence as tasks become more complicated individuals adopt simplifying strategies and the use of decision rules and heuristics become more common. Economists have used this notion to explain the existence of and to analyse the role of the rules, customs and other social institutions which abound within most markets.

bourgeoisie. A term used to describe that section of industrial society which came into prominence in the course of the Industrial Revolution as entrepreneurs and professional persons. Generally used to describe the property-owning middle classes, and since Karl Marx’s discussion of their role the term has often been used in a pejorative sense.

Box-Jenkins. A forecasting method based on ARIMA TIME SERIES models. The technique does not take causal factors into account, as we would forecasts based on regression analysis, for instance, but relies on being able to capture the trend, cyclic and other systematic characteristics of the time series statistically. It has proved to be a very accurate forecasting method for the short-run (up to two years ahead), but this precision tends to decline rapidly thereafter.

brain drain. The migration of educated and skilled labour from poorer to richer countries. Education or skill, which represents investment in human capital, is usually cheaper to acquire in poorer, labour-abundant countries, since its provision is usually a labour-intensive activity. Those with the skills or education then move to more developed countries where the return to their human capital is higher. Such migration is often encouraged by laws and institutional factors, as most countries look more favourably on immigration by those with skills than those without.

branch banking. The provisions of banking services through a network of branch offices owned by a single banking company. The development of branch banking, in which Scottish banks were the pioneers, is an important, though not an indispensable, condition of concentration and large-scale operation in banking, since historically the branch bank ousted, or replaced through mergers, the small independent local bank. An important early condition of branch banking was the development of control of lending through trained branch managers. In many states of the US branch banking is illegal; this derives from populist fears of the concentration of ‘money power’ in large banks and is responsible for the unusually atomized structure of much US banking.

brand loyalty. Psychic allegiance to the attribute combination of a branded product. In markets in which a heterogeneous product is sold firms use advertising in order to build up this allegiance to their products, thus increasing the psychic costs of switching to a competitor brand.

break-even analysis. The costs of producing a good can be split into two main parts. Fixed costs are those that remain the same for the firm however many goods are produced, e.g. interest on fixed capital, factory upkeep, etc. Variable costs vary with the
44 ‘break-even’ level of income

number of items produced, e.g. raw materials for the goods, labour to produce them, etc. From the cost accountant's point of view, the break-even sales volume is that which ensures that all fixed and variable costs are covered, given a particular selling price.

Break-even volume = \[
\frac{\text{Fixed costs}}{\text{Selling price minus variable cost per unit}}
\]

This can also be illustrated graphically:

break-even analysis

‘break-even’ level of income. The point at which consumption expenditures are just equal to income as illustrated by the point at which the CONSUMPTION FUNCTION intersects the 45° line in the INCOME-EXPENDITURE MODEL. Below this point consumption is greater than income, that is DIS-SAVING occurs; above this point consumption is less than income, that is SAVING occurs. (See CONSUMPTION FUNCTION.)

Bretton Woods. A New Hampshire resort in the US where the United Nations Monetary and Financial Conference was convened in 1944 to discuss the problem of post-war international payments. After considering the alternative institutional proposals suggested by the Canadian, US and UK governments, the conference agreed to establish the INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT and the INTERNATIONAL MONETARY FUND. (See also KEYNES PLAN, WHITE PLAN.)

Bretton Woods System. See INTERNATIONAL MONETARY FUND.

British Technology Group. The Group was formed by the merger in July 1981 of the remnants of the NATIONAL ENTERPRISE BOARD, which in 1980-81 had disposed of most of its investment holdings, and the NATIONAL RESEARCH DEVELOPMENT CORPORATION. The Group has concentrated on limited but strategic attempts to promote new technology-based developments with private companies. Since 1983 it has been given the additional role of translating new research ideas into commercial products. In 1991 it was proposed that it be privatized.

broker. In the strict sense, an intermediary who brings buyers and sellers together, or who, acting as agent for one or the other, carries through a sale or purchase transaction, receiving for the service a commission or BROKERAGE charge. A notable example of this type of broker is the STOCK-BROKER. However in some markets the term denotes a dealer who buys and sells as a principal, though this application often derives from an earlier phase of true brokering.

brokerage. A charge made by a BROKER for carrying through a sale or purchase on behalf of a client. It may be a fixed charge or a percentage of the value of the transaction.

Brookings model. At the time of its construction (early 1960s) this was the largest and most ambitious ECONOMETRIC MODEL of the US economy. It and its subsequent forms are highly disaggregated with up to 400 ENDOGENOUS variables and 89 EXOGENOUS variables.

Estimation using quarterly DATA was only possible (due to DEGREES OF FREEDOM problems) by utilizing the model's block RECURSIVE structure which enables various blocks of equations to be estimated CONSISTENTLY.

The model has been used for analysis of the structure of BUSINESS CYCLES and for the assessment of FISCAL and MONETARY POLICY and ECONOMIC GROWTH. It marks an important step towards integrating various sections
of the economy into a large scale but manageable form, and is a landmark in the development of large econometric models.

Brussels, Treaty of. A pact of mutual assistance between the United Kingdom, France and the Benelux Countries signed in 1948. It recognised the perceived military threat from the USSR and also to some extent maintained the World War II alliance against Germany. This treaty was followed by the North Atlantic Treaty in 1949, which linked the Brussels treaty signatories with Denmark, Iceland, Italy, Norway, Portugal, the USA and Canada for the defence of the countries involved. The Brussels Treaty organisation eventually merged into the West European Union which included Western Germany with other European countries, with defence the main objective. The Treaty of Brussels is seen as a step in the direction of European integration which preceded the Treaty of Rome (1957) and the beginnings of the EUROPEAN ECONOMIC COMMUNITY (EEC), now known as the EUROPEAN COMMUNITY (EC).

Brussels, Treaty of (also known as Treaty of Accession.) See EUROPEAN ECONOMIC COMMUNITY.

Brussels Conference. An international monetary conference, held in Brussels in 1920 under the auspices of the League of Nations, which addressed the problem of FOREIGN EXCHANGE stability. The conference recommended the creation of an international organization designed to assist financially weak countries, an International Clearing House and the establishment of national CENTRAL BANKS as means of restoring and maintaining international monetary stability. (See also GENEVA CONFERENCE.)

Brussels Tariff Nomenclature. The standard classification of goods, adopted by the majority of countries throughout the world, for TARIFF purposes.

Buchanan, James M. (1919- ) American economist, who was awarded the Nobel Prize for Economics in 1986 for his contributions to the theory of political decision-making and PUBLIC CHOICE. While traditional economic theory could explain how CONSUMERS and producers made decisions about the purchase of goods and of FACTORS OF PRODUCTION, it had nothing to say about economic decision-making in the PUBLIC SECTOR. Influenced by the VOLUNTARY EXCHANGE MODEL of WICKSELL, Buchanan views the political process as a means of cooperation to achieve reciprocal advantages. The dynamics and the results of this process will depend on the 'rules of the game', so that Buchanan has stressed the importance of the choice of these constitutional rules: the concrete outcomes of policies are predictable and predetermined by these very rules. Buchanan has published more than 20 books and 300 articles.

Budget. In the UK the Government presents a major budget every year normally in March or April. In recent years this has often been supplemented by 'mini-budgets'. Traditionally the budget in the UK was the occasion when the Government made changes to the level and structure of TAXATION.

Strangely, government expenditure plans have been made separately, though a budget is defined as the plans for current and capital government expenditure as well as current and capital government revenue. In recent years more attention has been given to plans for government expenditure as well as revenue.

Since the Second World War it has been accepted that the government budget is a major instrument for regulating the overall economic situation in the economy. Thus if inflationary pressures are thought to be too strong a restrictive budget will be introduced. This means that taxes will be increased and/or government expenditure reduced. It has become accepted that the government could run BUDGET DEFICITS or SURPLUSES to achieve its objectives in managing the economy. The appropriate level of deficit (or surplus) has become a matter of major controversy in recent years. In the budget the government also makes changes in the structure of taxation and, to a less extent, in the structure of government expenditure. This is to achieve economic goals. For example, income taxes may be reduced to encourage work effort and risk-taking. On the other hand the schedule of tax rates may be changed to increase the degree of VERTICAL EQUITY as seen by the government of the time.
Conceptually a budget has three branches. These are the ALLOCATION BRANCH, the DISTRIBUTION BRANCH, and the STABILIZATION BRANCH. They are brought together in one budget for reasons of administrative expediency. Each branch actually requires its own separate solution.

In the actual budgets presented in the UK the Government has frequently taken the opportunity to initiate MONETARY changes as well as FISCAL ones. Strictly speaking these are not actually part of a budget.

**budget deficit.** Current expenditures in excess of current income. Most frequently used to describe the situation where government income, TAX receipts, fails to cover GOVERNMENT EXPENDITURE. (See BUDGET.)

**budget surplus.** Current income in excess of current expenditures. Most frequently used to describe the situation where government income, TAX receipts, exceeds GOVERNMENT EXPENDITURE. (See BUDGET.)

**budget line.** A line in COMMODITY SPACE indicating what combinations of goods the consumer can buy with a given income. The slope and location of the line are determined by the prices of the goods in question. Thus, if all income, Y, is spent on two goods X and Z with prices \(p_x\) and \(p_z\), then

\[ Y = p_x X + p_z Z \]

which on rearrangement becomes

\[ Z = \frac{Y}{p_z} - \frac{p_x}{p_z} X \]

so that the slope of the budget line is the ratio of the two prices (see diagram). The budget line is also known as the income line, consumer possibility line, budget constraint, wealth constraint and even price line. (See CONSUMER EQUILIBRIUM.)

**budgetary control.** A system whereby checks are made on expenditure and revenue flow against targets which have been set out in a BUDGET. The purpose is to discover to what extent outturn is actually deviating from targets so that action can be taken in reasonable time to bring the flows into line with the desired objective. A control system normally involves the regular preparation of statements of these flows. An effective system requires up-to-date information to be rapidly available so that any corrective action can be taken in sufficient time to have the desired effect. Computerized systems of accounts may be a major help here. Budgetary control is pursued by companies, nationalized industries and government departments. (See CASH LIMITS.)

**buffer stocks.** Stocks of a commodity held in an attempt to even out price fluctuations in primary commodities. The operators use the stock to mitigate fluctuations in prices by selling from the commodity stock when prices are high and by buying the commodity when prices are low. The schemes may be international or run by one producer. The scale of such schemes tends to be limited by the costs of warehousing and of finance, and while they can diminish short-term fluctuations they are powerless against long-run trends, which is often the problem to which a solution is sought.

**building society.** A financial institution which accepts funds in the form of 'shares' and deposits for relending almost wholly to owner-occupiers for the purchase of houses and flats. The modern building society movement developed in the nineteenth century, and the societies were founded as mutual, non-profit making bodies to
encourage and facilitate home ownership, and also thrift, among people of modest means. Building society shares have some legal affinities with company shares - e.g. holders are members of the society - but for practical purposes they hardly differ from bank and similar deposits. Both shares and deposits are withdrawable on terms varying from 'on demand' up to three months notice; but even deposits at notice can usually be had on demand with an interest penalty. In the 1980s, responding to an increasingly competitive financial climate, the larger societies began to offer CURRENT ACCOUNT services with cheque and cash card facilities (including cash dispensers), though in some cases they do this in conjunction with CLEARING BANKS. Also, helped by tax law changes, some societies have raised funds on the wholesale MONEY MARKETS and even, by way of short-term, BOND issues, on the STOCK EXCHANGE.

Apart from substantial reserves of cash and gilt edged securities (amounting, with premises, to nearly 20 per cent of total assets) the societies' assets are loans, almost wholly to owner-occupiers on the security of the properties purchased. However the movement has extended its lending in other directions and broadened the range of its services, e.g. into estate agency. The societies are regulated by legislation, the principal current instrument being the Building Societies Act, 1962; and their activities are monitored by the Chief Registrar of Friendly Societies.

As a matter of policy the building societies have tried to keep interest rate charges, both to borrowers and to shareholders and depositors, to a minimum, and until 1983 they determined their rates as a CARTEL. Since the claims they create are short-term they must eventually follow sustained interest rate changes in similar types of assets. The societies for long enjoyed a tax advantage, being permitted to deduct income tax on the interest payable on shares and deposits at an average rate; this allowed them to pay such interest on a 'tax-paid' basis which was favourable to depositors liable to high marginal tax rates, until the tax changes in 1991, which now require a higher rate tax-payers to pay the difference in their individual tax assessments.

business cycle. See TRADE CYCLE.
business performance. The extent to which an industry achieves the goals or objectives its member firms pursue. Performance is multi-dimensional and can cover aspects such as profitability, innovation, product design and quality and growth. (See STRUCTURE-CONDUCT-PERFORMANCE FRAMEWORK)

business risk. See CORPORATE RISK.

buyer concentration. Refers to the extent to which total transactions within a market are dominated by the largest few buyers. The two extremes are MONOPSONY, i.e. the single buyer, and the many buyers of PERFECT COMPETITION where there are a sufficiently large number in relation to total market size for all buyers to be PRICE TAKERS.

buyers' market. A market characterized by excess supply in which sellers consequently experience difficulty in selling all their output at anticipated prices.
calculus. The branch of mathematics concerned with the calculation of DERIVATIVES (differential calculus) and INTEGRATION (integral calculus).

call money. Funds borrowed by DISCOUNT HOUSES from the clearing and other banks in London, and which they employ in holding a portfolio of assets. A high proportion of these funds are borrowed literally 'at call', that is they can be withdrawn ('called') without notice, on a daily basis. Some, however, are lent at seven days' notice or for even longer periods. For the CLEARING BANKS call money represents their most liquid asset after cash and balances at the Bank of England, and is used for the adjustment of day-to-day changes in their total resources. In the US call money is interest-bearing deposits in US and foreign banks that can be withdrawn with 24 hours' notice. Many EUROCURRENCY deposits take this form.

call-option. A contract giving the option to buy SHARES at a future date within a pre-arranged time limit. (See also PUT-OPTION, OPTION.)

Cambridge Equation. See QUANTITY THEORY OF MONEY.

Cambridge K. See QUANTITY THEORY OF MONEY.

Cambridge School of Economics. A group of economists who were influenced by the writings of, and contact with, A. MARSHALL. The major figures of the original school were A.C. PIGOU, D.H. Robertson and J.M. KEYNES, though the last-mentioned developed a new body of thought, which with that of RICARDO and MARX has supplied the foundations of the modern Cambridge School.

The modern school is particularly critical of NEO-CLASSICAL ECONOMICS and of the work of P. SAMUELSON and R. SOLOW of the Massachusetts Institute of Technology (MIT) of Cambridge, USA, who are seen as its main representatives. This antagonism has given rise to a debate between the two Cambridges which has continued from the 1930s to the present with the participants scarcely agreeing on the importance of topics considered or on the techniques of the discussion.

The modern Cambridge School (England) see an economic model as encompassing, historical, sociological and psychological notions and facts as well as the purely economic. In its attack on neoclassical economics, a principal target has been the use of the AGGREGATE PRODUCTION FUNCTION, especially in GROWTH THEORY. Some of the more noteworthy members of the school in Cambridge have been J. ROBINSON, N. KALDOR, Lord KAHN, L. Pasinetti and P. SRAFFA, though disciples are to be found in the USA, Canada, Australia and Italy.

Cambridge Theory of Money. See QUANTITY THEORY OF MONEY.

CAP. See COMMON AGRICULTURAL POLICY.

capacity model. A model to explain the rate of investment which is closely related to the ACCELERATOR and CAPITAL STOCK ADJUSTMENT models but especially the latter. It suggests that the ratio of NET INVESTMENT to CAPITAL STOCK depends on the ratio of OUTPUT to CAPITAL STOCK. Statistically it has been found to be more satisfactory as an explanation of investment than either the accelerator or capital stock adjustment models.

capacity utilization. The ratio of actual to potential output. This can refer to firms, industries or whole economies and gives a measure of the amount of the total capacity that is being used. (See EXCESS CAPACITY.)

capital. 1. A word used to refer to a factor of production produced by the economic system. Capital goods are produced goods
which are used as factor inputs for further production. As such capital can be distinguished from land and labour which are not conventionally thought of as being themselves produced by the economic system. As a consequence of its heterogeneous nature the measurement of capital has become the source of much controversy in economic theory.

2. The word is also used as a term for financial assets. (See financial capital, capital controversy, finance.)

capital account.
See balance of payments.

capital accumulation. The building up of the capital stock through positive net investment. (See Golden rule of accumulation.)

capital allowances. Allowances against corporation tax which are related to firm’s capital expenditure. Generally corporate tax systems provide for the depreciation of capital equipment to be allowed as a deduction. In the UK depreciation provisions which appear in a firm’s accounts may not be the same as the capital allowances allowed by the Inland Revenue. For expenditure on plant and machinery and industrial buildings generous rates were in force in the UK for some years. In 1972 first-year allowances on machinery were raised to 100 per cent, whilst the initial allowance on industrial building was raised to 50 per cent in 1974. In 1984 initial and first-year allowances on machinery and buildings were phased out. The existence of capital allowances obviously postpones the payment of corporation tax and so improves discounted post-tax returns. In the post-war period the UK government has often made capital allowances more generous in development areas than in the rest of the country to encourage investment in the former regions. Investment grants have often been used as a substitute for generous capital allowances or even as a supplement to them.

capital asset. An asset which is not bought or sold as part of the everyday running of a business. Examples would be buildings, machinery, land, or securities.

capital asset pricing model. This model, developed in the 1960s, gives a specific form to the general notion of a trade-off between risk and return. It postulates a positive linear relationship between the expected return on a diversified portfolio of assets and the systematic risk of that portfolio as measured by the beta parameter in the equation

\[ r = \beta \left( r_m - r_f \right) + \beta \] where \( r \) is the expected return on the portfolio, \( r_f \) is the riskless rate of interest, e.g. on Treasury Bills, \( \beta \) is a measure of the extent to which the returns on the portfolio move with the market portfolio, i.e. a combination of all securities each in proportion to its share of total market value (because of its broad-based nature all avoidable risk has been removed in the market portfolio, so that the risk which remains, termed systematic or market risk, is associated with movements of the economy), and \( r_m \) is the expected return on the market portfolio.

The term \( (r_m - r_f) \) is the market risk premium. Thus if \( r_f = 3\% \), \( r_m = 8\% \) and \( \beta = 2 \), (a \( \beta \) of this value would represent a risky portfolio where any change in the return in the market portfolio is magnified two-fold).

\[ r = 3 + 2(8 - 3) = 13\% \]

A closely related model, the market model, states that the return on a security or portfolio comprises a market component and a non-market component, that is

\[ r = a + \beta \left( r_m - r_f \right) + u \]

where the non-market component is \( u \), an error term, and \( a \), the average return on the security or portfolio, when the return on the market portfolio is zero. This model can be shown to be formally equivalent to the capital asset pricing model in the absence of the \( a \) term, which should in any case tend to disappear in an efficient market as funds are moved towards this higher yielding security or portfolio.

capital budgeting. The process of allocating investible funds to capital projects. Many techniques have been suggested for this purpose. There are traditional accountants’ methods such as payback period and rate of return on capital employed but these are not highly regarded by economists who have...
capital gain. The difference between the purchase price of an ASSET and its resale price at some later date, where that difference is positive. Thus, a house purchased for £10,000 in one year and which, without significant expenditures on it in the meantime, sells for £15,000 two years later will have made a capital gain of £5000. If the general level of prices has risen in the period, then the real gain will be less than the money gain. Clearly, if the money gain is less than the general level of inflation there will be a real capital loss. A money capital loss can also occur if, for any reason, the asset loses value over the relevant period. Since capital gains appears as a form of ECONOMIC RENT
they are often subject to special forms of taxation. (See CAPITAL GAINS TAX.)

capital gains tax. A tax levied on the capital APPRECIATION of ASSETS. In most Western countries capital gains are not classed as income but it is recognized that they confer purchasing power and so are a fit subject of taxation. In practice it is only realized gains which are taxed rather than accrued. Generally it is monetary gains which are liable rather than real gains. This has given rise to controversy in recent years when inflation rates have been high. Some other forms of capital gain such as those reflecting falls in interest rates on government securities have also been the subject of controversy.

In the UK, gains from April 1982 are calculated after taking account of inflation by the indexation of acquisition costs. The coverage of the tax includes a wide range of assets with significant exceptions. In the UK, gains from main private residences are exempt as are those from private cars, life insurance policies, and the first £5000 of gains. In the UK income and capital gains have been taxed at the same rate since 1988. Prior to this the standard rate of capital gains tax in the UK was 30 per cent with lower rates for small gains.

Under present US law, realized capital gains are, with two primary exceptions, taxed as regular income. First, capital losses, up to a limit of $3000, may be used to offset any capital gains. Secondly, for persons aged 55 or over there is a one time exemption of up to $150,000 of any capital gain resulting from the sale of a primary residence.

capital gearing.
See GEARING.

capital goods.
See CAPITAL.

capital intensity. The ratio of capital to labour employed in the process of production. The higher the ratio the more CAPITAL INTENSIVE the production process. (See PRODUCTION FUNCTION.)

capital intensive. A technique of production A is said to be more capital intensive than some other equivalent technique B if the ratio of capital to other FACTORS OF PRODUCTION is greater in A than in B.

capital-intensive economy. An economy in which the majority of production techniques are CAPITAL INTENSIVE. Most advanced industrial countries have this property which has led some people to suggest that this is the only means to growth, but the CORRELATION between CAPITAL INTENSITY and advanced countries does not necessarily imply causality. (See CAPITAL INTENSITY.)

capital-intensive sector. A sector in an economy where the majority of production techniques are CAPITAL INTENSIVE in nature. The industrial sectors in less developed countries are usually capital-intensive although there is often a scarcity of capital and surplus labour. Some development theorists have maintained that the only way to achieve growth is by this type of industrial development. (See CAPITAL INTENSITY, CAPITAL-INTENSIVE TECHNIQUES, APPROPRIATE TECHNOLOGY)

capital-intensive techniques. A production technique which has a higher proportion of CAPITAL than any other factor of production. (See CAPITAL, FACTORS OF PRODUCTION.)

capital, marginal efficiency of.
See MARGINAL EFFICIENCY OF CAPITAL.

capitalism. A political, social and economic system in which property including capital assets are owned and controlled for the most part by private persons. Capitalism contrasts with an earlier economic system FEUDALISM, in that it is characterised by the purchase of labour for money wages as opposed to the direct labour obtained through custom, duty or command in feudalism. It differs from SOCIALISM principally in its prevalence of private ownership as opposed to social ownership of the elements of production. Under capitalism the price mechanism is used as a signalling system which allocates resources between uses. The extent to which the price mechanism is used, the degree of competitiveness in markets, and the level of government intervention distinguish the exact forms of capitalism.

capitalization. The total amount and structure of the share CAPITAL of a company. All companies must have owners who own the ORDINARY SHARES or EQUITIES. A company with only one class of share is said to have a straight capitalization. Many companies have several different types of capital issued and are then said have a differentiated or structured capitalization. The total market value of a company's issued share capital is termed its market capitalization. The term capitalization also refers to the act of converting net retained profits or reserves into issued share capital.

capitalization issue. See BONUS ISSUE.

capitalization rates. A concept which relates the proportion of each class of share or debt capital in a company to its total market CAPITALIZATION. Many large companies have several classes of SHARES, for example, ordinary shares, preference shares and debentures, and the use of this ratio indicates the relative importance of each in the CAPITAL STRUCTURE.

capitalized value. The value which would be placed on an asset at its existing level of earnings and at current market rates of interest. Thus if an asset were yielding £10 and the current rate of interest were 10 per cent the capitalized value would be £100. It is sometimes argued that values calculated in this manner are not always satisfactory for valuing assets, for example in the case of compulsory purchase. This is because an owner might himself value the asset more highly and might be prepared to pay more in order to retain it.

capital-labour ratio. The ratio at which LABOUR and CAPITAL are combined within the Production process. Generally labour and capital are measured as flows per unit of time. (See INVESTMENT.)
capital-labour substitution. The process of altering the FACTOR PROPORTIONS of CAPITAL and LABOUR in a production technique; if one factor costs less than the other, there will be a tendency for the expensive factor to be substituted by the cheaper one in a free market situation. (See CAPITAL, LABOUR, TECHNOLOGY, CHOICE OF.)
capital loss. See CAPITAL GAIN.
capital market. The market, or realistically the group of interrelated markets, in which capital in financial (i.e. monetary) form is lent and borrowed or 'raised', on varying terms, and for varying periods. These vary from the ultra-short to long or, as in the case of EQUITIES, non-specified periods. There are strong forces causing conditions in one set of financial markets to affect others, notably the propensity of some lenders or borrowers to switch between them as opportunities for cheaper borrowing or higher returns open up. This transmission effect, the result of arbitrage, is far from perfect, and is subject to complicating expectational effects, but it is sufficiently strong to justify reference to 'the' capital market in certain contexts. (See TERM STRUCTURE OF INTEREST RATES.)
capital movements. International flows of funds which may be undertaken by either private individuals or governments. An important element in the BALANCE OF PAYMENTS.
capital-output ratio. The ratio of the amount of capital to the amount of output produced by that capital. A constant capital-output ratio forms the basis of the ACCELERATOR PRINCIPLE. (See also INCREMENTAL CAPITAL-OUTPUT RATIO.)
capital rationing. Generally employed to define a situation where there is a budgetary constraint on the amount of funds available for investment in projects over and above the normal market constraint determined by the relationship between cost of capital and expected returns. Frequently this rationing will be self-imposed. A family firm may be unwilling to raise more EQUITY CAPITAL for fear of losing control or because a quiet life is preferred. Similarly, the directors may be
unwilling to borrow large sums because of restrictive conditions imposed by lenders. An important example of externally imposed capital rationing in the UK is that imposed by the government on nationalized industries. The presence of capital rationing means that ranking of projects is required to maximize the returns to scarce capital. The normal project appraisal in terms of NET PRESENT VALUE may have to be modified in these circumstances to maximize returns.

**capital requirements.** The estimation of capital requirements necessitates the determination of the \textit{INCREMENTAL CAPITAL-OUTPUT RATIO}, that is, the relationship between INVESTMENT and the consequent increase in INCOME.

**capital-reversing.** The adoption of a technique of production when the value of the associated capital stock and the rate of profit have both risen. It implies a positive relationship between the value of capital and the rate of profit. When only two techniques are being considered capital reversing implies \textit{DOUBLE SWITCHING} as the rising rate of profit means that a technique abandoned as the less profitable of the two will be readopted at a higher rate of profit implying a higher value of the capital stock associated with the abandoned technique. If more than two techniques are compared it is possible to have capital reversing without double switching, as a technique once abandoned may never be readopted for higher rates of profit, but techniques considered unprofitable at lower profit rates are adopted for higher rates.

**capital services.** The flow of services over time which stem from a stock of capital equipment. (See CAPITAL.)

**capital stock.** The aggregate or sum of CAPITAL goods in an economy. This implies that the stock of capital can be measured by a single number, and requires the heroic assumption that the diverse constituents of this stock (factories, roads, machinery, etc.) can be reduced to a common unit and summed to obtain an unambiguous measure of society's physical stock of capital. Karl MARX argued that capital consists merely of past embodied LABOUR and thus can be reduced to and valued in common units of labour time. (See also CAPITAL CONTROVERSY.)

**Capital Stock Adjustment Principle.** A theory which suggests that the level of NET INVESTMENT is a proportion of the difference between the desired CAPITAL STOCK and the actual capital stock, reflecting the possibility of imperfect adjustment to an optimal level in any finite period of time. (See ACCELERATOR PRINCIPLE.)

**capital structure.** The composition of a company's CAPITAL. A company must have ORDINARY SHARE capital but it can have several other types such as PREFERENCE SHARE capital and DEBENTURES or long-term debt capital. The capital structure refers to the weight which the different classes have in the total capital employed. The question of capital structure becomes particularly significant when a choice between debt and EQUITY capital is made. There is a major debate as to whether there is some optimal debt-equity ratio which minimizes a company's overall COST OF CAPITAL. The conventional view is that at very low levels of GEARING debt capital will be cheaper than equity capital because the level of risk is low with debt interest being a prior charge. The overall cost of capital is thus brought down with the use of debt. As the debt-equity ratio increases INTEREST becomes a bigger proportion of expected profits. The risks perceived by both equity owners and debt owners increase and so the required return by both rises as well. Even though interest is a prior charge there are still risks that at very high levels of gearing, profits may become adverse and be insufficient to pay the interest. The overall cost of capital is thus U-shaped as gearing is increased.

This view was challenged by the American economists MODIGLIANI and MILLER who argued in their original contribution that the overall cost of capital remained constant as gearing was increased. Essentially a situation where two companies with equal expected profits or equal risk but different levels of gearing had different total market values for their debt plus equity would be a non-equilibrium one. If one company had no gearing and the other had some debt which
reduced its overall cost of capital (and so enhanced its market value) it would pay individual shareholders in that company to indulge in gearing of their own to the same extent as that company's, sell their shares in that company and use the proceeds plus their borrowing to buy ordinary shares in the company with no gearing. A higher return would be obtained and the process would continue until the total market value of each company was the same. This analysis has been criticized on a number of grounds including the assumption that a given gearing ratio of an individual was no more risky than the same undertaken by a company, the omission of the danger of bankruptcy and the deductability of interest for CORPORATION TAX. If interest deductability is allowed the theory suggests that a maximum debt-equity ratio minimizes the cost of capital. On its own assumptions the Modigliani-Miller theory may be valid but the assumptions in the conventional analysis are more realistic. (See COST OF CAPITAL.)

capital tax.
See WEALTH TAX.

capital theoretic approach. An approach to economics, which views all resources as CAPITAL, i.e. as the net present value of their future income streams.

capital theory.
See CAPITAL CONTROVERSY.

capital transfer tax. A tax on transfer of WEALTH introduced in the UK in 1974 to replace ESTATE DUTY, and renamed inheritance tax in 1986. The capital transfer tax comprised a lifetime gifts tax and an inheritance tax.

capital turnover criterion. An early investment criterion suggested for use in DEVELOPING COUNTRIES. The suggestion is that projects be selected in accordance with their INCREMENTAL CAPITAL-OUTPUT RATIO and that priority be given to those with the lowest ratio. The argument was that in capital scarce countries a high rate of capital turnover would lead to an efficient allocation of resources. The use of the criterion would also lead to the utilization of LABOUR-INTENSIVE PRODUCTION TECHNIQUES which would be appropriate in developing countries. The criterion has been the subject of much criticism. Thus it does not take into account the fact that in many projects, e.g. in the agricultural sector, fixed capital may be a small proportion of the total investible inputs required and so the use of the criterion could lead to projects being ranked in an inappropriate manner. It does not take sufficient cognizance of the fact that there are other scarce resources in developing countries. The criterion takes no account of EXTERNALITIES and complementarities of projects. Further, it does not take into account the possibility that scarcity of skilled labour may be an impediment to growth.

capital widening. The process of accumulating CAPITAL at the same rate as the growth of the LABOUR FORCE so that the CAPITAL-LABOUR RATIO remains constant. (See also CAPITAL DEEPENING.)

capitation tax.
See POLL TAX.

capture theory. A theory of regulation developed by George STIGLER. Basically, an industry that is regulated can benefit from its regulation by 'capturing' the regulatory agency involved. This can occur because of political influence; superior technical knowledge that forces the regulatory agency to depend on the industry; appointees being selected from the regulated industry or the possibility of future positions in the industry; and the agency's need for recognition and informal cooperation from the industry.

carbon tax. A tax on fossil fuels to reduce the emission of carbon dioxide in an attempt to reduce global warming. The tax can be seen as an effort to internalise the costs associated with global warming and should be applied at different rates to fuels according to the amounts of carbon dioxide generated in their use. (See EXTERNALITIES, INTERNALIZATION.)

cardinalism. The doctrine that UTILITY is measurable in cardinal units. (See CARDINAL UTILITY.)

cardinal utility. Two meanings of this term may be distinguished. The first and less likely one is that the UTILITY attached to a
bundle of goods is capable of absolute measurement in terms of some units such as 'utils' (a term used for example by JEVONS in his *Theory of Political Economy* in 1871) which would be comparable to the units used for height, weight and distance. That is, absolute numbers would be placed on the utility level and those numbers would be related to a 'real' origin of zero (we do not speak of minus weights or distances).

The second and more widely used concept relates only to the intervals between utility levels. Thus, faced with four situations 1, 2, 3 and 4, if a consumer can say that the difference between the utility levels of 1 and 2 is some multiple or fraction of the difference between the utility levels of 3 and 4, he can be said to have scaled his utility levels in cardinal terms. The difference between this 'interval' interpretation and the absolute interpretation given above is that the 'interval' approach does not require us to attach absolute numbers to levels of utility.

In general, few economists now believe that utility is measurable in cardinal terms in either of the senses above. Indeed, it was the reaction against the unreality of cardinal measurement that gave rise to ORDINALISM. (See also ORDINAL UTILITY.)

cartel. Formal agreement between firms in an oligopolistic market to co-operate with regard to agreed procedures on such variables as price and output. The result is diminished competition and co-operation over objectives as, for example, joint PROFIT MAXIMIZATION or avoidance of new entry. In general side-payments must be made between cartel members in order to induce adherence to these objectives.

Interest in the economic analysis of cartels has focused on the conditions which can lead to instability in cartel organizations. In particular, the problem of the flefector has attracted considerable attention. (See OLIGOPOLY.)

cartel sanctions. Penalties imposed by members of a CARTEL to induce adherence to the joint goals of the group.

cash. In its broadest sense simply denotes MONEY, including CURRENCY and BANK DEPOSITS. In some contexts it may be restricted to the most liquid forms of money, i.e. currency and CURRENT ACCOUNT (or demand) deposits. In the case of BANKS the term covers currency in tills or vaults plus balances held with the CENTRAL BANK.

cash balance approach. 
See QUANTITY THEORY OF MONEY.

cash crops. This term refers to crops grown by peasant farmers specifically for sale in the market as opposed to crops directly consumed for SUBSISTENCE purposes.

cash flow. The sum of retained earnings and depreciation provision made by firms. As such it is the source of internally generated long term funds available to the company.

cash limit. A form of control on PUBLIC EXPENDITURE introduced in the UK. The technique involves setting a pre-ordained limit to the amount a government department will be allowed to spend in total rather than judging each element of expenditure on its merits as it arises. The system was introduced in response to a belief that government expenditure was growing out of control. Cash limits are a rather blunt instrument in that their existence may prevent economically worthwhile projects from going ahead simply through lack of funds. (See also PUBLIC EXPENDITURE SURVEY COMMITTEE.)

cash ratio. The ratio which banks maintain between their holdings of CASH and their deposit liabilities, and sometimes referred to as the cash reserve ratio. Historically it was determined by day-to-day LIQUIDITY needs, but it tended to become conventionalized and in most banking systems became fixed by law or regulated in some way by the CENTRAL BANK. This regulation or prescription, always of a minimum ratio, was partly to ensure prudent operation and maintain public confidence in the banks. With the development of the theory of CREDIT CREATION, and its consequences for the MONEY SUPPLY, a stable or controllable minimum cash ratio came to be regarded as a necessary condition of monetary control, and a controlled variable cash ratio a positive instrument of such control. In some systems where cash ratios are subject to legal or other control, differing ratios may be required for demand and TIME DEPOSITS, and
even, as in the FEDERAL RESERVE SYSTEM, between reserve city banks and banks elsewhere. In the UK, under the new monetary control arrangements introduced in August 1981, all institutions listed as BANKS or 'licensed deposit takers' under the banking Act, 1979, are required to hold a non-operational (i.e. non-usable) balance with the Bank of England equal to one half per cent of defined 'eligible liabilities' (broadly, deposit liabilities less certain offsets). However, this ratio has no control function and is simply a contribution of free resources to the Bank to provide it with operating revenue. Above this amount the institutions are free to determine their holdings of cash according to their own prudential needs, though they are required each day to indicate their target holdings to facilitate the bank's daily operations in the MONEY MARKET. (See LIQUIDITY RATIO, COMPETITION AND CREDIT CONTROL, MONETARY MANAGEMENT.)

casual employment. The state of being employed on an ad hoc basis without regular hours or a wage contract; this is the exception rather than the norm in advanced countries but the opposite is true in the underdeveloped world. Many people employed on this basis are self-employed and they constitute the INFORMAL SECTOR.

categorical grant (also known as a selective grant.)
See GRANT.

causality. A concept which arose from an examination of the underlying assumptions of an ECONOMETRIC MODEL estimated from time series data which were non-experimental in origin. The current use of causality in time series analysis is attributable to Granger (1969). A variable x is said to 'cause' a variable y, if taking account of past values of x makes possible better prediction of y. This definition of causality is closer to the more restrictive concept of predictability (see PREDICT). This has resulted in the term GRANGER CAUSALITY. Statistically it is linked to EXOGENEITY, and COINTEGRATION. See Granger, C.W.J., 'Investigating causal relations by econometric models and cross-spectral methods', Econometrica, 31 (1969), PP 424-438.

CBI. See CONFEDERATION OF BRITISH INDUSTRY.

ceiling. The limit to upward growth of output in TRADE CYCLE theory. The ceiling is reached when all factors of production are being utilized at their full capacity output levels. The stocks of such factors (i.e. labour and capital) may be augmented such that the ceiling grows over time. Sir John HICKS is much associated with work in this area of dynamic economics. (See also FLOOR.)

Celler-Kefauver Act. Enacted in the US in 1950 as an amendment to the CLAYTON ACT. The purpose of the act was to strengthen further the law against anticompetitive Mergers. Specifically, this Act closed a loophole that had previously allowed mergers based on acquisition of a corporation's ASSETS as opposed to its stock. The act also prohibited mergers if an industry showed a trend toward CONCENTRATION. This Act has had the effect of greatly inhibiting VERTICAL and HORIZONTAL MERGERS of large corporations.

central bank. The institution charged primarily with controlling a country's money and banking system, though with other functions depending on the financial structure and environment. The BANK OF ENGLAND was the first true central bank in the UK although, exceptionally, it developed this role while still a limited COMPANY with private shareholders and was nationalized only in 1946. In most cases central banks have been established as public bodies, though the constitutions of some give them large degrees of entrenched independence of their governments. In the US the central bank is a federally structured system, THE FEDERAL RESERVE SYSTEM consisting of 12 reserve banks under the overall control of the Federal Reserve Board. The powers and precise functions of central banks vary widely, the most essential being those connected with the operation of MONETARY POLICY, though these powers themselves are subject to any external constraints on the country's ability to pursue independent policies. Such powers include some or all of the following: undertaking OPEN MARKET OPERATIONS, determining a key short-term INTEREST or DISCOUNT RATE, determining and varying the minimum RESERVE RATIOS of banks, issuing directives to
banks and other financial institutions on their lending activities. An important function, from which much of the influence and powers of a central bank derive, is to act as LENDER OF LAST RESORT. Yet another important function is to set and maintain standards of integrity, financial strength and sound lending practice on the part of banks and other financial institutions. Where the national debt is large, as in the UK, its management cannot be separated from open market operations and the general conduct of monetary policy, and this therefore becomes an essential function of the central bank. The same applies, under modern conditions, to the management of the EXTERNAL RESERVES and the EXCHANGE RATE. Currency issue is a common, though non-essential, function of central banks, as is the provision of general banking services to government departments and agencies. As a general rule central banks are precluded from engaging in banking business with the public, that of the Bank of England being a historical survival of limited extent.

**Central Bank of Central Banks.**

*See BANK FOR INTERNATIONAL SETTLEMENTS and INTERNATIONAL MONETARY FUND.*

**central business district.** The area at the centre of most cities and large towns which is dominated, in terms of land use, by commercial activities. The central business district is generally the area of highest land values and rents in the city since commercial and financial activities are willing to pay high rents in order to obtain the advantages of a central, and thus highly accessible, location. *(See also ACCESS/SPACE TRADE-OFF MODEL.)*

**centralization of reserves.** The term given to plans proposing the location of reserves of currency and gold with a central international institution. It is based on the idea that currency holdings should be used only for working balances, with the majority of reserves kept as credit money controlled by a central institution which would act as a CENTRAL BANK to central banks. This would resemble a widely expanded INTERNATIONAL MONETARY FUND, and the establishment of SPECIAL DRAWING RIGHTS (SDRs) is a step in this direction.

**Central Limit Theorem.** This states that the sum (and MEAN) of a set of RANDOM VARIABLES will follow a NORMAL distribution if the sample is sufficiently large, regardless of the form of the distribution from which the individual variables come. The theorem is often used to justify the assumption of normality of the error term in econometric work, which allows the use of the usual T-STATISTICS for HYPOTHESIS TESTING, since this error term is supposedly composed of the sum of a set of random omitted factors.

**Central Place Theory.**

*See LOCATION THEORY.*

**central planning.**

*See PLANNED ECONOMY.*

**Central Policy Review Staff.** An office, set up in the UK in 1970, whose responsibilities included conducting analyses of major economic policy issues for the Cabinet office. The office, colloquially known as the 'think tank', co-ordinated its operations with those of the PUBLIC EXPENDITURE SURVEY COMMITTEE and various government departments. The CPRS was wound up in 1983.

**Central Statistical Office.** A British government office responsible for compiling, synthesizing and publishing statistics generated by government departments and semi- and non-official bodies in the UK. The office publishes a comprehensive survey of national economic data via regular reports on NATIONAL INCOME and expenditure, employment, industrial production indices, INPUT-OUTPUT TABLES, financial flows and the BALANCE OF PAYMENTS.

**certainty equivalence.** In contexts of RISK or UNCERTAINTY, variables will take on values with at least two characteristics: a mean (average) value and some measure of the riskiness or uncertainty surrounding that mean, say the STANDARD DEVIATION. The certainty equivalence procedure consists of finding a value of the variable such that the individual is indifferent between that value, obtainable with certainty, and the 'gamble' of the variable having a higher mean value but with a standard deviation greater than zero. Much more generally, entire models incorporating random terms can be reduced
to 'certainty equivalent' models which are accordingly simpler to deal with. (See BERNOULLI HYPOTHESIS.)

**certificate of deposit.** A document issued by a bank acknowledging a deposit of money with it, and constituting a promise to repay that sum, to the bearer, at a specified future date. Certificates of deposits (CDs as they are called) are 'negotiable', that is, may be transferred by simple delivery, which, given an active market, makes them highly liquid for the holder while securing the funds to the bank for a fixed period. Interest is paid on certificates of deposit, annually if the term to maturity is longer than a year, at maturity if less. Certificates of deposit originated in the US in the early 1960s, the first sterling certificates of deposit being issued in 1968. The issue of sterling certificates of deposit is subject to controls laid down by the BANK OF ENGLAND: one of these fixes their term to maturity at between three months and five years. In London there is an active SECONDARY MARKET in sterling certificates of deposit with the DISCOUNT HOUSES acting as the principal dealers.

**CES production function.**

See CONSTANT ELASTICITY OF SUBSTITUTION PRODUCTION FUNCTION.

**ceteris paribus.** A Latin expression meaning 'other things being equal'. Economic analysis frequently proceeds by considering the effect of varying one or a few INDEPENDENT VARIABLES while other things remain unchanged. To indicate that this is being done, the term ceteris paribus is employed.

**chain rule.** (also known as function of a function rule.) A rule for the determination of the DERIVATIVE of a function with respect to a variable, where the function consists of a function of a function of the variable. Thus, for instance, where \( Y = \Delta m \), and also

\[
\frac{dY}{Y} = \frac{dY}{du} \cdot \frac{du}{u}
\]

**Chamberlin, Edward** (1899-1967). American economist best known for his *Theory of Monopolistic Competition* (1933) in which he analysed, independently of the work in the UK by e.g. Joan ROBINSON, the market situation between PERFECT COMPETITION and MONOPOLY, where firms compete with each other, since demand for their goods is not unaffected by the existence of other firms, but where each firm enjoys some degree of monopoly since it has its own distinct product. Competition can take the form of product competition, in which advertising is important, as much as price competition.

Chamberlin stresses product differentiation as opposed to market imperfection, including under the former factors such as brand names, special qualities, form, packaging, and sales service. One of the important conclusions to emerge from his analysis is that monopolistic competition is likely to be characterized by EXCESS CAPACITY, a result which has subsequently been challenged, since it appears to depend on the assumption that all members of the group operate under identical cost conditions.

**characteristics theory.** Generally associated with CONSUMER DEMAND THEORY and the work of K. Lancaster. The basic idea is that consumers do not demand products but the characteristics of products. Thus demand is not for housing but for accessibility to shops and schools, clean air, peace and quiet, a garage, room for the children to play and so on. The procedure is then analogous to INDIFFERENCE CURVE ANALYSIS but preferences are expressed across characteristics rather than products. Note too that new products are not easily dealt with in traditional demand theory, whereas on the characteristics approach it can be incorporated by simply noting its characteristics in comparison with existing goods. The characteristics approach has made some impact on the study of the economics of housing demand and on the estimation of the price of unmarketed 'bads' such as noise and air pollution. (See HEDONIC PRICES.)

**charge account.** A credit facility extended by retail traders to customers. Conditions normally call for settlement within a given period though until recently failure to meet this rarely incurred a penalty. With rising interest rates and inflationary pressures on costs, traders have increasingly begun to
include a 'service' or interest charge on outstanding balances owed.

**charged in full.**

*See CIF.*

**cheap money.** Denotes a phase in which loans are available at low rates of interest or a policy which creates this situation. The term is frequently used to describe the policy of low rates in the UK after 1931, a policy initiated by a conversion of the then NATIONAL DEBT to lower interest rates.

**check-off.** The direct deduction by the employer of union dues from the employee's wage, which charge is then paid over to the union. Check-off arrangements require the written assignment of the employee.

**cheque.** A document, normally supplied in printed form by a BANK, ordering the bank to transfer funds from the drawer's CURRENT ACCOUNT to a named payee. If the payee signs the reverse side of a cheque it becomes 'negotiable', i.e. he may assign his claim in it to someone else simply by handing it over. A cheque 'crossed' with two lines and bearing the words 'and Co.' effectively can be paid only by being credited to a bank account; it should not be paid in cash over a bank's counter.

**cheque card.** Cards issued by banks to CURRENT ACCOUNT customers, which guarantee the payment of CHEQUES drawn by these customers up to specified limits. Such cards also permit the holder to obtain cash up to this limit, on demand, from any branch of the issuing bank.

**Chicago School.** The name applied to those economists who share four primary beliefs. Firstly, they believe that economics is (or can be) value-free in the same manner as the physical sciences. Secondly, they believe neo-classical price theory provides an accurate explanation of how economic systems work. Thirdly, they believe that the operation of free, competitive markets provide the best possible solution to the problem of resource allocation. Finally, they are staunch adherents of MONETARISM. All this leads them to advocate limited government intervention in the economic system. The name derives from the fact that many prominent members of the 'school' (e.g. FRIEDMAN, KNIGHT, SCHULTZ and STIGLER) have been associated with the University of Chicago.

**child allowance.** In most INCOME TAX systems an allowance for dependent children is given. The idea is to provide some relief for the costs of maintaining children. In the UK the value of the allowance increased with the age of the dependent child reflecting the higher living costs of older children. Under a PROGRESSIVE income tax the value of this type of allowance increases with the marginal rate of tax and assistance for people receiving low incomes could be zero or negligible. In the UK the income tax allowance has been phased out and replaced by child benefit which is a straight, untaxed cash payment per child.

**Chi-square Distribution.** (also known as $X^2$) A probability distribution with parameter $n$ degrees of freedom. The distribution is useful in econometric work since the sum of squares of $n$ independent standard normal variables follows approximately a Chi-square distribution with $n$ degrees of freedom. *(See also CONTINGENCY TABLES.)*

**choice of technology.**

*See TECHNOLOGY. CHOICE OF.*

**choice variable.** A variable in an optimization problem, whose value is 'chosen' so as to optimize the value of the OBJECTIVE FUNCTION. Choice variables are normally the INDEPENDENT VARIABLES of the objective function.

**CIF.** Cost, Insurance, Freight or Charged in Full. A term which describes pricing or valuation of a good to include all of the costs, known as TRANSFER COSTS, of delivering the good to the point of consumption. It may be contrasted with the FOB or free on board method where the transfer costs are excluded. In British overseas trading accounts imports are measured CIF while exports are calculated FOB. However, for the purpose of calculating the BALANCE OF PAYMENTS both are calculated FOB. Transfer costs are then counted in INVISIBLES.
circular flow of income. The flow of payments and receipts between domestic firms and domestic households. Money passes from households to firms in return for goods and services produced by firms and money passes from firms to households in return for the factor services provided by households. The simple notion that the money value of the income of households must equal the money value of output of firms and the money value of households expenditures to purchase this output provides the basis for NATIONAL INCOME accounting. It should be noted that total incomes or expenditures or indeed the money value of output, during a period of time, will normally be several times the value of the stock of money in this simple model for one unit of money will change hands several times in the period. WITHDRAWALS result in a reduction in the circular flow of income while INJECTIONS provide an addition. For equilibrium withdrawals must equal injections. (See the simple INCOME-EXPENDITURE MODEL.)

circulating capital. See WORKING CAPITAL.

Clark, John Bates (1847-1938). Appointed Professor at Columbia University in 1895, his major publications include Philosophy of Wealth (1885); Distribution of Wealth (1899); Essentials of Economic Theory (1907); and Problems of Monopoly (1904). He has some claim to the independent discovery of the principle of marginal analysis, and is regarded as the founder of the MARGINAL PRODUCTIVITY DOCTRINE in the US. His individual route to the marginal productivity theory came through a generalization of the RICARDO notion of RENT. He went further than VON THUNEN, JEVONS, Menger and Walras by asserting that income distribution according to the ‘law’ of marginal productivity is ‘fair’.

classical dichotomy. The separate and independent determination of relative and absolute prices in CLASSICAL and NEO-CLASSICAL ECONOMICS.

In the classical and neo-classical analysis of employment and output all variables are initially expressed in REAL terms and in relative prices. At its simplest, output is a function of employment and the technique of production. Employment depends on the real wage. The real wage depends on the supply and demand for labour. To determine the absolute level of prices and wages, the QUANTITY THEORY OF MONEY in one of its forms is introduced separately.

The implication of this procedure is that money is neutral and can have no effect on real magnitudes. It is one of the postulates of KEYNESIAN ECONOMICS, which attempts to integrate money and real variables, that money is not neutral. It may be held as an asset in IDLE BALANCES in the face of an uncertain future, and this decision may lead to a failure in effective demand for some good or service with resulting unemployment. This offends the classical conception of the NEUTRALITY OF MONEY.

The Keynesian position in turn has been attacked by the advocates of MONETARISM who, postulating RATIONAL EXPECTATIONS, argue that economic behaviour is influenced by real and not nominal magnitudes. This implies that, apart from a short run in which the perception of events may be imperfectly formed, money will determine nominal values but have no influence on such real magnitudes as output and employment. On this view the classical dichotomy remains valid. (See NEO-CLASSICAL SYNTHESIS.)

classical economics. The economic thought of the period from the mid-eighteenth to the mid-nineteenth century, of which the greater part emerged from the UK. Its principal exponents were Smith, Ricardo, Malthus, Say, Senior and J.S. Mill.

Classical economic theory was essentially about growth and development and set out to investigate the nature and causes of the wealth of nations and the distribution of the NATIONAL PRODUCT among the FACTORS OF PRODUCTION within the framework of growing population and finite resources and of free competition in a private enterprise economy. The emphasis lay on capital accumulation, expansion of markets and the DIVISION OF LABOUR. Classical economics was also strongly orientated towards policy-recommendations, though intervention was argued for on pragmatic grounds, usually
when the market failed. Its successor, neo-classical economics, was static in outlook, since it concerned itself with a study of the principles determining efficient resource allocation.

Classical economics also examined microeconomic problems. The classical theory of value stressed the costs of production and labour theory of value, while neo-classical economics stressed the subjective aspects of value. While in neo-classical economics all prices are determined by the same forces (supply and demand and their underlying cost and demand conditions), classical economics has to rely on special theories. The prices of products are derived from the 'natural' rates of reward of the factors used in their production: the reward to land, rent, is determined by scarcity and the differential fertilities of land, the wage by the long-run cost of the means of subsistence of labour, while profit is a residual. Unlike other schools of thought, with the exception of Marx, classical economics is distinguished by the fact that it had a theory of population, since the Malthusian approach was accepted by most members. Where classical economics had weaknesses was in its inadequate treatment of aggregate demand (see Say's Law) and its lack of clarity on what determined the supply of capital to meet the wage bill (the wage fund) and physical investment.

In their methodology the classical economists fell into two camps. There were those who followed the inductive method, e.g. Smith, who formulated premises on the basis of empiricism, derived empirical laws, reasoned on the basis of these and tested the result against other empirical data. There was a second group, of whom the best known was Ricardo, which followed the deductive method of making hypothetical premises, deducing conclusions from them and making no attempt to verify the results, a procedure which Schumpeter in his History of Economic Analysis (1954) has called 'the Ricardian vice'.

classical techniques. A term normally used to describe standard statistical techniques, in order to distinguish them particularly from Bayesian techniques. The feature of classical methods is that no information other than the sample data is used to make statistical inferences, or in the estimation of parameters of regression equations.

clay-clay. An aspect of the production function in growth theory which does not allow the capital-labour ratio to be varied either before or after investment is carried out. The term 'clay', referring in particular to capital, is used due to that substance's assumed lack of malleability when compared with 'putty'. (See putty-clay and putty-putty.)

Clayton Act. Passed in the US in 1914. Its purpose was a specific definition of anti-trust violations in an attempt to make the Sherman Act less vague. The Clayton Act prohibits price discrimination which substantially lessens competition or creates a monopoly; contracts which prevent buyers from dealing with seller's competitors; tying contracts; acquisition of one corporation's shares of stock by another which will substantially lessen competition; and interlocking directorates between competitors. The Act exempts labour from antitrust provisions. (See also Cellar-Kefauver Act and Robinson-Patman Act.)

clean float. When a floating exchange rate is allowed to vary in complete freedom from any intervening influence by the monetary authorities, there is said to be a 'clean float'. This rarely happens in practice. (See also dirty float.)

clearing banks. In the UK, denotes those commercial banks which traditionally operated and had access to a clearing house or its equivalent for the purpose of clearing cheques drawn against one another. The 'London clearing banks' embraced the major domestic retail banks of England and Wales, and similarly in the case of the Scottish clearing banks. The term has not been used in connection with the Northern Irish banks, though these banks do operate a clearing arrangement for local cheques. In the case of the London clearing banks,
with the admission of the Central Trustee Savings Bank and other banks to the London Clearing House in 1975 and after, the term lost its functional denotation and the 'Committee of London Clearing Bankers' (CLCB) became the title of the trade association of the major domestic banks. In September 1985 the CLCB was replaced by the Committee of London and Scottish Bankers, to act in the interests of this wider group of (mainly) domestic commercial banks, though the Committee of Scottish Clearing Banks continues in existence to handle issues of particular relevance to the Scottish banks.

In the US regional and local banks enter into an arrangement whereby cheques drawn against each other are exchanged and the net balance due or owed is determined on a daily basis. The remainder of the cheques, drawn on those banks outside the region, are cleared through the FEDERAL RESERVE SYSTEM.

clearing house. The place in London where the London CLEARING BANKS and the BANK OF ENGLAND - and in Edinburgh, the Scottish joint stock banks - carried out the daily clearing of cheques and other claims on each other. 'Clearing' is an operation by which a group of banks (or any group of transactors for that matter) holding CHEQUES, BILLS or other documentary claims on each other, in presenting them for payment engage in a process of mutual offsetting of these claims which results in each bank emerging with a single net debtor or creditor position which it settles with the clearing organisation, usually by transfer of balances with the CENTRAL BANK. In 1975 the Central Trustee Savings Bank and the Cooperative Bank, and in 1983 the National Girobank, were admitted to membership of the London Clearing House. In Scotland, with the consolidation of the banking system into three banks the centralised clearing of cheques was discontinued in favour of each bank presenting cheques individually to the others. In 1969, in London, the Bankers' Automated Clearing System (BACS) was established to handle electronically the clearing of regular payments, such as credit transfers and direct debits. In 1984 the Clearing House Automated Payments System (CHAPS) was launched to provide a nationwide system of same-day clearing of high-value payments. Then in December 1985 a new countrywide organisation, the Association of Payment Clearing Systems (APACS) was inaugurated to oversee three clearing companies handling respectively the high volume paper clearing (cheques etc.), same-day clearing, and the electronic clearing of regular payments. With the rise in electronic payments systems the role of the traditional clearing house in the UK has declined in relative importance, though it continues to function as the venue for cheque clearing.

cliometrics. The name for the 'new' economic history which uses ECONOMETRICS to study issues treated by economic historians. In a sense all econometric work is cliometrics as the data used have been generated in the past. However, in general the greater the antiquity of the data the greater the justification for the term cliometrics.

closed economy. A concept used mainly in theoretical models to describe an economy with no external trade, which will be completely self-sufficient and insulated from external forces.

closed shop. In its American usage the term refers to an arrangement requiring workers to be members of the union before they are hired by a firm. In Britain, on the other hand, it is conventional to distinguish between pre-entry and post-entry forms, i.e. pre or post employment, of closed shop - the latter would be termed a UNION SHOP in the US.

Historically, closed shop agreements have been restricted to the skilled crafts and casual occupations in which the employer depended on the union to supply workers who were often only in temporary demand. Under this arrangement, the employer had a ready source of labour and the worker a place to get jobs. The closed shop thus made it possible to allocate scarce jobs. Equally, a worker might lose his job ticket via expulsion from the union, and favouritism as well as equity could enter the job allocation mechanism.

The closed shop presents unions with monopoly power, because of the control of labour supply. Also firms and unions may
collude with the express intention of monopo-
limizing a particular trade. Because of this
and other facets of the closed shop, it has
been declared illegal in the US. Similarly the
post-entry closed shop is illegal in the UK.

closing-prices. This is most commonly
used in connection with the STOCK-MARKET
to describe the prices of the STOCKS and SHARES
etc. at the close of trading on a particular
day.

club good. An intermediate case between
purely PUBLIC GOODS and PRIVATE GOODS.
With the club good EXCLUSION is feasible but
the optimal size of the club is in general
larger than one individual. An example
would be cinema shows. Here it is possible
for the good to be priced (exclusion can be
practised) and for a number of people to
share the same good without diminishing
each other's consumption of it. The size of
the OPTIMAL sharing group is that which max-
imizes their joint UTILITY. (See CLUBS, THEORY
OF.)

clubs, theory of. The theory of clubs is
part of the theory of IMPURE PUBLIC GOODS. A
CLUB GOOD is EXCLUDABLE (i.e. it is possible
to prevent its consumption by whole groups
of people, in contrast with PUBLIC GOODS) but
NON-RIVAL in that the consumption of the
good by one person does not reduce the
consumption of the same good by other
persons. Examples would be swimming pools,
museums, beaches and parks. Obviously,
the non-rivalry will cease when congestion
occurs and the UTILITY of any one individual
will therefore be affected by the presence of
more 'members' of the club. The aim of the
theory is to determine the optimal size of the
club, and the optimal provision of the good.
The Economic Theory of Clubs,' Journal of
Economic Literature, pp. 1481-1521.

Coase, Ronald H. (1910- ). A
British-born economist who was awarded
the Nobel Prize for Economics in 1991 for
his seminal work in the THEORY OF THE FIRM
and in the economics of EXTERNALITIES.
Coase, who was educated at and taught for a
time at the London School of Economics,
worked for most of his life at the University
of Chicago.

In 1937 in an article, 'The Nature of Firm',
Economica New Series IV, he raised the
question of why certain economic activities
were left to market exchange and others
carried out within firms. As markets and
firms are alternative ways of organizing pro-
duction, what is it that determines when
each is used? Coase answered the question
by saying the firm would expand to the point
where the cost of conducting the activity
within the firm became the same as conduct-
ning it through a market transaction. This was
the starting point for viewing industrial
organization from a transaction-cost per-
spective, namely that that form of organiza-
tion will be chosen which minimizes the
costs of an economic transaction.

In 1960 in an article, 'The Problem of
Social Choice', Journal of Law and
Economics, Vol. 3, Coase argued what has
come to be known as COASE'S THEOREM, that a
Pareto optimum is still possible in the pres-
ence of externalities in the absence of state
intervention, if bargaining is possible be-
tween the producer and recipient of an ex-
ternal effect and if PROPERTY RIGHTS are
clearly specified.

Coase's theorem. This theorem is based
upon the argument that EXTERNALITIES do
not give rise to a misallocation of resources
provided there are no TRANSACTION COSTS
and given PROPERTY RIGHTS that are well de-
defined and enforceable. Here the parties -
the producer and consumer of the externality
would have a market incentive to negotiate a
mutually beneficial trade, that is, to interna-
lize the externality. The neutrality theorem
states that the outcome of this trading pro-
cess would be the same irrespective of
whether it was the producer or consumer of
the externality who held the property right
of veto over the use of the resource.

Cobb-Douglas production function. A
PRODUCTION FUNCTION with the algebraic
form:

\[ Q = A \cdot L^a \cdot K^b \]

where \( Q \) is output, \( A, a \) and \( b \) are constants
and \( L \) and \( K \) are labour and capital respect-
ively. The function is homogeneous of de-
gree \( a + b \) (see DEGREE OF HOMOGENEITY and
PRODUCTION FUNCTION) since multiplication
of \( L \) and \( K \) by some constant, \( k \), will raise
output by a proportion \( k^{a+b} \). The proof is straightforward:

\[ Q^t = A_k L^a_k K^b = k^{a+b} (A_k L^a_k K^b) \]

If the exponents sum to unity the Cobb-Douglas function is LINEARLY HOMOGENEOUS - that is it exhibits constant returns to scale. If the exponents sum to more than unity the function exhibits increasing returns to scale, and if less than unity there are decreasing returns to scale.

The ISO-PRODUCT CURVE relating to a Cobb-Douglas function will exhibit the familiar convex shape and will be 'smooth'. If the function is linearly homogeneous it is possible to derive several propositions of interest. These are (i) that the AVERAGE and MARGINAL PRODUCTS of capital and labour are functions of the capital/labour ratio alone and (ii) EULER'S THEOREM holds. Moreover, (iii) if each input is paid according to its marginal product, then the exponents \( a \) and \( b \) will actually measure the share of total production accruing to labour and capital respectively. Proofs of these propositions may be found in A.C. Chiang, *Fundamental Methods of Mathematical Economics*, 2nd edition, McGraw Hill, New York (1974).

cobweb theorem. The simplest form of a DYNAMIC MODEL in which the supply of a good in year \( t \) is a function of the good's price in year \( t-1 \) and where, in any period, price is adjusted so as to 'clear the market'. Such examples may occur in agriculture where the decision to grow a crop or breed certain animals for food may be based on conditions in previous years. The effect can be to generate a process of fluctuating prices, with the fluctuations being 'damped' so as to converge on an EQUILIBRIUM of prices, or 'anti-damped' so as to continue fluctuating from one period to the next. Indeed, it is possible for the process to be such that the fluctuations grow over time. In this way 'cycles' of prices and output are generated and the process is sometimes called the 'cobweb cycle' or 'hog cycle', in the latter case because the phenomenon was observed in pig prices in the USA in the 1930s. Continued fluctuations only seem likely, however, if producers do not 'learn' from previous experience. It seems probable that a LEARNING PROCESS will in fact operate.

Cochrane-Orcutt. The name of a commonly used procedure designed to estimate the parameters of an equation whose RESIDUALS are subject to SERIAL CORRELATION, whereby the date is subjected to partial FIRST DIFFERENCE before estimation by ORDINARY LEAST SQUARES. It approximates to the GENERALIZED LEAST SQUARES ESTIMATOR. (See also PRAIS-WINSTEN.)

cobra determination. Worker participation in the process of policy decision-making in firms. In Germany the system of Mitbestimmung has been in existence since the early 1950s and provides for worker participation in decision making at board level. Worker directors together with shareholders sit on a supervisory board, which together with the managing board constitute, respectively, the policy and executive authorities within the firm.
**Coefficient of determination** (also known as $R^2$ multiple correlation coefficient.) A statistic which summarizes the explanatory power of an equation. It is the proportion of the variation in the dependent variable which is accounted for by the composite variation of the explanatory variables and is defined as

$$R = 1 - \frac{\sum e^2}{\sum y^2}$$

where $\sum e^2$ is the residual sum of squares, and $\sum y^2$ is the sum of squares of the dependent variable. Thus $R^2$ lies between zero and unity. The closer to zero it is, the less is the explanatory power (the higher the residual variation as a proportion of the total), and vice versa for values close to unity. (See also ADJUSTED $R^2$, GOODNESS OF FIT.)

**Coefficient of variation.** (also known as relative dispersion.) A commonly used measure of the degree to which a variable is distributed around its MEAN value. It is defined as

$$V = \frac{S}{X}$$

that is the ratio of the STANDARD DEVIATION to the sample MEAN. The advantage of this measure is that it standardizes for the scale of the variable concerned, so that comparisons between the degree of dispersion of variables with widely differing typical values is possible. (See also VARIANCE, SUM OF SQUARES.)

**Coercive comparisons.** Comparisons drawn between the pay of different groups of workers and used by the representatives of employees as justification for a pay increase. Such comparisons may result from formal or informal comparability exercises or may be drawn between jobs with a widely differing content. (See COMPARABILITY.)

**Cofactor.** The cofactor of an element in a MATRIX is the DETERMINANT of the new matrix which is formed by deleting the row and column of the original matrix in which the element is situated.

**Coinage.** That part of the hand-to-hand CURRENCY that consists of metallic coins. Coins are pieces of metal, normally shaped and stamped with a device which is evidence of their value and of their legal status as money. In the case of 'full-bodied' coins, which circulate at a value equal to that of the metal in them (less a seignorage charge), coining is an evidence of their metallic content. With token coins, the circulating value of which is unrelated to their value as metal, coining declares value and establishes their legal status. In almost all countries with established political orders coining has been reserved to the state.

**Coinage debasement.** Historically a reduction in the quantity of the prime metal in a full-bodied coin, without a corresponding reduction in its legal nominal value. Debasement occurred in various ways: by clipping and 'sweating', by reduction in the fineness of the metal in new coins, and by reduction in the actual weights of coins on reccoinage. It was widely practised by rulers and ruled to obtain finance. Theoretically it should have eventually led to a rise in the price of commodities, either by direct markup when debasement was detected and was widespread, or by the consequent increase in the amount of money in circulation. However, in periods of money shortage its effect could be anti-deflationary rather than inflationary. (See COINAGE.)

**Coincident indicator.** An economic data series that moves with the business cycle; that is, the economic data series will peak at approximately the same time as the business cycle reference peak and bottom out at the business cycle's trough. The Coincident Index Indicator, which is a composite of four coincident economic data series, is used to track current economic activity. The four coincident indicators included in the US index are: 1) employees on non-agricultural payrolls, 2) personal income less transfer payments in 1972 dollars, 3) total industrial production, and 4) manufacturing and trade sales in 1972 dollars. The journal, Business Conditions Digest, in which the series appeared ceased publication in November 1990.

**Cointegration.** This is a method of defining the long run relationship amongst a group of TIME SERIES variables. It uses the idea of an
integrated TIME SERIES in describing the long run interaction, and arose in the context of the spurious regression problem. To be related to one another statistically in the long run variables must be of the same order of integration. For example if a two variable regression model is specified as

\[ y_t = \beta x_t + u_t \]

then \( u_t \) will only be I(0), integrated of order zero and, therefore, having the property of \textit{stationarity}, if \( y_t \) and \( x_t \) are both of same order of integration \( I(d) \). The simplest and most common case is where \( x_t \) and \( y_t \) are both I(1). Then if \( u_t \) is I(0) the series \( x_t \) and \( y_t \) are said to be cointegrated. Cointegration is closely linked to error correction models. See R.F. Engle and C.W.J. Granger, 'Cointegration and Error Correction: Representation Estimation and Testing', Econometrica, 1987, Vol. 55, pp. 251-276.

\textbf{COLA.} Cost of living adjustment. (See ESCALATORS.)

\textbf{collateral security.} Loosely used it means any security (other than personal security such as a guarantee) taken by a bank when it makes an advance to a borrowing customer, and which it is entitled to claim in the event of default. More strictly it denotes a non-personal security put up by a third party, i.e. not the borrower, and which offers certain legal advantages to the bank in case of default.

\textbf{collective bargaining.} Negotiations between employees and employers about the establishment of procedures and rules to cover conditions of work and rates of pay. Such arrangements usually involve the joint regulation of agreed procedures. (See NATIONAL BARGAINING, COMPANY BARGAINING and PLANT BARGAINING.)

\textbf{collective choice.} Sometimes also called social choice. A decision made by or on behalf of a group. The study of MARKET economies is largely concerned with choices made by individuals but in all economies many decisions concerning resource allocation are made by governments or other groups. Economists are interested in the way in which such collective decisions are reached and the allocations of resources to which they lead. In particular, economists have been interested in the \textit{Pareto optimality} of collective choices and the extent to which such choices reflect the \textit{preferences} of individuals. The \textit{Impossibility Theorem} of K.J. Arrow indicates that there are serious difficulties in obtaining collective choices from individual values. (See also SOCIAL WELFARE FUNCTION, PUBLIC CHOICE.) See Mueller, D.C., Public Choice, 2nd edn., Cambridge University Press (1989).

\textbf{collective goods.} Commodities or services that possess the characteristics of \textit{non-excludability} alone. In such cases, although it is technically feasible to exclude people from consuming the commodity or service in question it is nonetheless uneconomic because the revenue would be less than the costs of collection. (See PUBLIC GOODS.)

\textbf{collinearity.} (See MULTICOLLINEARITY, LINEAR DEPENDENCE.

\textbf{collusion.} Agreement between firms to cooperate in order to avoid mutually damaging rivalry. The means of achieving such cooperation range from informal or tacit agreement, arising from the pooling of information for instance, to formal arrangement within CARTEL organizations where sanctions are imposed on defectors. (See PRICE LEADERSHIP.)

\textbf{collusive oligopoly.} (See COLLUSION.

\textbf{collusive price leadership.} (See PRICE LEADERSHIP.

\textbf{Comecon.} (See COUNCIL FOR MUTUAL ECONOMIC ASSISTANCE.

\textbf{command economy.} See PLANNED ECONOMY.

\textbf{commercial banks.} A general, non-definitive, term denoting those banks, usually in the private sector, which conduct a general rather than a specialized type of business. They accept deposits on varying terms, but including demand deposits; and their lending to private sector business,
commercial bill

traditionally for non-fixed capital purposes, usually accounts for the greater part of their assets. The term distinguishes such banks from SAVINGS BANKS or MERCHANT BANKS on the one hand, or banking type institutions like BUILDING SOCIETIES and FINANCE COMPANIES on the other.

commercial bill. A BILL drawn to finance trade or other commercial or production activities. It is distinguished from a TREASURY BILL or local government bill which are instruments of public financial operations.

commercial paper. A collective term for COMMERCIAL BILLS.

commercial policy. The rules adopted by a country for the conduct or regulation of its foreign trade and payments. At one extreme a country may adopt a policy of FREE TRADE and at the other one of AUTARKY, while in between are policies of varying degrees of protection by TARIFFS, QUOTAS, EXCHANGE CONTROL ETC.. See Corden, W.M., Trade Policy and Economic Welfare, Oxford University Press (1974).

commissions. See COMPENSATION RULES.

commodity. Any object which is produced for consumption or for exchange in markets. The term is also used more narrowly to denote those raw foodstuffs and materials that are widely traded internationally in organised markets, e.g. wheat, cotton, copper.

commodity bundling. The practice of selling goods or services in a package. An example of this marketing strategy is the selling by restaurants of set meals which bundle together individual dishes. It can be profitable, because customers sort themselves into groups with different reservation prices. As a result it is easier for firms to extract the CONSUMER'S SURPLUS.

Commodity Credit Corporation. A US corporation chartered in 1933 to provide a more stable and orderly market for farm commodities. The commodities serve as collateral for loans. The government establishes certain limitations on acreage planted in particular crops. Farmers who are in compliance with these acreage restrictions are given loans based on some percentage of 'parity' prices established at the beginning of the year. If the farmer defaults, the collateral is surrendered to the Commodity Credit Corporation. This amounts to a conditional purchase plan by the government to establish a price floor on farm products. The Corporation also buys and stores commodities. The Corporation is capitalized at $100 million and authorized to borrow an additional $30 billion backed by the United States government. In 1988, the Corporation provided over $13.3 billion in loans. (See PARITY PRICE SYSTEM.)

commodity money. A system of MONEY based upon a specific COMMODITY. The CURRENCY itself may be made of the commodity, e.g. gold or silver coin, or it may consist wholly or partly of tokens, e.g. notes, convertible into such 'full-bodied coin', or simply into the bulk commodity. In such a system the monetary unit is usually linked to a specified quantity of the commodity and its value is accordingly determined by the value of the commodity (though that value will itself be affected by the monetary status of the commodity). The GOLD STANDARD was a commodity money system.

commodity space. The space bounded by axes representing the quantities of goods or services potentially available to the consumer. In two dimensions, commodity space is shown as a quadrant bounded by axes representing the amounts of two goods. As such it indicates the various combinations of those two goods over which consumers exercise choice.

commodity terms of trade. See TERMS OF TRADE.

Common Agricultural Policy. The common system of agricultural price supports and grants adopted by the EUROPEAN COMMUNITY. It attempts to encourage stable agricultural market conditions, ensure a fair return to farmers, maintain reasonable prices for consumers and introduce policies designed to increase yields and labour productivity in the Community's agricultural sector. The policy has established a COMMON MARKET for
most of the major agricultural commodities. Agricultural prices within the Community are based on common 'target' prices. The target prices once set are converted into different national currencies using adjusted rates of exchange known as 'green' rates (e.g., the GREEN POUND.)

A system of levies on non-EC agricultural imports is used to protect target prices when they are set above the general level of world prices. In addition, the Community has established an internal price support system based upon a set of 'intervention' prices set slightly below target price. If, for example, the level of supply is in excess of that required to clear the market at the target price, the excess supply is bought by the Community at the intervention price, thereby preventing over-production from depressing the common price level. The Community also supports prices by means of export subsidies adjusted to influence the internal supply of agricultural commodities. The guarantee section of the European Agricultural Guidance and Guarantee Fund finances the price support programmes. The Community also offers assistance to farmers in the form of grants designed to improve and rationalize methods of agricultural production.

Common Customs Tariff. The common external tariff of the European Community (EC). There are no tariffs on trade between member countries of the EC and a common tariff on imports from third countries. This is essentially for protective purposes. There are many concessions. Thus most industrial products from the European Free Trade Association (EFTA) enter duty free. Under the Generalized System of Preferences a wide range of goods from developing countries may be imported on a non-reciprocal tariff preference basis. Similarly, under the Lome Convention the EC members entered into a trade, aid and co-operative agreement with 46 developing countries from Africa, the Caribbean and the Pacific (the ACP countries). This agreement allowed the free entry of all industrial and many agricultural goods from these countries.

Common External Tariff. A tariff applied by members of a customs union, common market or economic community at an agreed, similar rate on imports from non-

members. While the rate for any given imported good is identical in all member countries, different rates of duty are applied to different goods.

Common facility co-operatives. A policy measure designed to facilitate the growth of progressive technology, by forming co-operatives which use common facilities or joint production workshops to raise productivity of local artisans and craft industries. (See ALTERNATIVE TECHNOLOGY.)

Common market. An area, usually combining a number of countries, in which all can trade on equal terms. Such a system requires the establishment of a customs union, with a common external tariff, the free movement of factors of production as well as of goods and services, and considerable harmonization of tax and other policies. (See also EUROPEAN COMMON MARKET.)

Common stock. A financial instrument (financial agreement) which conveys ownership and voting rights in a corporation to the instrument's holder. In the case of common stock, holders have claims to the corporation's remaining net earnings and assets after all other classes of debt and equity have received their promised return. Such claims are based on the ratio between their holdings and total shares outstanding. Preferred stock holders, who are given dividend guarantees, have prior claim to the corporation's earnings and assets. Similarly, debt holders have claims prior to those of both common and preferred stock holders. Common stock holders elect the board of directors. Voting rights are in proportion to ownership rights. (See PREFERENCE SHARES, EQUITIES.)

Communism. In the strict sense, a stage of economic development which is said to occur when all classes in society have been absorbed into the proletariat. In this ideal society the state would have withered away and each person would contribute according to ability and receive according to needs. This Utopia envisaged by Marx is seen to be the stage of economic development which follows on from capitalism and socialism. The term is however often used to denote the planned economic system operated in the Comecon countries (until the revolutions
in Eastern Europe in the late 1980s), China and elsewhere where the government has centralized economic decisions and taken control of productive activity.

Community Charge. A tax introduced in the UK in the late 1980s as a replacement for rates. It proved to be exceptionally unpopular and expensive to collect. It was based on the principle that all adults living in a particular local government area should pay the same amount, if their income was above a minimum threshold. Those with incomes below the threshold paid at a reduced rate. Commonly referred to as the POLL TAX it is due to be replaced by a new tax based on property values (to be known as the council tax).

Community indifference curve. A curve along which each individual in a community receives an unchanging level of UTILITY. The points along such a curve represent bundles of commodities which can be distributed among individuals so as to maintain this particular distribution of utility. Community indifference curves (unlike individual INDIFFERENCE CURVES) can intersect. As many indifference curves will pass through any point in commodity space as there are different ways of distributing that commodity bundle. If one curve lies entirely outside another this implies that at least one individual experiences higher utility and no individual receives any less.

Company. This normally signifies a JOINT STOCK COMPANY, which is a legal entity set up for the purpose of conducting commercial or industrial operations, and with a capital divided into SHARES that are held by its members. In principle, the shareholders control the company through their right to vote at annual meetings and to elect the board of directors, whose function is to oversee the running of the company. The formation and conditions of operation of companies are regulated by the Companies Acts which confer rights as well as apply restrictions. The basic feature of a joint stock company is that it is a 'legal person', entirely separate from the individual shareholders, and able to act - for example, make contracts, undertake legal proceedings - in its own right. Most companies are 'LIMITED LIABILITY companies', that is, the liability of the shareholders for the company's debts, e.g. on insolvency, is limited to what they have paid for their shares plus any amount unpaid on the shares. Companies are of two basic kinds, public and private, each subject to different regulatory conditions in certain respects. Public companies must have an issued capital of not less than £50,000, before they are permitted to do business. They may offer their shares for public subscription, and provided they satisfy the requirements of the STOCK EXCHANGE these shares may be 'listed' (or 'quoted') and hence traded on the exchange. Private companies may not invite the public to subscribe for their shares, but they are not subject to any minimum capital requirements. The transfer of shares in private companies is often subject to control by the other members. The private company's form is well suited to small businesses; but if the company grows and its capital needs expand, it may need to convert itself into a public company. Private companies are much the more numerous type; but the average size of public companies is much greater, the capital requirements of the stock exchange being even greater than those of the Companies Acts. (See UNCALLED CAPITAL, EQUITIES.)

Company bargaining. COLLECTIVE BARGAINING between the representatives of a single company, which may have one or more plants throughout the country, and employees' representatives to establish rates of pay and conditions of work throughout the company. Where a company has a number of plants throughout the country in the same industry and the company is a monopolist this form of bargaining is equivalent to NATIONAL BARGAINING. (See also PLANT BARGAINING.)

Company director. A person elected by SHAREHOLDERS to participate with the other directors in the running of a COMPANY. A director may be concerned solely with the shared responsibility for general policy, or may have additional specialized responsibilities with respect to a particular branch of the firm's activities as, for example, with MARKETING.
**Company Savings.** That part of firms' PROFITS which is neither paid out in TAXES nor distributed to shareholders as DIVIDENDS. (See also SAVINGS.)

**comparability.** Formal and informal comparisons drawn by work groups between their pay and the pay of other workers. Such comparisons influence the wage determination process. Formal comparisons are those embodied in the procedures for determining pay, for example the rates of pay of civil servants are established after detailed enquiries into the pay of individuals performing similar work in the private sector of the economy. Informal comparisons are those used as points of reference by either employers and employees but which are not recognized simultaneously by both parties as serving as a suitable frame of reference for establishing pay. (See RELATIVE DEPRIVATION, COERCIVE COMPARISONS.)

**comparability argument.** The belief that workers doing similar jobs and producing the same amounts should be paid the same wage.

**comparable worth.** Equal pay for work of equal value. Designed to remove wage discrimination that arises where women are crowded in to low paying predominantly 'female' jobs, this concept proposes to pay women according to the intrinsic value of their jobs. This value is to be established by observing the pay of equally qualified males in other similar jobs.

**comparative advantage.** Credit for the discovery of the doctrine of comparative advantage, which is the basis of the case for SPECIALIZATION on the part of nations or individuals and for freedom of trade, is given to David RICARDO who explained the principle by means of the following example.

Portugal has an absolute advantage in the production of both commodities since the input requirements for both commodities are less than those of England. Portugal has a comparative cost advantage in wine for the ratio of Portuguese to English costs is 80:120, which is less than the ratio of 90:100 in cloth. If Portugal specializes in accordance with her comparative cost advantage, for every yard of cloth she ceases to produce she can have one and one-eighth gallons of wine, for both embody 90 labour hours. If, as Ricardo postulates, the exchange rate after trade between cloth and wine is 1 to 1, then Portugal can exchange her one and one-eighth gallons of wine to obtain one and one-eighth yards of cloth; with 90 labour hours Portugal can have 1 yard of cloth produced by herself or one and one-eighth indirectly. Despite her absolute inferiority England can simultaneously gain from trade. For every gallon of wine, which England ceases to produce, 120 hours of labour will be set free to make one and one-fifth yards of cloth, which by international exchange can be converted to one and one-fifth gallons of wine. A situation of equal advantage, where one country is superior to another in the same ratio in all products, precludes the possibility of gains.

Modern theory, no longer reliant on RICARDO'S labour theory, has established that the only necessary condition for the possibility of GAINS FROM TRADE is that price ratios should differ between countries. The post-trade exchange rate between the commodities, whose determination Ricardo could not explain, is established by the LAW OF RECIPROCAL DEMAND.

**comparative costs.** See COMPARATIVE ADVANTAGE.

**comparative dynamics.** A method employed in DYNAMIC ECONOMICS with a special feature that the rates of change in the values of the PARAMETERS and in the equilibrium values of the VARIABLES are constant. Comparative dynamics compares equilibrium values of the ENDOGENOUS VARIABLES for different rates of change for one of the parameters. The economic models within which this method is employed are often referred to as steady state models.
comparative statics. The comparison of a new EQUILIBRIUM position with an old one after some change in the variables, without reference to the way in which the new position is reached, and usually without quantitative aspects. Simply, the determination of the direction in which variables will change consequent upon some disturbance to the original equilibrium.

compensated demand curves. A DEMAND CURVE in which the INCOME EFFECT of a price change has been removed so that along the demand curve real income is held constant. The demand curve then exhibits the shape it does because of the SUBSTITUTION EFFECT Only. The MARSHALLIAN DEMAND CURVE includes both income and substitution effects. The method of taking the income effect out depends on how that effect is measured. The two procedures are those of HICKS and SLUTSKY (see INCOME EFFECT, SUBSTITUTION EFFECT.) For normal goods, the compensated demand curve will be steeper in slope than the Marshallian curve.

compensating variation. See CONSUMER'S SURPLUS.

compensation principle. See COMPENSATION TESTS.

compensation rules. A formula for determining an individual's income. There are four principal categories of these. First, compensation based on the time an individual works. These are called time rates. Second, compensation based on an individual's performance. When performance is measured by the amount produced, such payments are known as PIECE RATES, and when measured by the value of sales they are known as commissions or ROYALTIES. Third, compensation may be based on team performance as in profit sharing schemes or group bonus schemes. Finally compensation may be based on an individual's comparative performance as with a RANK TOURNAMENT COMPENSATION RULE.

compensation tests. Such tests ask the question whether the losers from some particular change can be compensated for their losses while still leaving the gainers better off than they were before the change. The compensation is hypothetical and not required to take place. The best known of such tests is the KALDOR-HICKS TEST.

Competition Act 1980. This legislation emphasized the importance in competition policy of business conditions and practices. It empowered the Director General of Fair Trading to undertake preliminary investigations (subject to the approval of the relevant Secretary of State) into anti-competitive practices (in both private and NATIONALIZED INDUSTRIES), defined as business conditions which may restrict, distort or prevent competition. The findings of these investigations must be published. In response to these findings the Director General of Fair Trading can accept an undertaking from the firm(s) involved to modify or drop the business practices in question. Alternatively, the Director General can (with the approval of the Secretary of State) make a reference to the Monopolies and Mergers Commission. These references are known as 'competition references'. The commission has six months to report on whether the practices, if confirmed, operate against the public interest. The Secretary of State can prohibit the practices in the event of an adverse finding. (See RESTRICTIVE TRADE PRACTICES ACT 1956, MONOPOLIES AND Mergers ACT 1965, RESTRICTIVE TRADE PRACTICES ACT 1968, FAIR TRADING ACT 1973, COMPETITION ACT 1980.)

Competition and Credit Control. The title of a consultative document issued by the BANK OF ENGLAND in mid-1971, outlining proposals for a major revision of the credit control arrangements applying to the BANKS and other financial institutions, and which were put into operation later that year. The essence of the changes was that they should permit an ending of quantitative controls over lending, especially that of the CLEARING BANKS; and that they should apply to the banks and FINANCE HOUSES in as wide and non-discriminatory a fashion as possible. The requirement of the London and Scottish clearing banks to maintain certain minimum LIQUIDITY RATIOS was ended; instead all banks operating in the UK, as well as the larger finance houses, were required to observe a minimum RESERVES ASSETS RATIO.
in their sterling operations, and all were to
be subject to the SPECIAL DEPOSITS scheme on
an equal footing. The object of these changes was to remove discriminatory re-
strictions on competition between banks, and for their part the London and Scottish
clearing banks ended their respective agree-
ments on deposit and lending rates. In
further pursuit of flexibility, the old, admin-
istered BANK RATE was discontinued, to be
replaced by MINIMUM LENDING RATE which
was intended to vary according to a formula
relating it to the TREASURY BILL rate. Certain
revisions were introduced in the Bank's re-
lations with the DISCOUNT HOUSES who for
their part discontinued their practice of
underwriting the weekly Treasury bill tender
with a syndicated bid (at a uniform price),
though they continued to ensure that their
collective bids covered the total of bills on
offer. Despite the inclusion of a minimum
reserve ratio, and the retention of special
deposits, the stated intention and sub-
sequent practice of the Bank was to place
even greater reliance than before on interest
rate policy as a means of controlling credit
and bank deposits. It may be noted that the
system was quickly subjected to a severe test
in the monetary expansion of 1972-73, and
modifications were made, notably the intro-
duction of SUPPLEMENTARY SPECIAL DEPOSITS
in 1973, and the placing of Minimum Lending Rate on a wholly administered basis, in
1978. Finally in August 1981 further major
changes in monetary control arrangements
were introduced. These included the abol-
ition of the reserve assets ratio, and its re-
placement with a required ratio of non-
operational balances with the Bank of
England applicable to all banks and
LICENSED DEPOSIT TAKERS and the indefinite
suspension of Minimum Lending Rate. (See
also MONETARY MANAGEMENT.)

competitive markets. A market in which a
very large number of small buyers and
sellers trade independently, and as such no
one trader can significantly influence price.
(See PERFECT COMPETITION.)

complements. A good which tends to be
purchased when another good is purchased
since it 'complements' the first good. Favourite examples are cups and saucers,
cars and petrol etc. Complementary goods

Perfect complements and the indifference curve

have a negative CROSS ELASTICITY OF DEMAND. The INDIFFERENCE CURVE for perfect comple-
ments is shown in the diagram.

complex number. Numbers which involve
IMAGINARY elements, i.e. which contain the
square root of minus one.

composite commodity theorem. Due to
J.R. HICKS (Value and Capital, Oxford
University Press, 1939) this theorem states
that if there exists a set of goods whose
relative prices (i.e. the price of any one rela-
tive to the price of any other) do not change
then those goods can be treated as if they
were one commodity, the so-called 'compo-
site commodity'.

compound interest. The procedure whereby
future INTEREST is paid on past interest
earned. Thus if a sum of £1 is invested at a
rate of interest \( r \), its value after one year will
be \( £(1 + r) \). If the interest gained is now
removed, the £1 will remain and will gather \( r \)
per cent again in the following year. If how-
ever the £(1 + \( r \)) is left to secure interest,
then it will secure interest in the second year
of £(1 + \( r \))r, and the original £(1 + \( r \)) will
remain. The total investment at the end of
the second year will therefore be

\[
£ (1 + r) + £ (1 + r) r
\]

which reduces to

\[
£ (1 + r) (1 + r) = £ (1 + r)^2
\]
At the end of year $t$, the investment will have a value of

\[ \£ (1 + r)^t. \]

**concave function (concavity).** A function which is concave towards the origin, and therefore, one whose second DERIVATIVE is negative. Such a function is also CONVEX away from the origin.

**concentration.**

1. A term indicating the state of competitive conditions prevailing in an industry. Two extremes are PERFECT COMPETITION and MONOPOLY with market structures in between representing various degrees of imperfect competition. Conventionally, it is thought that the higher seller concentration is, the less competitive the market.

2. A concept used either in connection with the SIZE DISTRIBUTION OF FIRMS in an industry or economy, or with reference to the location of industry. In its former use concentration refers to the extent to which a market's or an economy's total output is accounted for by the few largest member firms. When used in the context of industrial location, concentration means the degree to which an industry has become localized within a particular area. *(See also CONCENTRATION RATIO, LORENZ CURVE, HERFINDAHL INDEX.)*

**concentration, coefficient of.** A statistical measure of the degree to which an economic activity or feature is geographically concentrated within (say) a nation. The coefficient of concentration of an industry may be calculated as the relation between the distribution of that industry across the regions of the nation and the distribution of some other characteristic - for example population. If the pattern of location of the industry is greatly different from that of the population we would regard the industry as being spatially concentrated. The formula for the coefficient is

\[ \sum_j |P_{aj} - P_{ij}| \]

(where the vertical lines indicate absolute values) where $P_{aj}$ is the percentage of the activity ($a$) under analysis located in region $j$ and $P_{ij}$ is region $j$'s percentage share of the characteristic, $i$.

**concentration ratio.** The percentage of total industry size accounted for by the few largest firms in the industry. The measure may be used as a proxy for one dimension of market structure, i.e. the degree to which an industry is centralized. *(See STANDARD INDUSTRIAL CLASSIFICATION.)*

**concerted action.** The name given to the German variant of INCOMES POLICY in which the government, although not a party to the COLLECTIVE BARGAINING process, sets out criteria for relating pay increases to the aims of stability and growth. Since 1967, representatives of the German employers, trade unions, government and other official bodies (including the Bundesbank and the Council of Economic Advisers) have met several times a year to discuss the government's economic forecasts and analyses. The intention of such concerted action has been to provide an opportunity for the co-ordination of private decisions and official policy, and on occasions the government has quite explicitly given its view of the consequences of alternative actions.

**concertina method of tariff reduction.** A procedure of TARIFF reduction, which involves cutting the higher tariff rates, while leaving lower rates unchanged, so that the gap between tariffs is diminished. *(See ACROSS-THE-BOARD TARIFF CHANGES.)*

**conciliation.** Intervention in an INDUSTRIAL DISPUTE at the request of the parties to the dispute by an independent and impartial third party in an attempt to reconcile the views of the two parties. *(See also MEDICATION, ARBITRATION.)*

**Condorcet Criterion.** A system of COLLECTIVE CHOICE in which the chosen alternative is that which defeats all other alternatives in a series of pairwise (one to one) contests using majority rule. The procedure is named after
the Marquis de Condorcet who discussed it in 1785. While the Condorcet approach may be said to give a more complete reflection of voters alternatives than simple majority rule it can, like MAJORITY RULE, fail to yield an unambiguous 'winner'. Consider the preferences of a three person community shown below concerning alternatives X,Y AND Z.

<table>
<thead>
<tr>
<th>Voter</th>
<th>ranking</th>
<th>A</th>
<th>B</th>
<th>C</th>
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<tbody>
<tr>
<td>2</td>
<td></td>
<td>X</td>
<td>Z</td>
<td>Y</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Z</td>
<td>Y</td>
<td>X</td>
</tr>
</tbody>
</table>

With these preferences, x will defeat y but not z, y will defeat z but not x and z will defeat x but not y. There is not a Condorcet winner. (See APPROVAL VOTING, BORDA COUNT, PARADOX OF VOTING, SOCIAL DECISION RULE, SOCIAL WELFARE FUNCTION.)

Confederation of British Industry (CBI). A UK employers' organization formed in 1965 by the merger of three associations which previously had represented industrial interests (viz: Federation of British Industries, British Employers' Confederation and National Association of British Manufacturers). The CBI represents more than 250,000 companies through parent companies, subsidiaries, trade and commercial organizations, employers' associations and nationalized industries. The confederation provides a channel by which the views of the economy's manufacturing sector are conveyed to the government regarding the development and implementation of economic and industrial policies. Its activities also include disseminating information about economic policies and legislation, providing advice and assistance on industrial relations problems, acting as a liaison for individual firms and government departments and extending technical assistance related to overseas marketing. In addition to its lobbying and service activities for members, the confederation publishes quarterly Industrial trend surveys which provide information on sales performance, orders, export competitiveness etc. Responsibility for the activities of the confederation is vested in a 400-strong council which consists of nominated representatives from trade associations and individual firms. Standing committees have been established by the council to formulate policy in particular subject areas. The council is chaired by a President whereas the confederation's permanent staff is headed by a Director General.

Confidence interval. (also known as confidence limits.) The a per cent confidence interval for a parameter consists of two numbers, between which we are a per cent confident that the true value of the parameter lies. The interpretation is that there is only a \((1 - \alpha)\) probability that we will have a sufficiently extreme sample of observations which will result in our calculating an interval which does not contain the true parameter value. Thus the 95 per cent confidence interval for a population MEAN is defined as

\[
\bar{x} \pm a,
\]

where \(\bar{x}\) is the sample mean, and \(a\) depends on the critical values of the appropriate distribution (usually \(t\) or normal) outside of which 5 per cent of the probability lies, the STANDARD DEVIATION of the sample or population and the sample size. If we draw one hundred samples and repeat the above calculations for each, then 95 of these limits can be expected to contain the true population mean.

Note that it is the interval which changes, not the population mean. For higher confidence levels, wider intervals are required and vice versa. (See also STATISTICAL INFERENCE, INTERVAL ESTIMATION.)

Confidence problem. One of the problems of the international monetary system which arises when there is an expectation that a currency is about to be devalued, such that short-term capital is then withdrawn from that country and there is a loss of confidence in that particular national currency. To maintain a pegged value for the currency will require a high level of international reserves capacity if this occurs often and/or is particularly severe.
congestion costs. When an increase in the use of a facility or service which is used by a number of people would impose a cost (not necessarily a monetary cost) on the existing users, that facility is said to be 'congested'. Thus, for example, if an increase in the number of vehicles using a road lengthens journey times then congestion occurs. Alternatively, if an increase in the number of economic activities located in a geographical area reduces the efficiency of those activities then the area gets congested. In the latter case congestion represents a dis economy of agglomeration. Costs imposed by congestion are important in such areas as COST-BENEFIT ANALYSIS (especially of projects involving transport), the explanation of the actual pattern of economic activity and in the analysis of jointly consumed goods by the theory of CLUBS. (See also AGGLOMERATION ECONOMIES.)

conglomerate. A firm comprising a HOLDING COMPANY and a diverse group of subsidiary companies which are generally unrelated in their activities and markets. Conglomerates are typically built up by MERGERS and TAKE-OVERS, and the rationale for their formation is the reduction of risk through the consolidation into one group of a diverse range of enterprises. But some conglomerates have resulted from the flair of particular ENTREPRENEURS for taking over firms with underused assets, or which are otherwise underperforming.

conjectural behaviour.
See CONJECTURAL VARIATION.

conjectural variation. Refers to firm behaviour in Oligopolistic Markets where, due to the small number of active firms, the decision-maker must before deciding upon appropriate strategies take into account rivals' potential responses. One of the applications of GAME THEORY in economics has been the analysis of firm behaviour under such conditions. (See also OLIGOPOLY.)

consistency. A desirable property of econometric estimators. A consistent ESTIMATOR is one whose mean tends to the true value of the PARAMETER, and whose variance tends to zero as the sample size becomes very large. The ORDINARY LEAST SQUARES ESTIMATOR is a consistent estimator if there are no econometric problems.

consolidated fund. Another term for the UK EXCHEQUER which is the government's account into which money collected as taxes is paid. The government then makes its expenditures according to the BUDGET from this account. The servicing for the NATIONAL DEBT is paid out of this fund and constitutes one of the consolidated fund standing services which does not have to be agreed by the UK Parliament as part of the budget.

consols. Today this term denotes 2.5 per cent Consolidated Stock, a GILT-EDGED security issued in a conversion and consolidation operation in 1888. But the name is much older than that, going back to the mid eighteenth century and the introduction of 3 per cent Consolidated Bank Annuities, a security issued in considerable amounts to raise money down to 1815, and issued after that mainly in conversion operations for other stocks. By 1914 the great part of the NATIONAL DEBT was in consols, now the 2.5 per cent issue, and it formed the largest single stock traded on the stock market. Because of their security as government debt, and the ease with which they could be sold in a very active market, they enjoyed an unequalled reputation as a safe asset of high LIQUIDITY (banks held them as liquid reserves). In 1888 the stock was issued as redeemable 'on or after 1923' which effectively makes them an UNDATED security. The growth of the national debt in two World Wars, and since 1945, and the fact that in recent decades it has been possible to issue only DATED debt has reduced consols to a tiny element within the national debt.

consortium bank. A type of international bank formed by groupings of existing banks usually drawn from different countries. These banks appeared in the 1960s and are now established in several financial centres, including London. They engage to a considerable extent in medium-term lending, frequently to multinational companies; they obtain the greater part of their funds in the EUROCURRENCY MARKET; but they also arrange 'syndicated' loans (i.e. loans raised among a group of lenders) frequently bring-
consumer demand theory

-ing in lenders outside the consortium members. (See LIBOR.)

costentious consumption.
See VEBLEN.

costant amplitude. A characteristic of the TRADE CYCLE, where the AMPLITUDE does not change with time. This implies that the system being considered lies between one with an EXPLOSIVE CYCLE and one with a DAMPED cycle.

costant capital. In the Marxian scheme, that part of CAPITAL which is represented by the means of production, raw materials and instruments of labour. It is defined as constant since it can add no more to the value of output than its own value, value being defined as hours of embodied SOCIALLY NECESSARY LABOUR. (See VARIABLE CAPITAL.)

Constant Elasticity of Substitution (CES) production function. The CES production function is a LINEARLY HOMOGENEOUS PRODUCTION FUNCTION with a constant ELASTICITY OF INPUT SUBSTITUTION. This elasticity can take on values other than unity. The actual form of the CES production function is:

\[ Q = A \left[ aK^{-b} + (1 - c) L^{-b} \right]^{-1/b} \]

where \( Q \) is output, \( K \) and \( L \) are capital and labour, and \( a, b, c \) are constants. It was first introduced by K.J. ARROW, H.B. Chenery, B.S. Minhas and R.M. SOLOW, in 'Capital-Labor Substitution and Economic Efficiency', Review of Economic Studies, 1961.

costant market share demand curve.
The relation between quantity sold and price which faces the firm if all its competitors exactly match any price change made by this firm. It is therefore more inelastic than the conventional DEMAND CURVE, as each point will represent an equal share of the market. This concept has been used analytically in the KINKED CURVE model of oligopoly and the theory of MONOPOLISTIC COMPETITION. (See ELASTICITY.)

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consumer credit. A general term denoting lending to CONSUMERS to finance the purchase of goods and services, but usually excluding house purchase finance. Such lending may be of money untied to the purchase of any specific good, or it may be finance converted with specified goods as in HIRE PURCHASE or CHARGE ACCOUNT CREDIT.

consumer demand theory. That area of economics which defines testable theories of how consumers behave in response to changes in variables such as price, other prices, income changes and so on. The two main schools of thought are those based on INDIFFERENCE CURVE ANALYSIS and REVEALED PREFERENCE THEORY, but considerable attention has also been given to the theories based on the CHARACTERISTICS of goods.
consumer durable. Any consumer good which has a significant 'life' and which is not therefore immediately consumed (like food). Consumer durables have some characteristics of capital goods in that they tend to yield a flow of services over their lifetime rather than one immediate 'service' in one act of consumption. Nonetheless, the dividing line between consumer goods, consumer durables and capital goods is a hazy one in practice.

consumer equilibrium. The situation in which the consumer maximizes UTILITY subject to a given BUDGET CONSTRAINT. In terms of an INDIFFERENCE MAP this situation is achieved when the consumer reaches the highest possible INDIFFERENCE CURVE given the limitations imposed by his BUDGET LINE. This will be a situation where the indifference curve is tangential to the budget line - i.e. their slopes are equal. Formally, the MARGINAL RATE OF SUBSTITUTION is equal to the price ratio of the two goods - i.e.

\[ MRS_{xy} = -\frac{p_x}{p_y} \]

for two goods x and y.

consumer expenditure. See CONSUMPTION EXPENDITURE.

cost benefit analysis. A method of assessing the desirability of an action against its potential costs and benefits. It is widely used in evaluating new projects and policies, and in the analysis of social and economic issues where there are uncertainties over the outcomes. The analysis involves estimating the costs and benefits of the action, and then comparing these to determine whether the action is worthwhile. It is a subjective process and relies on assumptions and estimates, which can be contentious.

consumer goods and services. Tangible and intangible COMMODITIES which are consumed for their own sake to satisfy current wants.

cost utility analysis. A method of assessing the desirability of an action against its potential costs and benefits. It is widely used in evaluating new projects and policies, and in the analysis of social and economic issues where there are uncertainties over the outcomes. The analysis involves estimating the costs and benefits of the action, and then comparing these to determine whether the action is worthwhile. It is a subjective process and relies on assumptions and estimates, which can be contentious.

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theoretically precise there are practical problems in measuring consumption. The main problem arises in the treatment of CONSUMER DURABLES. If they are included they overstate current consumption expenditure; if excluded they understate them. Ideally we wish to include only the value of the flow of the services of the consumer durables that are consumed in each period. (See CONSUMPTION FUNCTION.)

Consumption expenditure. Aggregate expenditures on goods and services to satisfy current wants. (See CONSUMPTION.)

Consumption function. The schedule detailing the relationship between aggregate CONSUMPTION EXPENDITURES and INCOME, that is $C = C(Y)$. Consumption expenditure may be related to either NATIONAL INCOME or DISPOSABLE INCOME. This functional relationship is one of the cornerstones of KEYNES' general theory, as consumption is the largest single component of AGGREGATE EXPENDITURE in most developed countries. Keynes initial developments have come to be known as the ABSOLUTE INCOME HYPOTHESIS but more recent developments have explained aggregate consumption expenditures in terms of relative income, the RELATIVE INCOME HYPOTHESIS, life-cycle income, the LIFE-CYCLE HYPOTHESIS, permanent income, the PERMANENT INCOME HYPOTHESIS and related it specifically to wealth, the ENDOGENOUS INCOME HYPOTHESIS. Considerable controversy surrounds the actual specification of the consumption function. Empirical studies have by and large revealed that the SHORT-RUN CONSUMPTION FUNCTION and CROSS-SECTION CONSUMPTION FUNCTION confirm Keynes' absolute income hypothesis. In contrast evidence on the LONG-RUN CONSUMPTION FUNCTION suggests a quite different form. Hence all of the above theories, which post-date Keynes' pioneering work, have sought to reconcile the conflicting evidence. Further problems abound with empirical work in this area and at present there exists no consensus for dealing with these. Principal among the problems are:

1. In practice it is difficult to measure consumption accurately. CONSUMER DURABLES provide a flow of services beyond the time of purchase and it is these services which should be included in consumption.

2. The variables $C$ and $Y$ can either be measured in current pounds or dollars or they can be DEFLATED by the CONSUMER PRICE INDEX to transform them into real terms;

3. Aggregate, per capita, or even household values for $C$ and $Y$ can be chosen. See Speight, A.E.H., Consumption, Rational Expectations and Liquidity, Harvester Wheatsheaf, London (1990). (See also MARGINAL PROPENSITY TO CONSUME, AVERAGE PROPENSITY TO CONSUME.)

Consumption tax. The taxation can take two forms; one where the consumer himself is taxed as with an EXPENDITURE TAX, and another where the goods or services which the consumer purchases are taxed. In the former case the tax is imposed on the firm supplying the good or service.

Contestable market. A MARKET where there is freedom of entry and exist is costless. Potential entrants can enter such markets whenever profits exceed the normal rate. Oligopolistic markets can thus be contestable. Costless exit implies SUNK COSTS are zero. Such markets are subject to 'hit-and-run' entry and exit, and firms will produce where price equals marginal cost and marginal cost equals average cost. See Baumol, W.J., Panzar, J.C. and Willig, R.D., Contestable Markets and the Theory of Industrial Structure, Harcourt Brace Jovanovich (1982).

Contingency reserve. The unallocated reserve for contingencies and other requirements which cannot be quantified when UK public expenditure plans are being considered. Formerly, only expenditure decisions increasing the volume of expenditure were charged against the reserve. However, in line with the move to cash planning, approved increases in cash limits have been charged to the contingency reserve since 1981-2.

Contingency table. A device whereby the degree of association or dependence between two variables or characteristics can be assessed. Sample information is compared to a theoretical situation in which there is complete independence between the characteristics. A STATISTIC can be calculated from the table which is approximately CHI-SQUARE dis-
contingent valuation. Attempts to elicit consumer valuations of goods and services which are not usually traded in markets. Individuals are confronted with hypothetical choices and are asked either willingness to pay or willingness to accept compensation questions. This approach has been most widely used in the area of environmental economics.

continuous variable. A variable which can take on any value (i.e. which can vary without interruption) between given limits (possibly infinite). (See also DISCRETE VARIABLE.)

contract curve. In the context of two consumers exchanging two goods the curve represents the locus of points where the MARGINAL RATE OF SUBSTITUTION between the pair of goods is the same for both individuals. These points of tangency between the individuals' INDIFFERENCE CURVES are efficient or exchange optima in the sense that it is not possible by any reallocation to make one individual better off without the other becoming worse off.

In the production case the contract curve represents the points of tangency between ISOQUANTS and thus is the locus of points for which the MARGINAL RATE OF TECHNICAL SUBSTITUTION is the same for the production of each good or in the one good for each firm. (See EDGEWORTH BOX.)

contractionary phase. The phase of the TRADE CYCLE following a PEAK and lasting to the next lower turning point or trough. It marks a decline in the level of economic activity.

convergence thesis. The idea that socialist and capitalist economies are departing from their respective 'ideal' forms and are evolving increasingly similar modes of behaviour and thinking, institutions and methods. The hypothesis that the two systems are converging was originally put forward by Jan TINBERGEN and has developed into a theory of inevitable convergence based on the necessity of similar patterns of technological development. The events in Eastern Europe in the late 1980s can be considered to have disproved the mechanism of convergence, for while the convergence appears to be taking place, it is in a general move to a capitalist form of organization.

convergent cycle. See DAMPED CYCLE.

conversion. The practice of issuing new STOCKS and SHARES in exchange for others. For example, the government may offer new stock to holders of existing stock at the time when it is due for redemption.

convertibility. An attribute of a currency which is freely exchangeable for another currency, or for gold. (See also EXCHANGE RATES, GOLD STANDARD, EXCHANGE RESERVES, GOLD RESERVES.)

convertible bond. See CONVERTIBLE SECURITY.

convertible loan stock. See FINANCIAL CAPITAL.

convertible security. A security, that is a claim on the issuer, which is convertible into something else, including cash. The term is most commonly met in the form of 'convertible stock' or 'convertible debentures', which are fixed interest securities that are convertible into another type of holding, usually EQUITIES, on specified dates and terms.

convex function (convexity). A function which is convex to the origin and therefore is one whose second DERIVATIVE is positive. Such a function is also CONCAVE away from the origin.

cooling off period. A period of legally enforced delay before STRIKE activity can commence so as to permit a de-escalation or cooling off of emotions and thus, it is assumed, a more rational evaluation of matters in dispute. In the US, the TAFT-HARTLEY ACT makes a postponement of up to 80 days possible for a strike judged likely to threaten national health and safety. Moreover, strikes require 60 days' notice if contemplated during the currency of a collective agreement. In the UK, an attempt was made
to institute similar procedures under the ill-fated Industrial Relations Act.

co-ordinated wage policy. The co-ordination by employers and unions of the timing of, respectively, their wage offers and wage claims. This type of collective bargaining arrangement has been suggested to eliminate the wage and price inflation which results when each group of workers tries to 'leap-frog' - to gain a higher wage award than its predecessor in the WAGE ROUND.

core, the. See GAME THEORY.

corner solution. In an optimization problem, a situation in which one or more of the CHOICE VARIABLES has a zero value at the OPTIMUM. In the WORK-LEISURE MODEL, for example, the individual could choose to consume zero leisure (work all of the time) or zero income (take the total leisure option).

Corn Laws. Laws introduced in the UK in 1815 and repealed in 1846, to maintain the price of corn by means of import prohibition, when the domestic price fell below a certain level. The debate about the Corn Laws stimulated the beginning of the modern theory of international trade.

corporate capitalism. A contemporary view of modern developed western economies in which the productive sector is dominated by large corporations characterized by a separation of ownership from control. A central contention here is that ECONOMIC POWER has passed from the CAPITALIST class to small groups of professional managers who, due to the increasingly ineffective constraints placed upon them by the CAPITAL MARKET, pursue policies contrary to the raw ethic of CAPITALISM. (See also MANAGERIAL THEORIES OF THE FIRM.)

corporate conscience. With the separation of ownership from control some analysts (see A. Berle and G. Means, The Modern Corporation and Private Property, rev. edn., Harcourt, Brace and World, New York, 1967) argue that managers in large CORPORATIONS have broken away from the 'stockholder-orientated conscience', and adopted instead a widespread sense of responsibility to the general public. Corporate conscience is a term used to represent this development in managerial behaviour. (See also CORPORATE CAPITALISM.)

corporate risk. The total risk involved in a business can be defined as corporate risk. This comprises two main types of risk: financial risk which arises out of DEBT FINANCE, and business risk which is the basic risk involved in the firm's day to day operations.

corporate state. An economic and political system where the major sectors of the economy are organized into single large corporations and administered through the collaboration of government, workers' organizations and organized employers' associations. The corporation is an umbrella organization determining the running of individual firms - input and output prices and quantities. The theory of the corporate state was an element of fascist economic theory, but the existence of large corporations, INDUSTRIAL DEMOCRACY and government intervention in industry in many Western economies has led some people to suggest that these countries are moving towards the ideal of a corporate state. (See GALBRAITH, PLANNED ECONOMY, MIXED MARKET ECONOMY, MARKET SOCIALISM, COMMUNISM.)

corporation. See COMPANY.

corporation tax. This is a tax levied on the income of companies after the deduction of operating costs, INTEREST, CAPITAL ALLOWANCES and STOCK RELIEF. Since 1973 there has been an imputation system of corporation tax in the UK. Under this system (at 1991 rates) a company pays corporation tax at 33 per cent irrespective of whether the profits are to be retained or distributed. If a company has profits of £100 and wishes to retain post-tax profits it will have £67 available. If the company wishes to distribute its profits to shareholders it may declare £67 as a dividend. When it does this it has to pay 25/75 of this or £22.33 as ADVANCE CORPORATION TAX. The shareholder now receives a tax credit of equal amount. The tax credit is an imputation based on the fact that corporation tax has been paid. For income tax
purposes the shareholder is considered to have received income equal to the sum of the dividend and the credit. In this case the sum is £89.33. The tax credit does, however, satisfy the shareholder’s liability to income tax at the basic or standard rate on the dividend plus the credit. A standard rate shareholder thus receives £67 net. Shareholders not liable to income tax, such as charities or pension funds, could receive a payment equal to the credit from the Inland Revenue. A higher rate tax-payer would pay tax at his marginal rate on the dividend plus credit, not deduct the credit from his tax bill. For standard rate shareholders the system is neutral between retained and distributed profits. The system thus gives shareholders credit for tax paid by the company and this credit is used to offset income tax liabilities in dividends. In other words a proportion of the company’s tax liability is imputed to the shareholders and then considered to be a prepayment of their income tax on dividends. The advance corporation tax is not a necessary part of an imputation system because the scheme is essentially one where the company pays corporation tax at 33 per cent and profits which are then distributed are considered to have already paid income tax at a certain rate. This is the imputation rate which is equal to the standard or basic rate of income tax in the UK. Thus in the example discussed above the grossed distribution =

\[ \frac{£67 \times \frac{1}{1 - 0.29}}{£65} = £91.95 \]

This system does not contain nearly such a big incentive to retain profits as was the case with the so-called ‘classical’ system which existed in the UK from 1965 to 1973. Under this scheme if pre-tax profits of £100 were made, corporation tax at 33 per cent left £67 which could then be retained and reinvested. If a distribution were desired, £67 became the gross dividend which was taxable at a shareholder’s marginal rate. Thus a net distribution of £50.25 would be made to a standard rate shareholder. There is thus a considerable discrimination against distributed profits in this scheme.

A debate took place in the 1960s and early 1970s concerning the advantages and disadvantages of this form of discrimination. The main question at issue was whether investment was likely to be encouraged by one system rather than the other. Proponents of the no-discrimination philosophy argued that efficient investment was more likely to be encouraged if there were no disincentives to dividends and shareholders could then allocate their funds to companies which offered the best prospects. Young companies requiring funds would be more likely to attain them if the tax system did not discourage dividends. The proponents of a system which encouraged retentions argued that retentions and external capital were complements not substitutes. Further, companies which had increasing earnings per share would have a higher rating on the stock market and could thus raise external funds on relatively cheap terms. The most obvious way to increase earnings per share it was argued was to retain and reinvest profits and a tax system which encouraged this was therefore welcome. The debate has perhaps been inconclusive to date.

Small companies are given relief through lower rates of corporation tax in the UK.

correlation. The degree to which two variables are linearly related, whether through direct causation, indirect causality, or statistical chance. This is usually summarized by a correlation coefficient \( r \), defined as

\[
 r = \frac{\sum x \cdot y}{\sqrt{\sum x^2 \cdot \sum y^2}}
\]

where \( x \) and \( y \) are the deviations from the means of the two variables respectively. This coefficient can take on values between plus and minus unity. A value of \(-1\) indicates a perfect negative relationship, \(+1\) indicates a perfect positive relationship, and zero indicates no relationship. Values in between the extremes indicate the strength of relationship. Note that this will only reflect the degree to which variables are linearly related. For instance, two variables may be perfectly related in a non linear way (e.g. \( y = x^2 \)) and still result in a low value of \( r \). (See also RANK CORRELATION.)

correlogram. Normally, a graphical plot of the CORRELATION COEFFICIENT between the current value of a variable and its own
lagged values, against the length of the lag. The correlogram can give valuable information about, for instance, the characteristics of SERIAL CORRELATION characteristics of the RESIDUALS in REGRESSION analysis.

correspondent banks. A BANK which acts as agent for another bank in a place where the latter has no office, or for some reason is unable to conduct certain operations for itself. Examples of business conducted by a correspondent include paying cheques and bills drawn on the 'client bank', or obtaining payment of them for that bank. All banks with overseas business require correspondent banks abroad, and the arrangements are usually reciprocal with each party maintaining balances with the other (in 'nistro' or 'vostro' accounts). However, in non-concentrated banking systems, such as the US system, banks require correspondents in places within their own country. In some systems and conditions a bank's balances with its correspondents may go beyond day-to-day business needs and include an element of reserves. Historically, in some sterling area banking systems, balances held with London correspondents effectively formed part of the country's external reserves.

' corset'. The market colloquialism for the SUPPLEMENTARY SPECIAL DEPOSITS requirement, introduced in 1973 to strengthen the BANK OF ENGLAND'S control over the volume of bank deposits. It was discontinued in June 1980. (See COMPETITION AND CREDIT CONTROL.)

cost. In general, a measure of what must be given up in order to obtain something whether by way of purchase, exchange or production. Economists usually employ the concept of OPPORTUNITY COST which measures costs as the value of all of the things which must be foregone, lost or given up in obtaining something. The opportunity cost measure may, but will not always, coincide with the money outlays which an accountant would measure as cost. We should also note that economists sometimes distinguish between the private costs of a good or activity to the consumer or producer and the costs known as SOCIAL COSTS imposed on the community as a whole.

cost-benefit analysis. A conceptual framework for the evaluation of investment projects in the government sector, although it can be extended to any private sector project. It differs from a straightforward financial appraisal in that it considers all gains (benefits) and losses (costs) regardless of to whom they accrue (although usually confined to the inhabitants of one nation). A benefit is then any gain in UTILITY and a cost is any loss of utility as measured by the OPPORTUNITY COST of the project in question. In practice, many benefits (which may be positive or negative) will not be capable of quantification in money terms (e.g. loss of wildlife, destruction of natural beauty, destruction of community ties etc.) while the costs will be measured in terms of the actual money costs of the project. Where money measures are secured, however, they should be corrected for any divergence between the SHADOW PRICE and the market price if possible. Strictly pursued, cost-benefit analysis would value all outputs and inputs at their shadow prices. Similarly, where inputs and outputs have no observable market (e.g. clean air, quietness) it is necessary to discover what the price would have been had a market existed. This involves the construction of models of 'surrogate markets' in which shadow prices may be derived. An example would be the difference between the price of a house in a quiet area and the price in a noisy area. This differential can then be thought of as a first approximation of the 'price' of peace and quiet, although in practice there are formidable problems in making this translation. Cost-benefit analysis should also be 'timeless' in that all costs and benefits which occur and which are due to the project in question must be counted regardless of when they occur. In practice, future costs and benefits may not get counted if the DISCOUNT RATE is relatively high. That is, £1 in 50 years' time will have a very low PRESENT VALUE if the discount rate is positive and, say, 5 per cent or 10 per cent. Cost benefit practitioners therefore tend to ignore any costs and benefits which occur at far distant dates in the future. Others argue that the only 'just' discount rate for cost-benefit purposes is zero since this treats all generations as equals instead of downgrading the gains and losses to future generations. The discount rate used should be the
SOCIAL DISCOUNT RATE which need bear no specific relationship to market RATES OF INTEREST. The general rule for accepting a project will be

$$\sum_{t=0}^{T} \frac{B_t - C_t}{(1 + r)^t} > 0$$

where $t$ refers to time and $T$ is the 'time horizon' - that is, the point in time when the project either ceases its economic life or when the analyst judges that the effect of the discount rate is such that it is not worthwhile considering further gains and losses. $B_t$ is the benefit in period $t$ and $C_t$ the cost in period $t$. The social discount rate is given by $r$. What the formula tells us is that a project is potentially worthwhile if the discounted value of the benefits exceeds the costs. It does not enable us to recommend outright acceptance since CAPITAL RATIONING may be present. In this case it is necessary to adopt some other rule for ranking projects. This is often done by the size of the benefit-cost ratio, i.e. those with the highest ratios being accepted and the list of projects being adopted until the budget is exhausted. This is in fact not a foolproof ranking procedure, but is a first rough guide to desirability. Note that the requirement that benefits exceed costs can be expressed more formally in terms of the COMPENSATION PRINCIPLE, namely that beneficiaries should be able hypothetically to compensate the bearers of the costs. (See COMPENSATION TESTS, COST-EFFECTIVENESS ANALYSIS.) See Pearce, D.W. and Nash, C.A., The Social Appraisal of Projects (1981).

cost-effectiveness analysis. A technique closely related to COST-BENEFIT ANALYSIS. It differs in that it asks a different question, namely, given a particular objective, which is the least-cost way of achieving it? It thus aids choice between options but cannot answer the question whether or not any of the options are worth doing. It is utilized when there are difficulties in associating monetary values with the outcomes of projects but where the outcomes can be quantified along some non-monetary dimension.

cost-minimization. For any given level of output that choice of input combination which yields the smallest possible total cost. The choice of a cost minimizing firm facing fixed input prices and using the two factor inputs, Capital $K$ and Labour $L$, can be illustrated using ISOCOST LINES and labour ISOQUANTS. The cost minimizing choice for output level $Y_2$ is represented by the input combination $A$, where the isoquant labelled $Y_2$ is tangent to the lowest possible isocost line $I_2$. Other input combinations lying on $I_2$, such as those represented by points $B$ and $C$, will not be chosen as they yield the lower output level $Y_2$. On similar grounds, the firm will reject input combinations lying upon isocost lines above or below $I_2$ because those above $I_2$ require a higher outlay, while those below $I_2$ represent outlays which purchase an insufficient amount of inputs to produce output level $Y_2$.

The tangency conditions for cost minimization yields the result that the input combination which minimizes the total cost of producing any given output level must necessarily satisfy the equality of the ratio of the marginal physical products of any two factor inputs with the ratio of their prices. Though PROFIT MAXIMIZATION implies cost

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**Cost insurance freight.**

See CIF.

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**Cost-inflation.**

See COST-PUSH INFLATION.
minimization, cost minimization does not necessarily imply profit maximization. For instance, a sales revenue maximizing firm will choose input combinations which minimize total cost so as to generate the maximum possible sales revenue from any given cost outlay. (See EXPANSION PATH.)

cost of capital. The cost, measured as a percentage rate, of the various sources of capital required to finance capital expenditure. All sources of capital have a cost which can be a direct one as, say, with a loan or an OPPORTUNITY cost as, say, with retained earnings. At any time a company's cost of capital will be the weighted average of the cost of each type of capital. The weight is determined by the ratio of the value of each type to the total value of reserves and all securities issued by the company. These would include all ordinary shares, preference shares and long-term debt. The weighted costs are simply added together. The cost of raising new capital is the marginal cost of capital. The cost of ORDINARY SHares is related directly to the rate of return that the ordinary shareholders require before they will hold shares in the organization. This expected return, when capitalized, must exceed the current market price. The cost of ordinary shares is often stated as dividend per share/market price per share + growth rate of dividend. The cost of PREFERENCE SHares is equal to the fixed dividend rate. Dividends on both ordinary shares and preference shares are generally paid out of earnings after tax and so the cost of these is on an after tax basis. The cost of retained earnings is an opportunity cost which is argued by some to equal the rate of return which shareholders could earn if the resources were distributed. Another view is that if the reserves were not there the company would have to raise new equity. Then the cost would be equal to the cost of ordinary shares. The cost of debt capital is the effective interest charged. Interest is an allowable expense and so it is the after tax rate payable which is relevant here. Companies have a choice in the CAPITAL STRUCTURE which they adopt and will generally try to minimize the overall cost of capital in making their choice. The cost of capital is used as the discount rate to find the NET PRESENT VALUE from new projects and is compared with the internal RATE OF RETURN from projects. (See CAPITAL STRUCTURE.) See Bromwich, M., The Economics of Capital Budgeting, Penguin, Harmondsworth (1976).

cost of living. See RETAIL PRICE INDEX.

costs of protection. The protection of domestic industry by TARIFF, QUOTA or other restriction normally imposes a cost on the protected economy in the two forms of a misallocation of resources in production and a distortion in the pattern of consumption. The former involves a reduced MARGINAL REVENUE PRODUCT from FACTORS OF PRODUCTION and the latter a loss of CONSUMERS' SURPLUS.

cost-plus pricing. A pricing practice whereby firms add a margin on to AVERAGE VARIABLE COST in order to cover FIXED COSTS and some reasonable level of profits. (See FULL COST PRICING, AVERAGE COST PRICING.)

cost-push inflation. A sustained rise in the general price level arising from an autonomous rise in costs. This may result from either an autonomous decision by employees to demand higher REAL WAGES or by employers to raise their PROFIT MARGINS or it may result from an autonomous increase in IMPORT prices. Such events may be illustrated by an upward shift in the AGGREGATE SUPPLY CURVE. However a MONETARIST would argue that these events will result in inflation only if they are accompanied by an accommodating increase in the nominal MONEY SUPPLY which shifts the AGGREGATE DEMAND CURVE out to the right. In the absence of such an increase in the money supply monetarists would argue that autonomous cost-push would result in deflation. Extreme KEYNESIANS would deny that monetary policy could exert such a restraining influence on cost-push pressures while moderate Keynesians would emphasize that the money supply plays a largely passive role and expands to accommodate these pressures. (See also DEMAND-PULL INFLATION, the WAGE-WAGE SPIRAL.)
cost-utility analysis. A form of COST-EFFECTIVENESS ANALYSIS that has arisen in health economics where the outcome or benefit is measured in terms of Quality Adjusted Life Years or a nonmonetary measure purporting to measure patient welfare.

Council of Economic Advisors (CEA). Executive agency of the US government, created by the EMPLOYMENT ACT OF 1946, which acts as chief economic adviser to the US president. Its major functions include providing advice on stabilization policy, economic regulation and regulatory reform, and international economic policy; making the macroeconomic forecasts, on which the budget projections are based; writing the Economic Report of the President together with The Annual Report of the Council of Economic Advisers. The latter is usually issued in February and presents forecasts and discusses economic events of the preceding year and major issues facing the economy. There are three members on the actual council, often highly respected academics. Council members and staff Personnel participate in inter-agency conferences, and often represent the nation as a whole against special interests represented within departments and agencies. Though its political power is weak, the Council’s economic expertise allows it to have a substantial voice in policy making.

Council for Mutual Economic Assistance (Comecon). An intergovernmental council, established by agreement in 1949 between Bulgaria, Czechoslovakia, Hungary, Poland, Romania and the USSR, which sought to improve and co-ordinate the planned economic development and integration of its member countries. Albania (1949; ceased participation in 1961), Cuba (1972), German Democratic Republic (1950), Mongolia (1962) and Vietnam (1978) were later admitted as full members. Yugoslavia participated from 1964 as an associate member whereas China and North Korea enjoyed observer status. Ostensibly established in response to the MARSHALL PLAN and the emerging economic integration of Western Europe, the council contributed little to the integrated economic development of the socialist bloc until it approved a revised charter in 1959 which emphasized economic and technical cooperation among the member countries. The council promoted economic cooperation in foreign trade and coordination of national economic plans. A co-ordinated plan of multilateral integration providing for the development of joint industrial projects was approved in 1975. However, as all decisions taken by the council had to be unanimous, several plans and projects were rejected by members, such as East Germany and Romania, who attempted to pursue independent economic policies and/or argued that most of the council’s benefits accrued to the USSR. The EC’s refusal to enter into interbloc trade negotiations also encouraged the council members to emulate Yugoslavia and develop individual economic ties with the West. Nonetheless, the council did establish co-operative agreements with Finland (1973), Iraq (1975) and Mexico (1975). With the revolutions in the Eastern Bloc socialist countries at the end of the 1980s, the Council was wound up in February 1991. (See also PLANNED ECONOMY, TRANSFERABLE ROUBLE.)

countercyclical. Moving in the opposite direction to a given phase in the TRADE CYCLE. Thus any deflationary policy aims to be countercyclical in the sense that it is applied during the latter part of the upswing of the trade cycle in order to prevent problems of inflation, bottlenecks etc. occurring. Similarly, a reflationaly or inflationary policy will tend to be applied during the downswing of the trade cycle.

countertrade. A variety of unconventional, international trading arrangements ranging from simple, but rarely encountered, BARTER deals to complicated industrial offset arrangements. Countertrade techniques organize exchanges of goods and services in an attempt to dispense with the use of CURRENCIES among countries short of HARD CURRENCY and have been prevalent among the former Eastern Bloc and less developed countries since the late 1970s. The arrangements are often tailor-made to suit the needs of the trading partners. BARTER AGREEMENTS have been entered into for minerals, agricultural products and relatively
homogeneous manufactured goods, where nuality and volume can be easily verified. Barter has been largely replaced by counter-purchase since the 1980s. Here an exporter agrees to buy goods of a certain percentage value of his exports from the overseas purchaser of his goods or from a company nominated by the purchaser. The goods taken in exchange by the original exporter need not relate to his production needs and the exporter may have a right to transfer his claim.

Other techniques of countertrade include: (1) buy-back agreements, where for example the exporter of capital equipment in one country agrees to buy the product made by this equipment in the other country; (2) industrial offsets, where a company in one country awarded a contract by an agent in another country agrees to use inputs from the country placing the order; (3) clearing agreements, where two parties, usually two countries, undertake to exchange goods up to a certain value over a defined period without using hard currency. The importer pays local currency for the imports to his central bank, which makes available to the central bank of the exporter a credit in 'clearing dollars'. In its turn this bank makes local currency available to the exporter. Theoretically clearing agreements should always lead to balanced payments. In practice this is rarely so and this gives rise to: (4) switch transactions, where a credit of country A with country B is used by country A to pay for an import from country C. If country C has no use for goods from B it may sell the right to this credit at a discount to another country prepared to buy the goods from B. This latter transaction is referred to as switch trade.

countervailing power. Countervailing power is said to prevail when the market power of firm(s) or economic agent(s) is counterbalanced by market power possessed by trader(s) who buy from or sell to the former. The concept of countervailing Power has been advanced by J.K. GAL-BRAITH, who argues that it can lead to a more workable and equitable economic and political system.

coupon. Technically, a warrant to be presented for the payment of interest on a fixed interest SECURITY, such as a bond, and from which it may have to be detached. However, a common and derived meaning of the term is the nominal or 'face-value' rate of interest on a bond or debenture, which defines the actual amount of interest payable per unit of the security in each period. The coupon rate may differ from the 'true' issue rate where bonds are issued at a price which shows a discount or premium on their nominal value.

coupon payments. See YIELD.

Cournot, Antoine A. (1801–1877). French mathematician, economist and philosopher. Although not the first to apply mathematical techniques to economic problems, Cournot is considered to be the founder of mathematical economics and because he was aware that his mathematical approach was capable of empirical quantification he can also be considered to have made the initial step in developing ECONOMETRICS.

His foremost contribution in his Recherches sur les principes mathematiques de la theorie des richesses (1838) is the development of the apparatus of supply and demand functions with the aid of which he analysed not only price formation under perfect competition, duopoly and monopoly but even TAX SHIFTING. In the same work he also introduced the concept of PRICE ELASTICITY OF DEMAND.

Cournot's duopoly model. Is based upon the behavioural assumption that each of the two firms will maximize profits assuming that its competitor's output remains constant. Given a linear MARKET DEMAND CURVE, zero costs, an homogeneous product and two firms A and B, suppose firm A is the first to enter the market. The profit maximizing price is found by setting marginal revenue equal to zero, and this will correspond to an output which is exactly one-half of the market demand at a zero price (i.e. $\frac{1}{2}X_0$) where $X_0$ equals market demand at a price of zero. The demand curve then facing firm B when it enters the market, will be that portion of the curve lying to the right of the point corresponding to $\frac{1}{2}X_0$, i.e. the unsupplied section of the market demand curve. Finding that point on the corresponding marginal
covariance

A measure of the degree to which two variables are linearly related. It is defined as

\[ \text{COV}_{XY} = \frac{\sum (X_i - \bar{X})(Y_i - \bar{Y})}{N} \]

where \( X_i \) and \( Y_i \) are the \( i \)th observations on the variables \( X \) and \( Y \),
\( \bar{X} \) and \( \bar{Y} \) are their respective sample means, and
\( N \) is the number of observations in the sample.

The covariance can be either positive or negative, implying a direct or inverse relationship respectively. The lower the absolute value of the covariance, the lower is the strength of the relationship. The covariance between two variables is a determinant of the product moment correlation coefficient between them. (See also VARIANCE-COVARIANCE MATRIX.)

covariance stationary.

See STATIONARITY.

covered interest parity. In a flexible exchange rate regime a situation where the rates of interest in two countries are rendered equal by an appropriate discount or premium on the forward exchange rate.

If the rate of interest in the US exceeds that in the UK, investors will have an incentive to move funds to the US. This action will tend to raise the price of the dollar. To remove any exchange rate risk when moving back to sterling at the end of the contract period, dollars can be sold forward and this will cause the forward price of the dollar to fall. The spot and forward rates for the dollar must diverge until the discount on the forward dollar exactly offsets the US interest rate differential, i.e. \( D = i_{US} - i_{UK} \), where \( D \) is the dollar discount and \( j \) represents the rate of interest. (See FORWARD RATE.)

CPRS.

See CENTRAL POLICY REVIEW STAFF.

craft unions. Trade unions which organize all workers possessing a particular skill or group of related skills, regardless of the industry in which they work. (See also GENERAL UNIONS, INDUSTRIAL UNIONS.)

Cramer's Rule. A method for the solution of linear simultaneous equations. A set of simultaneous equations can be represented as

\[ a_{11}x_1 + a_{12}x_2 + \ldots + a_{1n}x_n = b_1 \]
\[ \vdots \]
\[ a_{n1}x_1 + a_{n2}x_2 + \ldots + a_{nn}x_n = b_n \]

\( x_i \) is the \( i \)th variable
\( a_{ij} \) is the constant coefficient on \( x_i \) in the \( j \)th equation, and \( b_j \) is the constant on the right hand side of the \( j \)th equation. This can be written in matrix notation as

\[ AX = b \]

where \( A \) is the matrix containing the elements \( a_{ij} \),
\( b \) is the vector containing the elements \( b_i \); and
\( X \) is the vector of values of the variables \( x_i \).
The value of \( x_k \) which satisfies the set of simultaneous equations is found by Cramer's Rule by replacing the \( k \)th column of the matrix \( A \) by the vector \( b \), forming a new matrix \( A_k \). The value of \( x_k \) is then the determinant of \( A_k \) divided by the determinant of \( A \), i.e.

\[
x_k = \frac{|A_k|}{|A|}, \quad k = 1, \ldots, n
\]

crawling peg. A method of controlling exchange rates, this is a general term applying to any proposal with the characteristic that PAR VALUES - the official exchange rate as declared by the INTERNATIONAL MONETARY FUND (IMF) - can be adjusted over time, the required change being split into much smaller parts which are spread over a certain period. Thus a REVALUATION of say ten per cent might be achieved by successive changes of two per cent. The advantage is that the change can be offset by a change in the domestic INTEREST RATE thereby reducing the possibility of speculation having a destabilizing influence. This is also referred to as sliding-parity. \( \text{See DEVALUATION.} \)

credit. A wide term used in connection with operations or states involving lending, generally at short-term. To 'give credit' is to finance, directly or indirectly, the expenditures of others against future repayment. Such lending or 'financing' is direct when, say, a BANK extends an overdraft facility to a customer who then uses it. It is indirect when a trader or producer supplies goods 'on credit', i.e. for payment at a later date. Again to 'have (a) credit' is to have a facility to acquire goods without immediate payment, or to be able to draw on finance from a lending institution. In monetary economics 'credit' frequently connotes types of lending that are held to have monetary effects, either by causing increases in the money supply, as when increased banking lending leads to increases in bank deposits, or by increasing money substitutes such as, on some views, TRADE CREDIT. This connection between credit and money is most direct at the macroeconomic level when changes in money supply are analysed in terms of DOMESTIC CREDIT EXPANSION. \( \text{See BANK CREDIT, MONEY SUPPLY.} \)

credit account. See CHARGE ACCOUNT.

credit card. A card issued to customers by a BANK or group of banks or other agency (e.g. Diners' Club) which gives the holder direct access to CREDIT, e.g. from a retailer, hotel etc., or, in the case of some cards issued by banks, to cash from the banks operating the particular scheme. When goods or services are purchased with a credit card, the supplier secures rapid reimbursement from the issuing bank(s) or agency, which takes over the CREDIT providing function. Cardholders may draw on such credit up to an individually defined limit; interest is payable on balances outstanding beyond a certain period; and repayment by instalments is normally provided for.

credit ceiling. In MONETARY POLICY, an announced limit on the amount of CREDIT which may be extended by specified institutions, usually banks, during restrictive policy phases. The limit may be fixed in relation to lending outstanding in a base period and allow for increase at specified rates, and it may discriminate between classes of borrowers. In the UK the regime of monetary policy introduced in 1971 under the title of COMPETITION AND CREDIT CONTROL was aimed to avoid resort to credit ceilings or similar measures; before that date they were frequently used to restrict credit. The revised monetary control arrangements introduced in August 1981 retain this aim.

credit control. General term denoting the set of measures used by the monetary authorities to control the volume of lending by certain groups of financial institutions, e.g. BANK CREDIT, HIRE PURCHASE CREDIT. \( \text{See MONETARY POLICY, OPEN MARKET OPERATIONS, CREDIT RATIONING.} \)

credit creation. The process by which a group of deposit-taking and lending institutions which operate on fractional RESERVE RATIOS can, on the basis of an increase in their reserve assets, produce an increase in the volume of their lending, and the associated deposit liabilities, of an amount greater than the increase in reserves. The term is normally applied to the effects of the operations of the banking system, but in principle
credit guarantee. A type of insurance whereby a credit guarantee association provides insurance against default. If a borrower lacks collateral, and although being otherwise 'sound' is unable to obtain a loan, the credit guarantee association or other institution will enable him to obtain credit from a bank. This is rarely implemented in the UK. (See agricultural credit corporation, export credits guarantee department.)

credit multiplier. Strictly, the ratio of the change in the volume of lending by a group of deposit-taking financial intermediaries (and especially banks) to the change in reserve assets which initiated the change (this may be an increase or decrease). More commonly, in the traditional theory of credit creation by the banks, it denotes the ratio of change in bank deposit liabilities, caused by the increased extension of credit, to the initiating change in reserve assets. In this case it is sometimes called the 'bank deposit multiplier'. However applied, the size of the multiplier depends on the reserve ratios maintained by the institutions concerned, and the scale of leakages of reserve assets from these institutions induced by the credit change itself. A simple credit multiplier, in the sense of a 'bank deposit multiplier', is given by the following formula:

\[
AD = \frac{1}{c + r} \cdot \Delta R
\]

where \( AD \) is the resulting increase in bank deposits; \( \Delta R \) is the initiating increase in bank reserves defined here simply as 'cash', i.e. currency; \( c \) is the public's desired ratio of cash to bank deposits; and \( r \) is the bank's cash reserve ratio. In this formula the size of the multiplier is given by the expression

\[
\frac{1}{c + r}
\]

By extension the increase in the money stock, defined as cash and bank deposits held by the public (AM), is given by the formula:

\[
AM = \frac{1 + c}{c + r} \cdot AC
\]

Here the expression

\[
\frac{1 + c}{c + r}
\]

would be described as a 'money multiplier'. (See 'new view' on money supply, open market operations.)

creditor nation. A nation which, regarded as a unit, has been a net lender to, or net investor in, other countries and has thereby accumulated a volume of net claims on those countries. Such a country will be a net recipient of interest and dividend payments from these assets, a situation which, in equilibrium, will have to be offset elsewhere on the balance of payments, e.g. by a passive or 'negative' visible balance. (See debtor nation, international monetary fund, international liquidity, keynes plan.)

creditors. Individuals or institutions who have lent money in return for promises made by the recipient, to pay a certain sum of money each year by way of interest, and to repay the principal at some date in the future.

credit rationing. The act of rationing loan finance by non-price means in situations of excess demand for credit, by financial intermediaries. The term implies that the institution concerned, e.g. banks or building societies, do not attempt to eliminate the excess demand by raising interest rates: they may be precluded from this by statutory or other rules, or for policy reasons of their own or of the monetary authorities.

credit restrictions. Measures taken or imposed by the monetary authorities, to limit or reduce the volume of credit extended by banks and other financial
institutions. They may take the form of OPEN MARKET OPERATIONS and movements of INTEREST RATES without any direct interference with the operations of financial institutions. Alternatively, banks and other institutions may be required to observe specified limits or criteria in their lending business. (See COMPETITION AND CREDIT CONTROL.)

credit squeeze. A policy phase of CREDIT RESTRICTIONS. (See MONETARY POLICY, OPEN MARKET OPERATIONS.)

credit transfer. The system by which funds can be transferred directly through the banking system to the account of a specified recipient. Such a transfer may be initiated simply by anybody, whether a customer or not, paying money into a bank office with the necessary credit slip. A large number of credit transfers are made under regular 'standing orders', by payments from the transferees' accounts. As a mode of payment the credit transfer is an alternative to the CHEQUE, and of comparatively recent growth in the UK. It has a longer history on the continent where it has been operated by GIRO banks. (See CLEARING.)

creeping inflation. A slow, but continuous INFLATION, which can result inter alia from increases in AGGREGATE DEMAND. (See DEMAND-PULL INFLATION, COST-PUSH INFLATION.)

critical value. The a per cent critical value of a probability distribution is that value above (or below) which only a per cent of the probability lies. Thus there is only a 0.05 probability that a Standard Normal Variable will take on values above the 5 per cent critical value of the Standard NORMAL DISTRIBUTION (in this case, 1.65). This concept is usually used to define acceptance criteria for statistical tests, and in the calculation of confidence intervals. (See also HYPOTHESIS TESTING, STATISTICAL INFERENCE.)

cross elasticity of demand. The responsiveness of quantity demanded of one good to a change in the price of another good. To avoid the measure being sensitive to the units being used, the measure is expressed as:

\[
\text{Cross Elasticity of Demand} = \left( \frac{\Delta Q_i}{Q_i} \cdot 100 \right) \div \left( \frac{\Delta P_j}{P_j} \cdot 100 \right) = \frac{\Delta Q_i P_j}{\Delta P_j Q_i}
\]

where \(Q_i\) is the quantity of good \(i\), and \(P_j\) is the price of another good \(j\). The symbol \(\Delta\) refers to a change in the variable in question. Where goods \(i\) and \(j\) are SUBSTITUTES the cross elasticity will be positive - i.e. a fall in the price of good \(j\) will result in a fall in the demand for good \(i\) as \(j\) is substituted for \(i\). If the goods are COMPLEMENTS the cross elasticity will be negative. Where \(i\) and \(j\) are not related, the cross elasticity will be zero.

cross-entry. A concept used with regard to new entrant firms which are already established in industries using similar technology to that in which entry is now taking place.

cross partial derivative. The DERIVATIVE of a function first taken with respect to one INDEPENDENT VARIABLE, and then with respect to another. For example in

\[ Y = f(X,Z) \]

the cross partial derivative is

\[ f_{xz} = \frac{d(dy/dx)}{dz} \]

In general, it makes no difference with respect to which of the independent variables the derivative is taken first.

cross-sectional analysis. Analysis of a set of data involving observations taken at one point in time. For example, cross section data on income would involve observations on say the incomes of different households in a country or the NATIONAL INCOMES of a set of countries in a given year. (See also TIME SERIES.)

cross-section consumption function. The functional relationship between consumption and income measured across different income groups at a point in time. These findings reported a positive association between income and consumption and found:

1. \(0 < \text{MARGINAL PROPENSITY TO CONSUME} < 1\);
2. Marginal propensity to consume < AVERAGE PROPENSITY TO CONSUME and there-
cross-subsidization. When used with reference to multi-product firms, the funding of losses in one line of business from supernormal profits on other products sold by the firm. But the term is used more widely, e.g. with reference to public enterprises, to denote any subsidization of losses on one activity or service with the profits from another.

crowding hypothesis. The argument that entry barriers and informational imperfections will tend to crowd certain groups, chiefly women and blacks, into a limited range of occupations and in the process lower the relative wage of these occupations.

crowding out. A fall in either private consumption or investment as a result of a rise in government expenditure. In a fully employed economy a rise in government expenditure will cause an offsetting fall in private investment in the following manner. The rise in prices that follows from the competition in the goods markets, as a result of increased government expenditure, reduces the real money supply which in turn reduces the amount of money available to meet speculative demand for money. In consequence there is a fall in bond prices and a rise in the interest rate which leads to a fall in investment. If workers suffer from money illusion or for some other reason fail to adjust their wage demands in line with the rise in prices more output may be forthcoming in the short run. In the long run however, if the economy was already at full employment increased government expenditure can only crowd out private expenditure. (See fiscal policy.)

cubic. A cubic equation is one in which the highest power of an independent variable is three (i.e. its cube). For example

$$Y = a + bX + cX^2 + dX^3$$

is a cubic equation. (See also power function.)

cultural change. One of the criticisms of certain types of economic development is that it destroys the indigenous culture, but technological change and economic development can be achieved without profound cultural change; an example of this is the industrialization of Japan which took place by transferring features of the feudal system directly from the land to the factory.

culture of poverty hypothesis. See feedback/entrapment effects.

cumulative causation model. An approach to the analysis of regional economic growth, owing much to the work of G. Myrdal, which argues that market forces tend to increase economic inequalities between regions of the same economy. It is argued that if one region experiences an initially higher rate of growth than other regions, the flow of factors of production from the slow growing regions to the fast growing regions will reinforce that initial advantage. The adverse effects on other regions are known as backwash effects and are said to more than offset the favourable effects on these regions (known as spread effects) from the creation of expanding markets and the generation of technical progress in the fast-growing region. The fast growing region is said to benefit from agglomeration economies which are production cost reductions resulting from the geographical concentration of economic activity.

The model predicts constantly widening divergences in regional growth rates, a prediction which is not borne out by empirical evidence. This result has led on the one hand to claims that regional growth rate divergences are only prevented by government regional policy and on the other to reformulations of the model which predicts divergences in regional per capita incomes but not widening divergences in growth rates.
currency school

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cumulative preference shares.  
See FINANCIAL CAPITAL.

cumulative shares.  
See FINANCIAL CAPITAL.

currency. Strictly, that component of a country’s money stock that literally circulates from hand to hand, i.e. coin and banknotes. But the term is also used in the broader sense of a country’s money, e.g. sterling, the franc, the dollar etc., in which case it refers to the total money stock of that country. (See CASH.)

currency appreciation. An increase in the value of one CURRENCY in terms of other currencies, i.e. a rise in its EXCHANGE RATE, under conditions of FLOATING EXCHANGE RATES. It is similar in its effects to REVALUATION which refers to an upvaluation of a currency under an ADJUSTABLE PEG SYSTEM. (See CURRENCY DEPRECIATION.)

currency control. Controls over the power of the CENTRAL BANK or issuing agency to issue currency. Normally a central bank issues part or all of a country’s currency and is subject to certain statutory rules in doing so. In the UK the Issue Department of the BANK OF ENGLAND issues paper money under statutory control, which gives Parliament an ultimate sanction over increases in the issue. However, under modern conditions there is no question of control over the MONEY SUPPLY being exercised through currency control, and the volume of notes in circulation is allowed to move to accommodate changes in the demand for currency. (See also CASH BASE.)

currency depreciation. A fall in the value of one CURRENCY in terms of other currencies, i.e. a decline in its EXCHANGE RATE, under a system of FLOATING EXCHANGE RATES. It is similar in its effects to a DEVALUATION which denotes a lowering of the exchange rate under an ADJUSTABLE PEG SYSTEM. (See CURRENCY APPRECIATION.)

currency notes. Historically the one Pound and ten shilling notes issued by the UK Treasury following the outbreak of war in 1914, to conserve gold stocks in the face of an initial, partly panic, demand by the public for sovereigns and half sovereigns. At that time no bank of issue in England and Wales (with minor exceptions this meant the BANK OF ENGLAND) could issue notes of a lower denomination than £5, although in Scotland the position was different. Currency notes progressively replaced gold coin, which from 1915 onwards was withdrawn from circulation. In 1928 the currency note issue was transferred to the ISSUE DEPARTMENT of the Bank of England, and the bank’s fiduciary issue was correspondingly enlarged.

currency principle. The theory, prevalent in the middle decades of the nineteenth century and propounded by the CURRENCY SCHOOL, that monetary stability was best achieved by controlling the amount of CURRENCY, and most especially banknotes, in circulation, by means of automatic (i.e. non-discretionary) rules. In this context, monetary stability meant, first, the continuing convertibility of paper money into the metal of the country’s chosen standard (i.e. gold or silver), but more fundamentally the avoidance of instability as manifested in periodic commercial and financial crises. Peel’s Bank Acts of 1844 and 1845 embodied this philosophy, applying limits to the issue of paper money designed to make the banknote issue behave precisely as a wholly metallic currency would. Apart from a distrust of discretionary action in regard to money supply, the currency principle rested on a monetary philosophy embracing the QUANTITY THEORY OF MONEY and Hume’s SPECIE FLOW mechanism of balance of payments adjustment. The Currency School’s prescriptions for stability were opposed, though on practical not theoretical grounds, by the BANKING SCHOOL who advocated the banking principle of monetary control. (See BANK CHARTER ACT, GOLD STANDARD.)

currency retention quota. The right in certain, largely socialist, countries of exporters to buy back a certain proportion of their FOREIGN EXCHANGE earnings, thereby freeing themselves from dependence on centrally allocated imports. The measure is regarded as an export incentive and an alternative to DEVALUATION. Such a scheme was introduced in Poland in 1982 and in the Soviet Union in 1991.

currency school. A group of politicians, economists and bankers concerned with
currency substitution. The practice in an era of convertible currencies of changing the composition of international monetary holdings with a view to making gains or avoiding losses from expected changes in CURRENCY values. Such switches may be undertaken by e.g. speculators or by MULTINATIONAL CORPORATIONS simply trying to avoid losses from changes in currency values.

Currency substitution has important consequences for national demand functions for money, for apparent stability of the function can be upset by changing patterns in the international holding of domestic money. This in turn has made it difficult for the MONETARY AUTHORITIES to achieve their target rates of growth for the MONEY SUPPLY. Currency substitution also has the effect of breaking the link between rates of growth of the domestic money supply and domestic inflation, so that if the monetarist proposition of the connection between monetary growth and inflation holds, it must be considered to hold between the growth of world money supply and world inflation. (See MONETARISM, MONETARY POLICY.)

current assets. There are three main components of current assets. The first is stocks, including finished goods, work-in-progress, and raw materials. The valuation of stocks is a difficult and sometimes contentious matter. The second item is accounts receivable or short-term debtors. The main problem under this heading concerns the estimation of bad debts. The third element is cash and short-term investments. The size of current assets, particularly in relation to other financial indicators in the form of FINANCIAL RATIOS, is a main indicator of the liquidity of the company. (See WORKING CAPITAL RATIO.)

current account. In British banking, an account on which a customer may draw CHEQUES up to the amounts of the credit balance in the account, or beyond it to an agreed OVERDRAFT limit. Credit balances in current accounts can be both interest and non-interest bearing in the UK and most banks levy charges related to the number of transactions flowing through the account, though with offsetting reductions if specified minimum credit balances are maintained, so that for many people banking is free. Current account deposits, termed 'DEMAND DEPOSITS', in the US are the most liquid of bank deposits and are included in all definitions of the MONEY SUPPLY. (See SIGHT DEPOSITS.)

current liabilities. This is a statement of a company's debts which have to be settled within the subsequent year. It is the measure of a company's total short-term debt. The debts may be for goods purchased, or for services received. They include credit obligations and interest payments. Their amount, especially in relation to other financial indicators, give a picture of the LIQUIDITY position of a company.

current profits. That excess of revenue over total OPPORTUNITY COSTS which is earned during the current planning period of the firm. (See PROFITS.)

current cost accounting. See INFLATION ACCOUNTING.

current income. See PERMANENT INCOME HYPOTHESIS.

current assets. This is a statement of a company's debts which have to be settled within the subsequent year. It is the measure of a company's total short-term debt. The debts may be for goods purchased, or for services received. They include credit obligations and interest payments. Their amount, especially in relation to other financial indicators, give a picture of the LIQUIDITY position of a company.

custom and practice. Informal workplace rules which govern the allocation and performance of tasks and in many cases the criteria to be employed in deciding on the levels of pay for various tasks. In the INTERNAL LABOUR MARKET custom and practice may play a large part in determining the structure of pay DIFFERENTIALS.

customer markets. Product markets in which prices do not equate supply and demand. In such markets, firms offer their products with price lists or price tags rather than through an auctioneer or organized market clearing exchange. Buyers and sellers are not trading anonymously but instead develop accustomed trading relations,
even though on conventional standards the
numbers in the market may be sufficient to
ensure reasonably competitive behaviour.
Because 'shopping' is a costly process buyers
prefer doing business with customary sup-
pliers, whilst the suppliers have an incentive
to avoid actions that encourage customers to
go shopping. Cost-based MARK-UP pricing be-
comes a convention, or a rule of fair play,
that helps suppliers and customers to main-
tain the joint benefit of their interdependent
relationship. These relationships create a
zone of indeterminacy for prices and a need
for 'fair' formulas for the sharing of BILAT-
ERAL MONOPOLY surpluses. They also leng-
then the lags and weaken the causal
connections between changes in demand and
changes in prices.

Similar arrangements are likely to be
found in labour markets, especially because
of the non-standardized nature of the labour
input. These have been termed 'obligational
markets'.

Customs Co-operative Council. A coun-
cil, established in 1950, which seeks to im-
prove and harmonise customs operations.
The council is primarily a consultative body
which prepares draft customs conventions,
provides information regarding customs pro-
cedures and supervises the application of
omenclature and valuation conventions. In
addition, the council, whose membership in-
cluded 85 countries in 1979, has extended
technical assistance to developing countries
which are adjusting their tariffs in accord-
ance with the BRUSSELS TARIFF NOMENCLA-
TURE. (See CUSTOMS, EXCISE AND PROTECTIVE
DUTIES.)

customs, excise and protective duties.
These are taxes imposed on the import or
sale of specific commodities. Traditionally
customs duties have related to imported
goods and excise duties to domestically pro-
duced ones but the distinction is not rigid.
The motives for imposing these charges are
generally (1) to raise revenue (2) to protect
domestic industries and (3) to give prefer-
ence to imports from certain countries (e.g.
less developed countries or EUROPEAN COM-
MUNITY (EC) partners). In the UK there are
heavy excise duties on the sale of oil prod-
ucts, tobacco and alcohol. Generally these
taxes are specific, i.e. so much per unit sold,
but sometimes there is an AD VALOREM ele-
ment as well. As a member of the EC the
UK has to admit goods from partner
countries free of protective import duty and
has to apply a common external tariff known
as the COMMON CUSTOMS TARIFF to imports
from non-members. There are concession-
ary agreements which reduce the burden of
this tariff. Thus many industrial goods are
admitted duty-free from EUROPEAN FREE
TRADE ASSOCIATION (EFTA) countries.
Under the GENERALIZED SYSTEM OF PREFERENCES a non-reciprocal system of tariff
preferences is given for a wide range of
goods from developing countries by the EC
countries. Similarly, under the LOME CON-
VENTION free entry into the Community is
provided for all industrial goods and many
agricultural products from the group of
African, Caribbean and Pacific (ACP)
countries associated with the EC. Protective
customs duties collected in the UK do not
flow into the UK Treasury but are paid over
to the EC as part of that organization's 'own
resources'. The funds constitute a share of
the revenue for the EC budget. Special
arrangements apply to imports of agricul-
tural commodities. (See EC AGRICULTURAL
LEVIES.)

customs union. A grouping of countries
within which trade restrictions are abolished
but which has a concerted commercial policy
towards non-members and a COMMON EXTER-
NAL TARIFF on imports from them, though
the tariff rate may vary between commodi-
ties.

cyclical unemployment. Short-run DE-
MAND DEFICIENT UNEMPLOYMENT. The impli-
cation is that during certain phases of the
BUSINESS CYCLE there will be insufficient jobs
for the whole of the labour force no matter
how it is trained or deployed.

cycling.
See PARADOX OF VOTING.
damage cost. The money cost of damage done, usually confined to damage done by pollution. In economics, pollution is generally regarded as an instance of an EXTERNA-LITY. Placing money values on externalities is a complex and often dubious procedure as with valuing injuries, death, loss of recreational land, loss of wilderness, wildlife and so on. In other cases valuation may be more straightforward as with the loss of commercial fisheries due to, say, oil pollution.

damped cycle. (also known as convergent cycle.) One of a series of cyclical fluctuations which show a decreasing AMPLITUDE over time.

data. Observations on the numerical magnitude of economic phenomena such as NATIONAL INCOME, UNEMPLOYMENT or the RETAIL PRICE LEVEL. Data may be RAW DATA where the observations are not processed in any way, or in a transformed state such as an INDEX NUMBER.

dated securities. Any SECURITY, such as a BOND, which has a stated redemption date. Such securities are conventionally divided into short-dated, medium-dated and long-dated securities depending on the length of time which has to elapse before they 'mature' (i.e. are repaid).

deadweight debt. A DEBT which is not backed by a real ASSET in that it is only used to finance current expenditure. If a DEBT is incurred to purchase a physical or financial asset, then the debt is backed by the asset because if necessary the asset can be resold to repay the debt. However deadweight debt is just used to boost current income and there is no resulting asset to back it. An example of this is the major part of the NATIONAL DEBT which was issued to pay for the two world wars.

deadweight-loss. Commonly used with reference to that loss of consumer surplus incurred by buyers and not captured by producers, which is consequent upon an initially competitive industry becoming monopolistic and therefore, CETERIS PARIBUS, charging a higher price and selling a lower level of output.

dear money. INTEREST RATES which are high compared with their historical average values.

debased coinage. See COINAGE, GRESHAM'S LAW, 'BAD MONEY DRIVES OUT GOOD'.

debentures. DEBT securities carrying a fixed rate of interest, usually issued by a company and secured on its ASSETS. They form one means of raising FINANCE for commercial or industrial operations. The debenture holder is a creditor of the company entitled to be paid his interest regardless of whether or not the company makes profits, and before any distribution of dividends. Debentures issued by a PUBLIC COMPANY, provided they have a STOCK EXCHANGE listing may be traded on the exchange. (See FINANCIAL CAPITAL)

Debreu, Gerard (1921- ). French-born, American mathematical economist; winner of the Nobel Prize for Economics in 1983 for his research work in the theory of GENERAL EQUILIBRIUM.

Debreu examined in detail the problem raised by SMITH and WALRAS, namely how a decentralized market system could lead to the desired co-ordination of individual plans. In his work with ARROW he was able to prove the existence of equilibrium-creating prices, thereby confirming the logic of the Smith-Walras vision. Debreu has answered two further questions in this field. First he has established the conditions under which the INVISIBLE HAND of the MARKET ECONOMY will ensure ALLOCATIVE EFFICIENCY. He has
secondly analysed the question of the stability of the equilibrium of a market economy and has been able to show that in large economies with numerous market agents the market equilibrium will be stable.

His major book, *Theory of Value* (1959), is renowned for its universality and its elegant analytical approach, for Debreu is able within the same general equilibrium model to integrate the theory of location, the theory of capital and the theory of behaviour under uncertainty.

debt. An obligation or liability arising from the borrowing of finance or the taking of goods or services 'on credit', i.e. against an obligation to pay later. Depending on the terms of the transaction, interest is payable at specified periods on most forms of debt and the repayment on maturity date (or dates, if repayment is by instalments) is also usually specified. Important forms of debt, e.g. government debt, are marketable, that is, they may be traded on particular markets such as the stock exchange. (See credit, gilt-edged, floating debt.)

debt conversion. See conversion.

debt finance. This concept is used in two distinct senses, but in both cases it involves borrowing. It can refer to the use of loans by companies to finance their operations, particularly capital expenditure through long-term loans. The overall cost of capital may be reduced by the use of debt. Governments also borrow to finance their operations and to help regulate the volume of aggregate activity in the economy. Such borrowing involves the issues of short-term and/or long-term securities. In a recession, Keynesians argue, a government should be prepared to incur a budget deficit and increase its borrowing to stimulate the economy. (See gearing, capital structure, debt management.)

debt for equity swaps. A technique developed to reduce the debt burden on less developed and Eastern bloc countries, by which the debt is converted from a loan to a firm or government into an equity holding. A commercial loan by a bank to a firm can be swapped for an equity holding in the firm; the firm is then freed from the obligation of having to repay the capital of the loan, while the bank may be able to substitute a non-performing loan with an asset yielding a dividend and has the further option of selling the shares. In the case of a loan to a government, the loan may be traded for local currency to finance an equity purchase. Debt for debt swaps are also possible, where a less onerous form of debt is substituted for the original debt by, for example, denominating the substitute in domestic currency in place of an international currency, so that debt service is now carried out in the local currency. In debt for nature swaps, part of the debt is converted into an investment in environmental protection. This recognizes the frequent link between the indebtedness of developing countries and the destruction of their environment caused by the investment.

debt management. Term used, generally in connection with public debt, to denote the action taken by the debt-issuing authority, or by the central bank acting for it, to regulate the size and structure of the outstanding debt. Such management includes deciding the types of debt to be issued, e.g. short-term or long-term, marketable or non-marketable, and the conditions of issue, e.g. coupon, issue price, maturity date. An important objective is to control the term structure (relative amounts of different maturities), e.g. by funding short-term into longer-term debt. Because of its large size, almost continuous growth and predominantly dated character (i.e. having a contractual maturity date) the management of the UK’s national debt is essential to control the country’s money supply. (See floating debt, gilt-edged, open-market operations, tap issue.)

debtor nation. A nation which has been a net borrower from other countries, or has been at the receiving end of investment by foreign enterprises, and has thereby accumulated a volume of net debts and other obligations to these countries. In order to service its foreign debts, or allow repatriation of profits and dividends of foreign-owned enterprises, such a country will have to develop a surplus position on other items of the balance of payments, e.g. the visible balance. (See keynes plan, international monetary fund, international liquidity.)
debt ratio.  
See GEARING.

decile.  A measure of location of sample data or a distribution. The \( n \)th decile is that value below which 10 \( n \) per cent of the observations on the variable concerned lie. Thus the second decile is that value below which 20 per cent of the observations lie. The fifth decile is also the MEDIAN. (See also QUARTILE, PERCENTILE.)

decimal coinage.  A system of currency which uses the base ten. Prior to February 1971, the UK used a system whereby 12 pence (d) were equal to 1 shilling (s) and there were 20 shillings in the pound. With the change as recommended by the HALESBURY COMMITTEE, the pound retained its value and was divided into 100 new pence (p) which were equal to 2.4 old pence; the term shilling no longer being used. Under the old system there were coins of the following denominations, \( \frac{1}{4} \)d, \( \frac{1}{2} \)d, 1d, 3d, 6d, 1s, 2s, 2/6d, and a 10s note as well as the larger denominations of bank notes which have remained. The new coinage consisted of \( \frac{1}{2} \)p, 1p, 2p, 5p, 10p and 50p coins; the \( \frac{1}{2} \)p coin has been withdrawn from circulation and 20p and £1 coins added. This system brought the UK into line with other countries of the world.

decision function.  A synonym for OBJECTIVE FUNCTION. (See DECISION THEORY.)

decision lag.  The delay between the recognition of the need for action on an economic problem (in particular macroeconomic) and a policy decision. The decision lag for MONETARY POLICY is generally shorter in contrast to that for FISCAL POLICY, which is generally longer due to institutional constraint. Also a component of INSIDE LAG.

decision rule.  A criterion employed in making choices, such as whether or not to carry out a given project or how to price output. These rules emerge from economic analysis; for example, economic theory yields the decision rule that a firm which wishes to maximize profit (or minimize losses) should produce the output level at which MARGINAL COST equals MARGINAL REVENUE. Economists have also attempted to produce decision rules for, among other things, the evaluation of projects and the pricing policies of state industries. The precise nature of a decision rule will depend upon the OBJECTIVE pursued and the CONSTRAINTS on choice.

decision theory.  The theory relating to the establishment of appropriate courses of action with the aim of achieving given objectives under specified circumstances, which may be subject to UNCERTAINTY. Decision analyses lead to the selection of appropriate criteria by which a course of action may be judged. (See MINIMAX REGRET.)

decreasing cost industry.  An industry where the long-run supply curve is downward sloping. This could occur if there were important economies external to the firm and internal to the industry. An example might be where training costs per worker fall when the fixed costs of specialized technical schools are spread over a larger number of trainees.

decreasing returns.  See LAW OF DIMINISHING RETURNS, RETURNS TO SCALE.

decreasing returns to scale.  See ECONOMIES OF SCALE, RETURNS TO SCALE.

deferred ordinary shares.  See FINANCIAL CAPITAL.

deficit.  A situation where outgoings exceed income, on an ongoing basis, or where liabilities exceed assets at a specific point in time. KEYNES was the first to suggest that governments should deliberately run a planned deficit as part of ECONOMIC POLICY. (See DEFICIT FINANCING, BUDGET DEFICIT, BALANCE OF PAYMENTS.)

deficit financing.  The financing that is required in the situation in which expenditure deliberately exceeds income. The term is also used generally to refer to the financing of a planned deficit whether operated by a government in its domestic affairs or with reference to BALANCE OF PAYMENTS deficit.
deficit units. Economic units who cannot meet their expenses in a given period from their incomes which arise during that period, either from the sale of their labour, or their assets. They are therefore dependent on borrowing money or obtaining CREDIT.

deflation. A sustained fall in the general price level. A proportionate rate of decrease of the general price level per unit of time. (See also DEFLATIONARY GAP.)

deflationary gap. A situation in which AGGREGATE EXPENDITURE falls short of that required to produce a level of NATIONAL INCOME which would ensure FULL-EMPLOYMENT. In the INCOME-EXPENDITURE MODEL this is shown by an aggregate expenditure function which cuts the 45° line, where \( E = Y \), at less than the full employment level of national income. The diagram below illustrates that an UNEMPLOYMENT EQUILIBRIUM exists at \( Y \) and that there is a corresponding deflationary gap of magnitude \( AB \) at full employment \( Y_f \).

deflationary gap

deflator. An implicit or explicit PRICE INDEX used to distinguish between those changes in the money value of GROSS NATIONAL PRODUCT which result from a change in prices and those which result from a change in physical output.

degree of homogeneity. See HOMOGENEOUS FUNCTIONS.

degrees of freedom. (also known as df). The number of pieces of information which can vary independently of each other. Thus, a sample of \( n \) observations has \( n \) degrees of freedom. However, the calculation of the sample mean involves the loss of one degree of freedom, since independent changes in \( n - 1 \) of the sample observations would require a specific offsetting change in the rth to maintain the value of the sample mean. Similarly, the calculation of the \( \kappa \) parameter estimates in an econometric exercise involves the loss of \( \kappa \) degrees of freedom, leaving \( (n - k) \). Degrees of freedom often enter as parameters of probability distributions, such as the ‘t’ and CHI-SQUARE DISTRIBUTIONS, and can fundamentally affect their shapes.

deindustrialization. A development in a national economy towards an increasing share of the GROSS DOMESTIC PRODUCT or of EMPLOYMENT being accounted for by SERVICES. For this to occur the rate of growth of the service sector must be greater than that of the manufacturing sector. Deindustrialization tends to typify those ADVANCED ECONOMIES that have secured industrialization first, as with the UK, or where rapid industrialization has occurred and high levels of national income have been achieved, as with the US. Deindustrialization is regarded as a matter of concern by some economists since it is thought to be associated with a decline in international competitiveness. The evidence for this is however far from conclusive.

Delors Report. This report presented to the European Council at its Madrid meeting in June 1989 is part of the current phase of the plan for MONETARY UNION in the EUROPEAN COMMUNITY. It envisages a three stage process with stage one based on consolidating the single European Market. It covers strengthening of competition policy, closer coordination of economic and monetary policies, expansion of regional aid, deregulation of financial markets, expansion of the EUROPEAN MONETARY SYSTEM and the adoption of the European Currency Unit for private transactions.

Stage two would be transitional involving the strengthening of existing institutions and the establishment of new ones including a European System of Central Banks (ESCB),
which would mark the institutional beginning of a European CENTRAL BANK. Stage three would include a further strengthening of regional policy, a move to fixed exchange rates, constraints on national budgets, centralisation of international policy measures and the passing of responsibility for monetary policy to the ESCB including exchange rate policy with non-EC currencies. Finally a single European currency would be established regulated by the ESCB or its successor.

Stage one can be accommodated within the TREATY OF ROME but stages two and three will require amendment of the Treaty. To this end an intergovernmental conference has been called to negotiate the necessary changes in the Treaty of Rome. (See EUROPEAN ECONOMIC COMMUNITY, EUROPEAN UNIT OF ACCOUNT.)

demand. The quantity of a good or service which an individual or group desires at the ruling price. The total demand in an economy is referred to as aggregate demand. Aggregate demand backed by actual payment may be described as EFFECTIVE DEMAND. (See DEMAND CURVE, NOTIONAL DEMAND.)

demand curve. A graphical illustration of a DEMAND SCHEDULE or DEMAND FUNCTION but, given that diagrams can only be drawn in two or three dimensions, showing the relationship between demand and only one or two variables affecting demand, the others being held constant. Most typically, the demand curve is shown as a curve relating quantity demanded to the price of the good in question (the 'own price'). It is also usually shown as sloping downwards from left to right. Slightly confusingly, the demand curve is almost always shown with price (the INDEPENDENT VARIABLE) on the vertical axis and quantity (the DEPENDENT variable) on the horizontal axis, contrary to mathematical convention.

demand-deficient unemployment. A situation in which AGGREGATE DEMAND is too low to provide work for all those who wish to work at the current real wage no matter how they are trained or deployed. The unemployed outnumber the existing job vacancies at the current levels of money wage rates. On a classical view it is only the existence of rigid money wages that prevents a fall in the real wage and an elimination of this demand-deficient unemployment. Indeed classical economists would argue that by its very nature this form of unemployment resulting from rigid wages can only be temporary. The concept is therefore essentially a KEYNESIAN one for it emphasizes that a reduction in real wages will lead to a reduction in aggregate demand and in the Keynesian model wages and employment are jointly determined by the level of aggregate demand. The causality therefore runs from aggregate demand to employment and wages. (See NEO-CLASSICAL SYNTHESIS.)

demand deposit. See SIGHT DEPOSIT.

demand for inflation. The notion that there are potential gains for some groups as a result of inflationary policies. The resultant political (voting or lobbying) pressure from such groups is viewed as an implicit 'demand' for inflation. Although no group in society explicitly demands more inflation, pressures for the government to follow a more inflationary policy emanate from a variety of sources: tax payers who resist tax increases made necessary by increases in expenditures, beneficiaries of government expenditure programmes who resist cuts, groups attempting to increase their share of the national income, and so on. Trade unions are commonly depicted as the primary potential beneficiaries from inflation. However, although labour can raise its share of national income by pushing for higher wages, this possibility is restricted to the short run. In the long run, unions cannot redistribute income to their memberships. The problem is thus one of explaining the incentive for unions to push continuously.

demand for money. See MONEY, THE DEMAND FOR.

demand function. An algebraic expression of the DEMAND SCHEDULE expressed either in general terms or with specific numerical values expressed for the various PARAMETERS, and usually including all factors affecting demand. Thus, a general form might be:
\[ Q_i = f(P_i, P_j \ldots P_n, Y, t) \]

where \( Q_i \) is the quantity demanded of good \( i \),

\( P_i \) is the price of good \( i \) (the 'own price'),

\( P_j \ldots P_n \) are the prices of other goods \( j \) to \( n \),

\( Y \) is income, and

\( t \) is some measure of tastes.

The general algebraic form may be made more specific by postulating a particular form of the equation, e.g.:

\[ Q_i = a \cdot P_i^b \cdot P_j^c \cdot Y^d \cdot e^k \]

where \( a, b, c, d \) and \( k \) are constants. This particular form is known as the 'constant elasticity demand function' since, on manipulation, \( b \) is found to be the (own) price Elasticity of Demand, \( c \) is the Cross Elasticity of Demand, and \( d \) is the Income Elasticity of demand. The expression \( e^k \) is often construed in such a way that \( e \) is the value of the natural (Napierian) logarithm and \( e^k \) therefore represents some trend factor for taste.

The numerically specified form would then give actual values for \( a, b, c, d \) and \( k \) in the previous equation. These values would be obtained from statistical analysis, most usually REGRESSION analysis.

**demand increase.** Terminology varies widely, but an increase in demand tends to be reserved for a rise in demand at a given price. That is, the DEMAND CURVE itself has shifted outwards due to changes in income or some other variable besides the 'own price'. A rise in demand due to a price change is simply referred to as a 'rise' in demand, an 'extension' of demand, and so on. The terminology is confusing, however, and care should be taken to define what kind of demand change is in question.

**demand management.** The control of the aggregate level of demand in an economy through the use of MONETARY POLICY and/or FISCAL POLICY.

**demand-pull inflation.** A sustained rise in aggregate demand which results in a sustained rise in the general price level. Demand pull inflation may be illustrated by either upward shifts in AGGREGATE EXPENDITURE beyond the full employment level in the simple INCOME EXPENDITURE MODEL, and thus result in an INFLATIONARY GAP, or by rightward shifts in the economy's AGGREGATE DEMAND CURVE beyond the full employment level of output. For inflation to result from such an increase in aggregate expenditures the nominal money supply must be continually expanded. The expansion of the nominal money supply may itself be the cause of the rightward shift in the economy's aggregate demand curve or it may merely be accommodating the excess demand of other sectors. Keynesians would emphasize the upward surges in AUTONOMOUS EXPENDITURES and the accommodating nature of MONETARY POLICY while MONETARISTS would emphasize prior disequilibrium in the MONEY SUPPLY as the cause of the excess demands. (See also COST-PUSH INFLATION.)

**demand schedule.** A table showing the level of demand for a particular GOOD at various levels of price of the good in question. The schedule relates to a specific period of time (e.g. per month, per year etc.) and is drawn up on the basis that other factors affecting the level of demand - income, tastes, the price of other goods - are held constant.

**demand-shift inflation.** A theory combining elements of DEMAND-PULL and COST-PUSH inflation which considers inflation to be a result of a change in the structure of aggregate demand. If there are structural rigidities in the economy, while some industries are expanding others will be declining and factors of production will not be able to move easily to the productive sectors. Hence higher prices will have to be paid to attract factors of production to the expanding industries. Workers in the declining sectors will then, it is hypothesized, demand equally high wage rates and the combination of these factors results in inflation.

**demography.** The study of POPULATION characteristics.

**density gradient.** The rate at which the intensity of land use changes with radial distance from the centre of an urban area. Studies of a large number of cities in industrial countries have indicated that
population densities and the intensity of use of land for non-residential purposes decline steadily from the centre of a town or city outwards. Indeed, it has been argued that for population densities, this gradient can be represented by an equation of the form

\[ D_x = D_0 e^{-bx} \]

where \( D_x \) is density at \( x \) distance from the centre, \( D_0 \) is the 'central' density, \( e \) is the base of natural logarithms and \( b \) is a slope factor. This gradient is one of the observed regularities which economic models of urban spatial structure must seek to explain. In general, the intensity of land use towards the town or city centre is explained in terms of the value placed on accessibility (which is argued to be greatest at the centre). (See also ACCESS/SPACE TRADE-OFF MODEL.)

dependence structure. The third world countries are part of a wide structure of economic, social and political dependence between power groups in advanced countries, especially multinational companies and key interest groups in the poor countries. (See MULTINATIONAL CORPORATIONS.)

dependency burden. A situation in which there is a very high proportion of children in a population dependent on a much smaller proportion of adults. As the result of high fertility rates the age distribution of a population becomes skewed in the direction of younger age groups. (See POPULATION EXPLOSION, POPULATION POLICY.)

dependent variable. The variable on the left hand side of the equality sign in an equation, so called because its value is 'dependent' or determined by those of the independent or explanatory variables on the right hand side. (See also ENDOGENOUS VARIABLE, REGRESSAND.)

deposition. A tax advantage that allows the owner of natural resources to deduct from gross income the depletion in value of a non-renewable asset, such as minerals, oil or gas. The deduction may be based on recovery cost or on a set percentage of related gross income. This can serve as an incentive to spur the discovery and extraction of resources essential to the national economy and defence; however, it can also prompt integrated producers to set high prices at the extraction stage, along with other devices, to shift reported earnings to this stage and thus reap the benefits of the tax preferences.

deposit. Sums lent to certain financial institutions, e.g. banks, building societies and finance houses, on terms allowing withdrawal with or without notice, or providing for repayment after specified periods - such sums are usually described as 'on deposit'. CURRENT ACCOUNT deposits in banks are directly transferable by cheque; whereas those deposits for which CERTIFICATES OF DEPOSIT are issued are effectively transferable since the certificates of deposit themselves may be bought and sold.

deposit account. In UK banking, a type of account designed to attract customers' less active balances, and act as a savings medium. Deposit account balances, which attract interest at a rate that varies with the banks' base rates, cannot be drawn on by cheque. Withdrawals, normally by presenting a passbook, are formally subject to 7 days notice in the London Clearing Banks (though this is not usually insisted on), but require no notice in the Scottish clearing banks. In US banking, the corresponding accounts are 'time' and 'savings accounts', and the term 'time deposits' is now widely used to denote all non-current account deposits. (See CURRENT ACCOUNT, DEMAND DEPOSITS.)

deposit money. Or, more generally, bank deposit money. Refers to that component of the money stock which is in the form of bank deposits. Whether or not both DEMAND and TIME DEPOSITS are included depends on the MONEY SUPPLY definition adopted. In turn this depends partly on the practices of the system considered, e.g. as to withdrawal notice required for time deposits. (See DEPOSIT ACCOUNT.)

Depository Institutions Deregulation and Monetary Control Act of 1980 (DIDMCA). An act passed in 1980 by the US Congress, DIDMCA was claimed to be the most extensive banking and financial market legislation since the Federal Reserve Act in 1913 and
The legislation arose out of near crisis situations in the 1970s when high interest rates in the US drove financial institutions to create a whole array of competing financial instruments to try and attract funds. The Act itself contains nine titles. There are ten important provisions in the act. 1) Reserve requirements for all depository institutions were set at 3 per cent of the first $25 million in transaction account deposits, and 12 per cent for deposits in excess of $25 million. 2) Interest rate ceilings, in particular Regulation A, were to be phased out over the next six years. 3) The Depository Institutions Deregulation Committee was established to oversee the phase out of interest rate ceilings. 4) Savings and loan institutions were authorized to expand their lending powers and allowed to invest up to 20 per cent of their assets in consumer loans, COMMERCIAL PAPER, and corporate debt obligations. 5) NOW (Negotiable Order of Withdrawal) accounts were legalized with a uniform interest rate ceiling. Share drafts of credit unions (in effect, cheques drawn upon deposits at credit unions), automatic transfer accounts of banks, and remote service units (computerised banking machines, operated by credit card and located off the premises of a banking office) were also legalized. 6) The Fed was also authorized to begin pricing its services. 7) Non-member banks were permitted to pass their reserves through member banks. 8) State usury laws that limited the interest charged on different kinds of loans were overridden for all federally insured lenders. 9) Federal usury limits were pegged to the discount rate. 10) Lending requirements were simplified.

The Act provided for many other changes in what is becoming known as the financial services industries. The intent of all of these changes was to improve the competitive environment within which all financial institutions operate and to improve the control of the Federal Reserve Board of Governors over the money supply. (See HUNT COMMISSION.)

depreciation. The reduction in the value of assets, generally arising from wear and tear. The consumption of capital is recognized as a cost of production and an allowance for this is made before net profit is arrived at. Conventional accounting seeks to allocate the decline in value of the asset over its projected economic life. Annual provisions are conventionally calculated by one of two methods. The first is the 'straight-line method' where the cost of the asset minus the residual disposal value is divided by the number of years of its expected life to give the annual figure. The second is the 'declining balance method' where the figure employed is a constant proportion of the value of the asset and so an annually diminishing amount. Generally historic values of capital have been employed. At times of high inflation, replacement cost values could become much greater than historic costs and historic depreciation provisions will not ensure that capital costs are recovered in real terms. The problem could be dealt with by periodically revaluing assets by an index of capital costs and adjusting the depreciation charges accordingly. This is termed replacement-cost depreciation.

Depreciation is generally permitted as an allowance against profits for CORPORATION TAX purposes but the allowances have to be calculated according to rules set down by the tax authorities and these need not correspond to the depreciation charged by a firm in its accounts. In the UK they are called capital allowances.

The term is also used in economics to refer to a situation where a currency falls in value against other currencies through changes in the forces of supply and/or demand.

depressed area. A geographical area or region within a nation which experiences a significantly poorer economic performance than the nation as a whole. The index of 'depressed-ness' most frequently used is the rate of unemployment. However, other indices of economic performance used include economic growth rates and income per head, while persistent out-migration is also regarded as a characteristic of a depressed area. In many countries governments pursue REGIONAL POLICY which aims to improve the economic performance of depressed areas.

depression. See SLUMP.
deregulation. The removal of central or local government laws and by-laws, which restrict entry to certain activities. For example in western economies bus and taxi services are often subject to regulation, while in the former Eastern Bloc countries many activities e.g. foreign trade, were restricted to the state. (See PRIVATIZATION.)

derivative. The change in the DEPENDENT VARIABLE of a function per unit change in the INDEPENDENT VARIABLE, calculated for an infinitesimally small interval for the latter. The process of calculating the derivative is called differentiation with respect to the independent variable. In NON-LINEAR functions, the derivative will itself be a function of the independent variable. The derivative of the derivative is called the second derivative. The derivative of this is called the third derivative, and so on.

The derivative has a graphical interpretation in the slope of the graph of the function. In economic terms, the first derivative of any total function can be interpreted as the MARGINAL function. Thus, the first derivative of the TOTAL COST function with respect to quantity, is MARGINAL COST. The derivative of the function

\[ Y = f(X) \]

is conventionally written as

\[ \frac{dY}{dX} , \text{ or } f'(X) . \]

(See also PARTIAL DERIVATIVE.)

derived demand. Demand for a FACTOR OF PRODUCTION is sometimes called a derived demand. This means that it is derived from the demand for the final good that the factor co-operates in producing. In some cases, however, a factor of production, say labour, is demanded for itself. A case in point is the hiring of a baby-sitter. Here the demand for labour is identical with the demand for the service itself.

deseasonalization. The process of removing seasonal influences, regular seasonal occurrences which distort the underlying trend, from data. This can be achieved in a number of ways including MOVING AVERAGES, DUMMY VARIABLES and the calculation and subtraction of seasonal indices. (See also FILTER.)

desired capital stock. The optimal stock in the long run. The adjective 'desired' is often introduced in dynamic economic models to give substance to the concept of the long run optimal value of the CAPITAL STOCK. (See PARTIAL ADJUSTMENT.)

determinant. (also known as Det. or denoted by \[ | A | \]). The determinant of an n'th order matrix \( A \) is defined as

\[ |A| = \sum_{i,j} a_{ij} c_{ij} \]

where \( a_{ij} \) is the element in the \( i \)th row and \( j \)th column, and \( c_{ij} \) is the cofactor of this element. The sign of the term is determined as

\[ + \text{ if } i + j \text{ is even} \]
\[ - \text{ if } i + j \text{ is odd} . \]

The determinant is often used in matrix inversion, and in the determination of the rank of the matrix.

detrending. The process by which a time trend is removed from data, often by prior estimation of a time trend, and the calculation of residuals. (See also FILTER.)

devaluation. A fall in the fixed EXCHANGE RATE between one currency and others. When the relative values of two currencies have been fixed at an officially agreed level, any reduction in the value of one currency against the agreed fixed level is a devaluation. Two examples of a sterling devaluation occurred in 1949, when the pound fell from being equivalent to US $4.03 to US $2.80 and then subsequently in 1967, when the pound was devalued again to US $2.40.

Devaluation is used to correct a BALANCE OF PAYMENTS deficit but only as a last resort as it has major repercussions on the domestic economy. For example holders of foreign currency will then pay a lower price for British goods and the price of imports on the home market will rise. If there is no increase in the production of export goods, they will then earn less foreign exchange, which will exacerbate the balance of payments problem. (See CURRENCY DEPRECIATION, EXCHANGE RATE, BALANCE OF PAYMENTS.)

developing countries. This description of the economic position of the poorer nations of the world came into current usage in the 1960s and began to replace the less compli-
development area. Regions of Britain within which various forms of government assistance are available to industry. This assistance, which represents part of REGIONAL POLICY, consists mainly of grants for industrial investment which are paid 'automatically', though selective or discretionary support can also be given. The Development Areas were established in 1966 from the pre-existing development districts, and cover much of Scotland, Northern England and Wales. Slightly higher levels of assistance were paid in the SPECIAL DEVELOPMENT AREAS. The establishment of Development Areas can be interpreted as a response to relatively high levels of unemployment in certain regions. (See also ASSISTED AREAS.)

development planning. A plan with a broad set of objectives intended to develop the economic and social potential of either the economy as a whole or a specific area. Such plans are frequently of a long-term nature and many countries, especially India, China and the Soviet Union, have used five years as the time period for their plans. (See GROWTH THEORY, GREAT LEAP FORWARD, TECHNOLOGY, CHOICE OF, PLANNED ECONOMY, ECONOMIC PLANNING.)

development strategy. The approach taken to the problem of underdevelopment, which will depend on which particular growth model is being used. There are many different strategies, such as industrial development, IMPORT SUBSTITUTION, balanced growth of urban and rural areas, expanding and supporting agriculture in order to support the surplus population involved in establishing industry or developing the export sector in order to earn foreign exchange. See Meier, G.M., Leading Issues in Economic Development, 5th edn., Oxford University Press (1989).

deviation. The difference between the value of a variable and its MEAN. (See also STANDARD DEVIATION, VARIANCE.)

Dickey Fuller tests. A group of tests for the existence of a unit root in a time series. The simplest example can be illustrated from the following model

$$y_t = py_{t-1} + \varepsilon_t$$

which may be written as

$$\Delta y_t = -\beta y_{t-1} + \varepsilon_t$$

where \(\Delta y_t = y_t - y_{t-1}\) and \(-\beta = -(1-p)\)

The Dickey Fuller test for \(p=1\) is equivalent to testing for \(3 = 0\). However the LEAST SQUARES estimate of \(p\) (and of \(\beta\)) is not distributed around unity (and around zero) under the hypothesis that \(p = 1\) but round a value less than unity (less than zero). This negative bias diminishes as the number of observations increases. Dickey and Fuller allow for this in their UNIT ROOT TEST. If the error \(\varepsilon_t\) is serially correlated then the AUGMENTED DICKY FULLER TEST (ADF) may be used. There is a very large literature on this and related tests which allow for serially correlated errors and correct for the presence of a TREND STATIONARY PROCESS as well as a difference stationary process. Much of this further work is associated with P.C.B. Phillips and his associates. See D.A. Dickey and W.A. Fuller, 'Distribution of the estimators for autoregressive time series with a unit root', Journal of the American Statistical Association, Vol. 74, 1979, pp. 427-431.

difference equation. An equation in which the current value of the DEPENDENT VARIABLE is expressed as a function of its own previous values. An \(nth\) order difference equation is one in which the longest lag on the variable is \(n\) periods. Thus, an example of a second order difference equation is

$$X_t = a + bX_{t-1} + cX_{t-2}$$

where \(t\) is the \(rth\) time period.

differencing. A method used to recognize a DIFFERENCE STATIONARY PROCESS. (See UNIT ROOT TESTS.)

difference principle. See RAWLSIAN JUSTICE.

difference stationary process (DSP). A DSP may be written as

$$y_t - y_{t-1} = \beta + \varepsilon_t$$

(1)
where $\epsilon$ is white noise and thus integrated of order zero $I(0)$. (See INTEGRATED TIME SERIES.) It is a special case of the model,

$$y_t = \rho y_{t-1} + \beta + \epsilon_t$$

(2)

where $\rho = 1$. Testing for $\rho = 1$, and thus for a DSP, may be done using a UNIT ROOT TEST. If $\rho = 1$, then (1) is called a random walk with drift.

By repeated substitution (1) may be written as

$$y_t = n\beta + \sum \epsilon_{t-i}$$

Thus as $n$ tends to infinity it can be seen that a particular realisation of $\epsilon_t$ will have an infinite effect on $y_t$. A DSP is then said to have infinite memory, unlike a TREND STATIONARY PROCESS (TSP) which has finite memory. See C.R. Nelson and C.I. Plosser, ‘Trends and random walks in macroeconomic time series: Some evidence and implications’, Journal of Monetary Economics, Vol. 1, 10, 1982, pp. 139-162.

differentials.

See WAGE DIFFERENTIALS.

differentiated growth. An aspect of firm growth by DIVERSIFICATION, referring to that growth stimulated by the introduction of products which are sufficiently different from others as to be perceived as new by both customers and the firm alike. The effects arising from the introduction of such a product are spread thinly over a large number of producers, in contrast to the impact produced by the introduction of IMITATIVE GROWTH.

differentiation.

1. See PRODUCT DIFFERENTIATION.

2. The process of calculating the DERIVATIVE of a function.

diffusion. In the context of technical diffusion, this term refers to the rate at which innovations spread amongst firms. With static demand and perfectly competitive markets the amount of new capital incorporating a recent innovation will depend upon the amount by which costs are reduced and by the ELASTICITY OF DEMAND.

Dillon Round. The popular name for the fifth round of trade negotiations held under the auspices of the GENERAL AGREEMENT ON TARIFFS AND TRADE in Geneva (1960–61).

diminishing marginal utility. The phenomenon whereby it is assumed that the additional utility attached to an extra unit of any good diminishes as more and more of that good is purchased. In the CARDINAL UTILITY approach to demand theory, the existence of diminishing marginal utility is sufficient to explain the downward slope of the demand curve, other things being equal. The principle is also widely used to explain the CONVEXITY OF INDIFFERENCE CURVES since more and more of one good will be required to compensate for the surrender of extra units of any other good the less there is of the latter good. That this is not a strictly correct explanation of convexity is demonstrated in H.A.J. Green, Consumer Theory, rev. edn, Penguin, Harmondsworth (1976), pp. 86–9).

diminishing returns. See LAW OF DIMINISHING RETURNS.

direct costs. See VARIABLE COSTS.

direct debit. A system of recent development for making payments through the banking system. Under this, the bank of a transactor who is due to receive a payment issues a direct claim on the bank of the party liable to make the payment, which in turn debits the payer's account. The direct debit is, like the CREDIT TRANSFER, much used for the making of regular payments, e.g. insurance premiums and mortgage loan repayments. (See CLEARING HOUSE.)

direct taxes. Traditionally direct taxes were defined as those levied directly on individuals or firms such as INCOME TAX, PROFITS TAX and CAPITAL GAINS TAX. The original idea was that the bodies on whom these taxes were levied actually paid the tax. This is in contrast to INDIRECT TAXES. The distinction is neither watertight nor very useful from the viewpoint of economic analysis. Thus in the UK the employer's social security contribution was once considered to be a direct tax by the Central Statistical Office. Subsequently it was decided that this was an
indirect tax being levied on expenditure on employees and that it was probably passed on in higher prices anyway. The distinction is not analytically useful as it provides no information about the incidence of the tax.

directors.
See company director.

director’s law. A hypothesis, formulated by Aaron Director, that in a democratic system the government will tend to pursue policies which redistribute income from the relatively rich and poor towards the middle income groups. The hypothesis follows from the medium voter theorem which argues that, in a democracy, politicians will most closely reflect the preferences of those voters in the middle of the political or social spectrum. Consequently politicians will pursue policies which favour middle income groups.

dirty float. A type of floating exchange rate which is not completely freely floating because central banks interfere from time to time to alter the rate from its free-market level. It is still a ‘floating’ rate in that it has not been pegged at a predetermined par value which a government has committed itself to support, but it is not a pure ‘floating’ rate because it is influenced by central banks intervening on foreign exchange markets when and if they wish to alter it. (See exchange rate, foreign exchange, balance of payments, international monetary fund.)

disadvantaged workers. Workers who in terms of the skills they bring to the labour market or the ‘signals’ they transmit to would-be employers are at a relative disadvantage. The least skilled and educated section of the workforce who may alternatively be described as the working poor.

discharges. The total number of people involuntarily leaving employment in any single period. These may take the form of sackings, redundancies, or temporary layoffs.

discounted cash flow (DCF). A technique of appraising projects which is based on the idea of discounting future costs and benefits to their present values. The technique is founded on the idea that future cash flows - both inwards and outwards - are worth less in today’s terms because of individuals’ positive rate of time preference. Income received now can be reinvested to produce additional income. The two best known techniques using the discounting procedure are net present value and internal rate of return. They both involve discounting all future net cash flows and finding their sum. Use of this method of project appraisal is considered superior to traditional accountants’ methods where discounting is not employed. The technique has been widely employed in the USA for many years and is now increasingly employed by both industry and government in the UK. The net cash flows which are discounted include all inflows and outflows including interest and taxation. Depreciation does not appear in net cash flow. (See capital budgeting.)

discounted cash flow yield. See rate of return.

discount house. A financial intermediary in the London money market acquiring short-term assets with money repayable at short notice. A member of the London Discount Houses Association, a discount house borrows money repayable at very short notice, mostly ‘at call’ (i.e. recallable daily) or overnight, and most of it from banks. The borrowed funds are used to acquire a portfolio largely composed of bills and medium-term bonds, though including certificates of deposit (CDs) and other short-term assets. The name derives from the houses’ origins as specialists in discounting bills, an expertise which they retain. The holding of other assets, especially bonds, arises from the declining supply of bills in the interwar period. Discount houses occupy a key position in the UK banking and financial structure. They alone are entitled to borrow on their own initiative from the Bank of England, which acts in this event as lender of last resort. By an agreement dating from the 1930s the London Clearing Banks do not bid in the weekly tender for treasury bills, an expertise which they retain. The holding of other assets, especially bonds, arises from the declining supply of bills in the interwar period. Discount houses occupy a key position in the UK banking and financial structure. They alone are entitled to borrow on their own initiative from the Bank of England, which acts in this event as lender of last resort. By an agreement dating from the 1930s the London Clearing Banks do not bid in the weekly tender for treasury bills, an expertise which they retain. The holding of other assets, especially bonds, arises from the declining supply of bills in the interwar period.
discounting. The process of applying a rate of interest to a capital sum. It is widely employed to find the equivalent value today of sums receivable or payable in the future. Thus if the rate of interest or DISCOUNT RATE is 10 per cent and if the sum of £110 is receivable in one year's time its present value is £100. Discounting is the reverse of compounding and the formula for executing it on any sum

\[
\frac{S_i}{(1 + r)^t}
\]

where \( r \) refers to the rate of discount. The procedure is widely used in appraising projects where expenditure and income are spread over a number of years. It enables projects of different lives to be compared.

The concept is also employed to find the current value of a BILL OF EXCHANGE. The term is employed in relation to SECURITY prices and EXCHANGE RATES to refer to the impact of some political or economic event on current values. For example the expectation of, say, a miners' strike may already be reflected in, be discounted, in the current level of security prices.

Finally the term is used for the act of selling a BILL at a discount on (i.e. at less than) its face value. This is normal practice for someone who draws a bill on another party but is unable or unwilling to provide the FINANCE which the bill represents. The rate at which such a bill is discounted will reflect current rates of interest for finance of corresponding duration. (See NET PRESENT VALUE, RATE OF RETURN.)

discount rate. The rate at which future benefits and costs are discounted because of TIME PREFERENCE or because of the existence of a positive INTEREST RATE. Thus, if £100 accrues each year to an individual, the £100 in year 1 is worth less than £100 in the present. This is because the individual prefers his benefit now rather than later, or because £100 now can be invested at the rate of interest, \( r \), to become £100(1 + r) in one year's time. Hence the individual is indifferent between £100 now and a £100(1 + r) in 1 year's time. It follows that he is also indifferent between £100/(1 + r) now and £100 next year (dividing both sides of the previous option by \( 1 + r \)). The sum:

\[
£100 + \frac{£100}{(1 + r)}
\]

is the NET PRESENT VALUE and \( r \) is the discount rate. (See DISCOUNTING.)

2. In the US, the interest rate charged by the FEDERAL RESERVE SYSTEM for loans to member banks, set at the discretion of the Federal Reserve. The discount rate is cut or raised in response to market rate movements when authorities wish to signal their intention to maintain the new rates in the market.

Discouraged Worker Hypothesis. Those workers who leave the labour market when unemployment rises. It represents one hypothesis about the responsiveness of LABOUR FORCE PARTICIPATION RATES to Cyclical changes in the economy. When the economy turns down it has been argued there will be a fall in the real wage and family incomes. This fall in the price of market work will, on balance, induce a reduction in the labour force as a result of the dominance of the SUBSTITUTION EFFECT. Some SECONDARY WORKERS will leave the labour market and others will be deterred from entering it. A cruder version of the argument is that secondary workers looking for employment in conditions of high unemployment will become so disheartened by fruitless search for employment that they give up the attempt and withdraw from the labour force. On this interpretation the phenomenon is a cause for concern. An alternative explanation of the decline in labour force participation rates as unemployment rises suggests this represents the efficient outcome of an optimization
process. Individuals' participation in the labour market is concentrated in those periods in which real wages are rising fastest, generally those periods in which unemployment is falling, and is thus a strength of the economy. On this view secondary workers constitute the important source of labour reserves in the economy. (See ADDITIONAL WORKER HYPOTHESIS.)

discrete variable. A variable which can take on only certain values. For instance, a variable which can only take on integer values is a discrete variable, since it cannot take on fractional values. (See also CONTINUOUS VARIABLE)

discretionary profits. Those profits in excess of the minimum necessary to ensure shareholder acquiescence. This is a concept used in the MANAGERIAL DISCRETION model of the firm where discretionary profits are posited as an argument within the managerial UTILITY FUNCTION. (See MANAGERIAL THEORIES OF THE FIRM.)

discretionary stabilization. Direct intervention by the government usually in the form of monetary or fiscal policy to stabilize the growth or level of national income. (Contrast AUTOMATIC STABILIZERS.)

discriminating monopoly. See PRICE DISCRIMINATION.

discrimination. The unequal treatment of equals. In the labour market this manifests itself in the valuation of personal characteristics of the worker that is unrelated to productivity and is of three main types along the principal dimensions of race and sex. The first is that which occurs even before those discriminated against enter the market. This pre-entry discrimination assumes its most tangible form in the inferior public provision of schooling and formal training for minority groups, particularly blacks. The second type is known as employment discrimination and refers to the less favourable job slots occupied by women and blacks even after having standardized for their generally lower HUMAN CAPITAL endowments. The third type which also occurs within the labour market is termed wage discrimination. Here, minority groups receive lower pay in a given job description than their direct counterparts.

There are three main economic explanations for discrimination within the labour market: 'power' and 'taste' factors plus information externalities. The power explanation focuses upon the ability of one group to use its superior power to enable it to benefit economically at the expense of another. The more conventional 'taste' explanation requires that numbers of one group act as if they prefer not to be associated with members of another. The third explanation results from the use of outmoded rules of thumb or stereotypes in hiring and promotion decisions and is often termed statistical discrimination.

discriminatory pricing. See PRICE DISCRIMINATION.

diseconomies of growth. The dynamic constraints which set in beyond some high rate of growth and impair the efficiency of the firm's activities. On the supply side, organizational and financial constraints operate. The organizational constraint (the Penrose effect) is the limit set by the existing management personnel of the firm who at successively higher rates of growth will find it increasingly difficult to impart the knowledge and experience to new personnel which is necessary for effective organization of the firm's activities. Finance is a constraint because its supply is limited and growth of the capital stock must be financed. The growth-profitability function implied by diseconomies of growth ensure that this becomes increasingly difficult with increases in the growth rate.

On the demand side, growth requires the shifting of the firm's demand curve and the introduction of new products. This requires expenditure on demand creation and is subject to diminishing effectiveness as at successively higher growth rates resource requirements, such as design and development and marketing, grow at a proportionately greater rate given a finite number of markets. (See also ECONOMIES OF GROWTH.)

diseconomies of scale. See ECONOMIES OF SCALE.
disembodied technical progress. Technical progress which appears costless like 'manna from Heaven', completely independent of capital accumulation or any other variable in the economic system. (See EMBODIED TECHNICAL PROGRESS.)

disequilibrium. A state of not being in equilibrium. In such cases forces may exist which will automatically bring the system back into equilibrium, or it may be the case that the system will diverge further from equilibrium. (See EQUILIBRIUM.)

disguised unemployment. See HIDDEN UNEMPLOYMENT.

disincentive. See TAX DISINCENTIVE.

disinflation. The process of eliminating or reducing INFLATION.

disintermediation. The process by which funds which had previously flowed from ultimate providers to ultimate users through a FINANCIAL INTERMEDIARY, especially the BANKS, for reasons connected with relative INTEREST RATES or control over the bank's ability to expand their deposit liabilities (e.g. because of the 'corset') are routed directly. This is sometimes done with the assistance of banks, e.g. as when the banks, being constrained in their lending and deposit-taking, encourage operators to raise finance by ACCEPTANCES - bills which they, the banks, accept, but which are then sold to companies or other ultimate buyers of short-term investments. Reintermediation is the opposite process, by which previously direct flows of funds are routed through the banks or other intermediaries. However, it must be noted that at times this term has frequently been used in the sense of causing funds to flow through the banks, which had previously been flowing through other financial intermediaries, e.g. FINANCE HOUSES.

disinvestment. The deliberate destruction of part of the CAPITAL STOCK or the intended or unintended failure of REPLACEMENT INVESTMENT to cover DEPRECIATION.

displacement effect. An observed tendency for PUBLIC EXPENDITURE to rise during a war or other national crisis but not to fall to the original level after the crisis. In this way, such crises lead to a permanent increase in government expenditure. This phenomenon formed part of the explanation of public expenditure growth put forward by A.T. Peacock and J. Wiseman (see The Growth of Public Expenditure in the United Kingdom, London, Allen and Unwin, 1961). These authors argued that war or crises helped to overcome tax-payer resistance to higher taxes, the THRESHOLD EFFECT, and also led to increased centralization of various activities which thereafter remained in government control. (See WAGNER'S LAW, INSPECTION EFFECT.)

disposable income. INCOME less tax payments. (See PERSONAL INCOME.)

dissaving. CONSUMPTION in excess of current income. Consumption financed out of WEALTH or out of anticipated future income by borrowing.

distance costs. See TRANSFER COSTS.

distributed lags. The specification of econometric relationships often requires that an explanatory variable appears not only as a current value, but also as a series of earlier, lagged, values. A distributed lag formulation requires that the coefficients on these lagged values follow some mathematical relationship (or are 'distributed') through time. Examples include the inverted U-shape, and exponentially declining patterns. There are often special econometric procedures designed to estimate specific forms of distributed lag relationships, which often arise as the result of ADAPTIVE EXPECTATIONS, or PARTIAL ADJUSTMENT MODELS. (See also ALMON LAG, KOYCK TRANSFORMATION, RATIONAL LAG.)

distributed profits. That portion of net profits released by firms in the form of dividend payments to the owners of equity capital. (See DIVIDEND PAY-OUT RATIO.)

distribution, theories of. Theories relating to the mechanism by which the NATIONAL INCOME is distributed between individuals and groups in the economy. We may dis-
distinguish between the functional distribution of income which refers to the division of national product between the owners of different factors of production - land, labour and capital, and the personal distribution of income which refers to the determinants of individuals' incomes regardless of the factor from which income is derived. An example of empirical work on the personal distribution of income and wealth in the UK is the *Royal Commission on the Distribution of Income and Wealth* (1975).

The functional distribution of income in the economics of the classical school and particularly D. Ricardo, emphasized the antagonistic relationship between the rate of profit on capital, a fixed subsistence wage, the growth of population and the marginal productivity of labour. The relative share of each factor is determined by the technical and social relationships in the economy. The neo-classical marginal productivity doctrine treats the factors of production like any commodity and their prices are determined by the forces of demand and supply. This microeconomic approach has been questioned by those who emphasize the non-competitive nature of markets and role of sociological factors in determining the distribution of the product. Karl Marx's theory of distribution is based on the interdependence of the class struggle, changes in technology, population growth, the organization of workers and the extension of capitalist production to new areas. The neo-Keynesian models of distribution associated with the theories of M. Kalecki, Joan Robinson, N. Kaldor, and others, emphasize the role of market structures, the organization of workers and factors determining demand in macroeconomic models of the economy. Modern microeconomic approaches to the functional distribution of income also emphasize the imperfection of markets and introduce models of wage bargaining. See Atkinson, A.B., *The Economics of Inequality*. Oxford University Press (1975).

distributive equity. Justice or fairness in the manner in which the economy's output is distributed between individuals. It is of interest to economists in that alternative economic arrangements, projects or policies generally have different effects on distribution, thus a concept of what is desirable in terms of distributive equity facilitates the evaluation of alternatives. Distributive equity is sometimes expressed in terms of the distribution of income, of wealth or, particularly in the case of theoretical welfare economics, in terms of utility. (See also equity, distributive judgement.)

distribution function. That part of government tax and expenditure policy which is concerned with altering the distribution of income or wealth within society. This function will be undertaken if the distribution of income or wealth which emerges in the absence of government action is deemed to be undesirable.

distributive judgement. When economists are evaluating policies or projects, they face the difficulty that, in general, policies will affect not only the total output of the economy but also the way in which that output and its benefits are distributed between individuals. Given this, in the formation of a policy recommendation some judgement must be made concerning the desirability or undesirability of a policy's distributional effects since any decision will have distributional consequences. This distributive judgement is a value judgement - a matter of ethics not facts. (See also social welfare function.)
distributive justice. A concept or principle by which alternative distributions of income or wealth between individuals are to be judged. (See also DISTRIBUTIVE JUDGEMENT.)

disturbance term. The error term in a REGRESSION equation (also known as stochastic disturbance term.) It is designed to capture all of the RESIDUAL effects on the DEPENDENT VARIABLE, which are not explicitly taken into account by the EXPLANATORY VARIABLES. (See STOCHASTIC, CENTRAL LIMIT THEOREM.)

disutility. Dissatisfaction or unhappiness generated by a product, or 'bad'. (See also UTILITY.)

divergent cycle. See EXPLOSIVE CYCLE.

diversification. Either the variety of industry within a region, or the range of products sold by a firm. In its former context diversification of a region's industrial structure increases the variety of industry from which employment opportunities arise. In such regions as the North East of England where there has been a dependence upon declining heavy industries, diversification is a strategy pursued by government agencies to facilitate the expansion and stabilization of local employment levels.

With regard to firms, diversification refers to a policy of spreading the range of products marketed and has the analogous motive of reducing reliance upon the markets of a small number of products. Firm diversification is increasingly achieved by the means of takeover and MERGER, where the established brands of VICTIM COMPANIES are used to improve the range of products sold by the RAIDER FIRM.

diversifier. An investor who holds part of his wealth in MONEY and the rest in CONSOLS. If INTEREST RATES are rising then diversifiers will usually move more of their wealth into consols. Risk is likely to be the cause of PORTFOLIO diversification: if risks increase then the diversifiers will move back to holding wealth in the form of money.

dividend. A payment to shareholders in a company either in the form of CASH or SHARES. A cash dividend is a payment made out of profits after CORPORATION TAX and after interest to DEBENTURE holders has been paid. Dividends to preference shareholders are also paid before payments to ordinary shareholders. Thus the risk borne by the latter is greater. Dividends are subject to income tax but in the UK a TAX CREDIT is given to shareholders such that a given dividend declared by a company accrues free of further tax to a standard-rate tax-payer. Dividends are traditionally expressed as a percentage of the nominal value of the ordinary share capital, and in recent years (more sensibly) as an absolute amount per share. Share dividends (or scrip or bonus issues) involve no direct cash payment. The shareholder can obtain cash by selling the shares on the STOCK EXCHANGE. Shares in companies are quoted 'cum dividend' meaning that the purchase of the share carries with it the right to the next dividend, or 'ex dividend' meaning that the purchase does not carry the right to the next dividend. The significance of dividends as a determinant of share prices compared to the influence of EARNINGS has been a subject of continuing debate.

dividend cover. The ratio of earnings per ORDINARY SHARE to gross DIVIDEND per share. The higher the figure the greater is the number of times that the most recent reported earnings exceeds the most recently paid dividend. The definition of earnings in calculating this ratio is made complicated by the imputation form of CORPORATION TAX where ADVANCE CORPORATION TAX (ACT) sometimes cannot be fully offset against corporation tax. The concept of 'maximum' earnings is employed, which, if there is no excess ACT, means earnings on a 'nil dividend' basis grossed up by the rate of imputation credit (which equals the standard rate of income tax). Where excess ACT exists the figure employed is the dividend grossed up by the imputation credit plus retained earnings.

dividend payout ratio. That proportion of total profits accounted for by DIVIDEND payments.

dividend yield. The DIVIDEND per share as a percentage of the market price per
double-coincidence of wants. Where dividends are declared as a percentage of the nominal value of the share, the formula is

\[
\text{Dividend yield} = \frac{\text{dividend percentage} \times \text{nominal share value}}{100 \times \text{market price of share}} \times 100
\]

The dividend yield shows the percentage return available to an investor at current market prices. Dividends are paid out of PROFITS after payment of CORPORATION TAX. From the point of view of a company raising new EQUITY, the dividend yield is a main component of the cost that has to be paid for such capital. (See COST OF CAPITAL.)

division of labour. The process whereby labour is allocated to the activity in which it is most productive - i.e. in which it can make best use of its skills. As a result no one person carries out all the tasks in the production, instead each specializes in that in which he has a COMPARATIVE ADVANTAGE.

dollar certificate of deposit. CERTIFICATE OF DEPOSIT (CD) denominated in dollars and issued in exchange for a DEPOSIT in dollars. CDs originated in the US in 1961, but dollar CDs are now issued in other financial centres. In London, where they were first issued in 1966, a large number of BANKS, British and foreign, issue them and there is a SECONDARY MARKET in which they are traded.

Domar, Evsey D. (1914- ). Polish-born American economist recognized for his work on the theory of ECONOMIC GROWTH. He stressed that investment expenditures had a two-fold effect, namely an income-generating effect and a capacity-augmenting effect. KEYNESIAN economics recognized only the former and Domar set out to ascertain what conditions had to hold for the growth in demand and the growth in capacity to proceed in balance. The results which he established turned out to be similar to those derived independently by HARROD, so that they are now known as the Harrod/Domar conditions. His main publication is Essays in the Theory of Economic Growth (1957).

domestic credit expansion (DCE). An indicator of monetary change within an economy, developed and strongly advocated by the INTERNATIONAL MONETARY FUND in the 1960s as a truer current measure of expansionary forces in the monetary system than measured changes in the money stock. Broadly, it measures the total change within a given period in those types of credit which lead directly to changes in the MONEY SUPPLY, as conventionally defined. As such, and put simply, it is equal to that part of the PUBLIC SECTOR BORROWING REQUIREMENT that is not covered by borrowing from the non-bank public (and hence must be covered either by borrowing from the banks or from abroad, or by using the sterling proceeds of net sales of foreign currencies from the external reserves), plus the increase in bank advances. DCE is not normally equal to the change in the money supply: the difference between the two is accounted for, broadly, by the BALANCE OF PAYMENTS on current and capital accounts. In an expansionary phase, DCE takes account of that expansion which, by spilling over into foreign expenditures, does not show up in increased money supply. By stipulating a DCE limit as a condition of assisting a member country with an external payments deficit, as in certain cases - e.g., the UK - it did, the IMF was in its view applying a more appropriate monetary discipline than a straight money supply condition would impose.

dominant firm price leadership. See PRICE LEADERSHIP.

Doolittle method. A systematic approach to solving sets of four or more simultaneous equations developed by M.H. Doolittle. It involves a set pattern of multiplication of equations by the reciprocals of their coefficients, followed by a systematic process of addition which ultimately yields numerical solution values for the unknowns. A simple process for checking accuracy at each stage is built into the method. This and other systems for solving equation sets have largely been supplanted, within economics at least, by the matrix inversion methods used in computerized solution algorithms.

double-coincidence of wants. If trade is to take place under a system of BARTER then it is necessary for there to be a double-coincidence of wants between the two
double counting. The counting of a single element of benefit or cost more than once in a COST-BENEFIT ANALYSIS. For example, if the construction of a new bridge makes a particular location more attractive to live in, due to its increased accessibility, property values will increase. This should not be counted as part of the benefits since it represents simply the capitalized value of future time saving, improved job and shopping opportunities, etc. which already will have or should have been included in the cost-benefit analysis. Double counting is also a potential danger in the estimation of NATIONAL INCOME.

double factorial terms of trade. See TERMS OF TRADE.

double switching. See RESWITCHING.

double taxation and double taxation relief. An individual or organization obtaining income in a foreign country may be liable for TAXATION on that income in both the foreign country and the country of origin. A system of reliefs for such double taxation has been developed by most countries in the world. Sometimes the nature of the relief is contained in double taxation agreements but sometimes relief is given on a unilateral basis. For example, a UK company operating in a foreign country may have to pay income tax to the government of that country. In the UK the company will be liable for CORPORATION TAX on the income earned overseas. The UK tax system allows the foreign income tax to be set against the UK tax liability. The company ends up by paying the higher of the foreign or UK rate. Credit is given for INCOME TAXES but not others such as ROYALTIES. Where the foreign operation is via a subsidiary, credit is usually given not only for the WITHHOLDING TAX on a dividend but for the underlying income tax as well. Credit is frequently given for income taxes paid in the foreign country to state or local governments.

Dow Jones Index. The INDEX NUMBER of WALL STREET Stock Exchange share prices that is most commonly referred to. It is the United States equivalent of the FINANCIAL TIMES INDUSTRIAL ORDINARY SHARE INDEX.

dual decision hypothesis. In modern developments of KEYNESIAN ECONOMICS, the argument that conventional demand and supply functions do not provide the relevant signals for equilibrium to come about in markets. The argument is that conventional demand and supply curves yield quantities that buyers and sellers wish to exchange given their planned receipts. If realized current receipts differ from these planned receipts, buyers and sellers are accordingly constrained by their actual incomes and must therefore revise their plans. The 'duality' in question relates to the initial and revised demand and supply plans.

dualism, theory of. This theory was outlined originally by MALTHUS who saw an economy as consisting of two major sectors, one industrial and one agricultural; breaking the economy into two sectors and looking at the interaction between them is said to increase the understanding of the development process. The agricultural sector features subsistence farming often using primitive and inefficient techniques. Standards of living and wages are low. In the urban industrial sector, although wage levels are often high there is widespread poverty and unemployment because people are attracted to the urban areas by the high wages but are unable to find employment. This is a major problem in most developing countries but some of the worst examples are in South America where huge shanty-towns have grown up around the major cities because people cannot find employment or accommodation and are unwilling or unable to return to the rural areas. (See LEWIS-FEI-RANIS MODEL.)

duality. A method of deriving systems of demand equations which are consistent with optimising behaviour on the part of the consumer or producer by simply differentiating a function instead of explicitly solving a constrained optimisation problem. It has been applied to unit cost functions and constant RETURNS TO SCALE production functions. The
basic idea is that maximising profit is directly linked to minimisation of costs in such a way that both will result in the same behaviour patterns, but one may be a much easier solution to the given problem than the other. The duality approach can also be used in LINEAR PROGRAMMING as a maximising problem with inequality constraints for the system may be more easily solved in its dual minimising form where the number of constraints is different and the direction of the inequalities reversed.

As a method of generating systems of factor demand equations consistent with cost minimisation, duality was rigorously introduced as Shephard’s lemma.

dual labour market hypothesis. The hypothesis that the labour market is dichotomized into a primary and secondary sector. ‘Good’ jobs, characterized by high pay, promotion prospects, security and good fringe benefits, make up the primary sector of the dual economy, while ‘bad’ jobs and the workers frozen out of the primary sector comprise the secondary sector. In the latter, wages are established by competition and jobs are sufficiently plentiful to employ all workers. However, they are low paying, unstable and generally unattractive. Workers in that sector are precluded from entering the primary sector not so much by their lack of HUMAN CAPITAL and trainability as by institutional restraints in the form of DISCRIMINATION, the restrictive practices of unions, and a simple dearth of good jobs. Workers in the secondary sector are thus subject to UNDER-EMPLOYMENT.

The policy prescription of the dual labour market hypothesis is the creation by the government of better jobs or more good jobs accompanied by legislation to remove discrimination. This conflicts with the basic neoclassical analysis which would interpret labour market disadvantage as reflecting deficiencies in human capital investments. However the lower level of human capital investment by secondary workers may be a rational response to the lower returns to investment experienced by these workers as a result of discrimination. In this model in contrast to most other economic models TASTES, for education and training, become endogenous.

dummy variable. A binary (off-on) variable designed to take account of exogenous shifts (shift dummy) or changes of slope (slope dummy) in an econometric relationship. For instance, dummies can be used to account for seasonal influences in the data. By specifying a dummy to take on the value of unity for, say, winter months and zero at other times, it will indicate the degree to which a relationship shifts during the winter, compared to other seasons, by augmenting the constant term of the equation. This type of variable can also be used to include qualitative factors in a regression (e.g. male or female, or policy on-policy off periods).

dumping. The practice of selling a good abroad at a price lower than that charged for the same good in the domestic market. Dumping may be private on the part of a firm, subsidized by the state or may take place directly by a state-owned company. Where dumping is long run on the part of a private company, it is acting as a DISCRIMINATING MONOPOLIST in the international sphere. Short term dumping may be sporadic, to remove unwanted stocks on the part of a foreign producer, or predatory, where a foreign producer may temporarily reduce his supply price to force out a domestic producer in order to gain a monopoly position. Predatory dumping may justify antidumping duties on anti-monopoly grounds. Economic analysis suggests that where the dumping is long-run and there are no fears about the exercise of monopoly power by the foreign supplier, the country subject to dumping should accept the favourable terms of trade implicit in the dumping.

duopoly. A market structure where there are only two firms. Models purporting to explain the determination of output and price in this market structure base their analysis upon assumptions regarding decision making where there is perceived interdependence. (See COURNOT’S DUOPOLY MODEL, BERTRAND’S DUOPOLY MODEL, STACKELBERG’S DUOPOLY MODEL.)

duopsony. A particular market in which there are only two buyers of the product or service being traded.
duration of unemployment. The average period of time an individual spends on the unemployment register. The level of unemployment at any one time is a function of both flows on to the register and the average duration. (See also REGISTERED UNEMPLOYED.)

Durbin h-statistic. A statistic which diagnoses the problem of SERIAL CORRELATION or error terms in a regression which contains a lagged endogenous variable, in which case the more usual Durbin-Watson d-statistic is inapplicable. It is defined as

\[ h = (1 - \frac{1}{2}d) \sqrt{\frac{n}{1 - n\hat{\nu}(b)}} \]

where \(d\) is the Durbin-Watson statistic, 
\(n\) is the sample size, and 
\(\hat{\nu}(b)\) is the estimate of the variance of the coefficient of the lagged endogenous variable.

The h-statistic follows an approximately standard normal distribution under the null hypothesis of zero serial correlation, and so may be tested against critical values of that distribution. (See also SERIAL CORRELATION, DURBIN-WATSON STATISTIC.)

Durbin-Watson statistic. (also known as d, or D.W.). A statistic which diagnoses the problem of SERIAL CORRELATION of error terms in a regression. A value of around 2 usually indicates there is no problem, though the actual ideal value varies with the number of estimated parameters, and the number of observations. A further statistic defined as

\[ d' = 4 - d \]

is used to diagnose negative serial correlation. When the REGRESSION MODEL includes a lagged ENDOGENOUS variable as an explanatory variable, the computed value of the D.W. statistic is unreliable and may indicate no serial correlation, when such a condition is actually present. Recourse may then be had to the DURBIN-WATSON H-STATISTIC.

The D.W. statistic may also be used as a test for specification error in UNIT ROOT TESTING and as a test of COINTEGRATION. In these two latter categories the distribution of the test statistic differs over the two categories and requires the use of separate tables of critical values. Considerable care is required in the interpretation of the computed value of a D.W. statistic in all circumstances.

dynamic economics (or economic dy-namics). The intertemporal analysis of the economic system. The economy may be passing from one equilibrium point to the other, (i.e. two COMPARATIVE STATIC equilibria) or it may be continuing through time without reaching a state of static equilibrium. The essence of such models is the introduction of lags in the adjustment of variables, the current values of which depend on past values of themselves and/or other variables. Effectively any economic model which simultaneously contains variables dated in more than one time period may be considered dynamic. One way of considering the difficulties of interpreting the general theory of J.M. KEYNES is that he was concerned with a dynamic problem but had only the tools of comparative statics available to him, giving rise to great controversy over what he really meant. Dynamic economic theory requires techniques which are much less well developed than those for comparative static economics.

dynamic model. 
See DYNAMIC ECONOMICS.

dynamic peg. 
See EXCHANGE RATE.

dynamic programming. A collection of mathematical techniques for solving certain types of sequential decision problems. It is the dynamic or intertemporal extension of LINEAR PROGRAMMING and deals with the sequential problem by first solving for the last period \((t)\) of the sequence in question then proceeding with the given result for period \(t\) to the solution for period \(t - 1\). It then proceeds recursively to solve for all remaining \(t - 2\) periods using the method of backward induction.

Variations of dynamic programming can be used to solve problems over sequences of time periods of infinite number usually by solving for the first period into the future \((t + 1)\) followed by \(t + 2\), etc.

Dynamic programming is related to other dynamic OPTIMIZATION techniques used in economics such as the maximum principle, and the calculus of variations.
dynamic theories of comparative advantage. New theories of international trade which emphasize the role of information specificity and diffusion in explaining the pattern of international trade and production. The major explanations of the pattern of international trade, the RICARDIAN and the HECKSCHER-OHLIN opportunity cost approaches, are deficient in explaining and predicting the pattern of trade in manufactures, since it is only possible to refer back to COMPARATIVE ADVANTAGE or TO factor abundance once the export commodity is known. New theories, which emphasize the process of the generation and diffusion of new economically relevant knowledge, have been developed to supplement the traditional approaches. New products are developed for high income markets where there are increasing demand levels and where there is an incentive to economize on high cost labour and to introduce labour saving innovations. Exports of new goods represent technological gap trade, since knowledge of the technology is still lacking in the rest of the world. Eventually this knowledge becomes widespread and new locations for production arise. These tend to be where wages are low, so that exports of this product now represent low-wage trade. (See also PRODUCT CYCLE.)
earmarking. The practice of linking particular elements of PUBLIC EXPENDITURE to the revenue raised by specific taxes. This process of assigning certain revenues for specific purposes is also referred to as hypothecation. Economists are divided on the merits of earmarking, some holding that the practice may impose an undesirable rigidity on certain expenditures, while others argue that such taxes can help improve ALLOCATIVE EFFICIENCY by acting as PRICES provided the taxes are levied on those who benefit from the expenditure. (See also BENEFIT PRINCIPLE.)

earnings. The term is used in two ways: one to describe the return for human effort; the reward for input of the factor of production labour, and the other to describe the income of a business.

1. In labour economics, earnings is used to describe the total payments an individual receives from his employment. Gross earnings comprise the basic pay the individual receives together with any payments for shift and overtime working or any form of incentive scheme. Gross weekly earnings, the total payments received in a single week may be distinguished from gross hourly earnings by the total number of hours worked. Earnings may be quoted in pre- or post-tax terms (gross or net) and in real or money terms. (See also WAGE RATES.)

2. The earnings of a business refers to the income of that business which may be either distributed to shareholders or retained. Earnings per share is a measure of the total earnings of a company on its ORDINARY SHARE capital and is calculated by dividing net income by the number of ordinary shares. Net income represents gross income less deductions for DEPRECIATION, INTEREST payments, the earnings of preference shares and corporation tax liability. Earnings per share will in most cases be higher than dividends per share because the firm will in general choose to distribute only a part of these. (See DISTRIBUTED PROFITS.)

earnings drift. A rise in weekly earnings in excess of the rise in negotiated WAGE RATES. As distinct from WAGE DRIFT this measure makes no adjustment for changes in overtime or any other payments received under other recognized procedures for scheduling rates.

earnings function. The functional relationship between earnings levels and their determinants. A standard earnings function may be written

$$\ln Y_i = f(s_i, t_i, t_i^2, Z_i)$$

where $\ln Y_i$ is the natural logarithm of observed earnings of the $i$th individual; $s_i$ is education measured in years; $t_i$ is years of work experience; $t_i^2$ is the square of years of work experience; and $Z_i$ is a VECTOR of other variables.

Earnings are a positive function of education work experience and a negative function of the square of work experience (basically because HUMAN CAPITAL investments decline with age). These crude human capital variables have been shown to explain up to two-thirds of the observed variation of actual earnings.

easy money. A general state of ease and cheapness of borrowing in the financial system. It may result from policy action to reduce INTEREST RATES, increase LIQUIDITY of the banking system, relax any non-price restrictions on lending such as CREDIT CEILINGS and restrictive conditions on HIRE PURCHASE contracts. But at some periods it has resulted from a slack demand for finance produced by RECESSION conditions. (See MONETARY POLICY, OPEN MARKET OPERATIONS.)

EC Agricultural Levies. Duties levied by members of the EUROPEAN COMMUNITY (EC)
economic good. A good that is scarce, and also something of which one would choose more if one could. (See FREE GOOD.)

economic base multiplier. A form of REGIONAL MULTIPLIER which estimates the effect of changes in an area’s ECONOMIC BASE on the economy of the area as a whole.

economic community. An economic union among countries which have COMMON EXTERNAL TARIFF and COMMERCIAL POLICY and have removed restrictions on trade between member countries. Such a union ultimately involves the harmonization of industrial and social policies, and concerted monetary and exchange rate policies as a step to a common currency.

Economic Co-operation Administration. An economic aid agency, created in 1948 by the US Foreign Assistance Act, which administered the MARSHALL PLAN for European economic recovery following the Second World War. The functions of the agency were subsequently absorbed by the Mutual Security Agency (1951), the Foreign Operations Administration (1953) and the International Co-operation Administration (1955). (See also EUROPEAN RECOVERY PROGRAMME, ORGANIZATION FOR EUROPEAN ECONOMIC CO-OPERATION.)

economic development. The process of improving the standard of living and well being of the population of developing countries by raising per capita income. This is usually achieved by an increase in industrialization relative to reliance on the agricultural sector. (See ECONOMIC GROWTH THEORY, STAGES OF GROWTH.)

Economic Development Committee. See NATIONAL ECONOMIC DEVELOPMENT COUNCIL.

Economic Development Institute. See INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT.

economic dynamics. See DYNAMIC ECONOMICS.

economic efficiency. See ALLOCATIVE EFFICIENCY.

economic good. A good that is scarce, and also something of which one would choose more if one could. (See FREE GOOD.)
economic growth. Typically taken to mean an increase in the real level of NET NATIONAL PRODUCT, although the measure will then be sensitive to the way in which national product is measured. Thus, an economy with a large sector containing bartered goods or unrecorded consumption of its own product (e.g. farmers' consumption of their own produce) may raise its actual level of national product without the recorded level showing an increase. (See GROWTH THEORY.)

economic imperialism. See IMPERIALISM.

economic liberalism. The doctrine which advocates the greatest possible use of markets and the forces of competition to coordinate economic activity. It allows to the state only those activities which the market cannot perform - e.g. the provision of PUBLIC GOODS - or those which are necessary to establish the framework within which the private enterprise economy and markets can operate efficiently, e.g. by the establishment of the legal framework on property and contract and the adoption of such policies as anti-MONOPOLY legislation. (See LAISSEZ-FAIRE.)

economic man. The name given to the 'construct' in economics whereby individuals are assumed to behave as if they maximize UTILITY, subject to a set of constraints of which the most obvious is income. Economic man is then 'rational' if he pursues this objective although he may face obstacles, such as imperfect information, which prevent him actually achieving the goal. Rational man in economics may however pursue objectives other than the maximization of utility, in which case he is rational if he pursues that goal in a self-consistent manner.

economic planning. The institutional coordination of economic activities. Under planning, as distinct from ECONOMIC LIBERALISM, the state or other institutions seek to determine the volume and nature of final output by determining the allocation of factors of production between alternative uses. Economic planning may be classified as imperative or indicative. Imperative planning applies to a centralized macroeconomic plan in an economy dominated by the public sector. As in a fully PLANNED ECONOMY the government takes control of output, price and wage determination. INDICATIVE PLANNING refers to the indication of a series of goals by the government and indirect stimulation of certain economic activities through TAXATION or MONETARY POLICY to accomplish planning by inducement. The most comprehensive system of non-coercive planning in a MIXED ECONOMY was introduced by the French in a series of national plans in effect for four or five years. The aim of these plans has been to stimulate and direct economic growth using inducements such as access to finance, tax concessions and regional subsidies. The UK, Sweden and Japan have also used some form of indicative economic planning. The UK National Plan published in 1965 was not successful, however, mainly due to the unfavourable BALANCE OF PAYMENTS, and movements in the EXCHANGE RATE. See Cave, M. and Hare, P., Alternative Approaches to Economic Planning, Macmillan, London (1981).

economic policy. Conduct of the state towards the economy of the country. The attitude of the state may at a general level range from one of 'hands off (laissez-faire) to strongly interventionist as in a PLANNED ECONOMY.

Economic policy falls into two main classifications, namely those of microeconomic policy with the objective of improving the efficiency of resource allocation and macroeconomic policy with the objective of securing a fuller use of resources and price stability.

At a technical level it has been demonstrated by TINBERGEN that as a general rule every policy end requires a corresponding policy variable.
economic rent. A payment to a factor in excess of what is necessary to keep it to its present employment. For example, if a man is earning £10,000 in his current job and his next best alternative pays £9,000, the economic rent which he enjoys is £1,000. This definition of rent stems from PARETO and can be contrasted to that developed by RICARDO, MILL and MARSHALL, which sees rent as the difference between what a factor receives and the payment which would be necessary to entice it into employment. In terms of the above example, if a man would remain unemployed if offered less than £3,000 but would supply his labour at this figure, the Ricardo-Mill-Marshall definition would set the rent at £7,000. The latter definition stems from Ricardo's view of the rent of land, since he regarded all payments to land as the unnecessary surplus on the grounds that land had no alternative use. (See TRANSFER INCOMES, QUASI-RENT.)

economics. The study of the way in which mankind organises itself to tackle the basic problem of scarcity. All societies have more wants than resources (the factors of production), so that a system must be devised to allocate these resources between competing ends.

economic surplus. The difference between the output of an economy and the necessary costs of producing this output, where by necessary costs is meant WAGES, DEPRECIATION of capital and the cost of raw materials.

The concept is used in development economics, where it is argued that to attain sustained progress an underdeveloped economy must produce a surplus over SUBSISTENCE, which should be devoted to CAPITAL ACCUMULATION.

The concept has also been used by Baran and SWEEZY (Monopoly Capital, 1966). They extended the Marxian notion of SURPLUS VALUE, which could be measured as the sum of PROFITS, RENT and INTEREST, to include other disguised forms of surplus such as the costs of sales promotion and the activities of government, many of which are directed towards military expenditure. They argue that the modern capitalist economy is characterized by a law of rising surplus, and they are concerned that surplus which cannot be absorbed (or used) will not be produced, so that stagnation is likely to be the prevalent state in modern advanced capitalist economies.

economic theory of politics. A model of political behaviour which assumes that voters are UTILITY maximizers and that political parties are VOTE MAXIMIZERS. The individual voter will opt for that political party which he considers will provide him with the highest utility from government activity. Political parties aim to supply policies which will gain most votes. Politicians are assumed to be motivated by self-interest and the desire to hold office, and consequently formulate policies to achieve these goals. This view conflicts with the social welfare maximizing model of governmental behaviour in which politicians seek office to expedite preconceived policies designed for the social good. Instead, policies will reflect the preferences of the MEDIAN VOTER and the influence of producer interest groups (management and organized labour) and BUREAUCRACIES. Voter interests are likely to reinforce producer interests for the basic reason that their own producer-interest (earning and producing) is more immediate and concentrated than their consumer interest which is dispersed over many product markets.

economic union. See ECONOMIC COMMUNITY.

economic welfare. That part of human welfare which results from the consumption of goods and services. It may be defined in terms of the welfare of individuals or groups. PIGOU argued that it was that part of welfare which could be expressed in monetary terms. Although welfare was originally regarded as being synonymous with satisfaction or UTILITY, some economists have objected that welfare is an ethical concept and that to say that the satisfaction of an individual's desires increases his welfare is to make a VALUE JUDGEMENT that the satisfaction of those desires is a good thing. Other economists would persist in arguing that 'economic welfare' has a precise meaning and has no ethical overtones. Further difficulties and limitations arise when we wish to measure welfare, either for the purpose of considering changes in economic welfare or
when discussing the welfare of groups of individuals. In attempting to resolve these difficulties, economists have employed the concept of a SOCIAL WELFARE FUNCTION which seeks to relate the welfare of a given group to that of the individuals composing the group. WELFARE ECONOMICS is the study of the way in which economic arrangements affect the welfare of the members of a society.

economies of growth. The advantages that accrue to the growing FIRM or country as a consequence of current or earlier ECONOMIC GROWTH. At or below some rate of growth it can be argued that the growing firm has advantages over the stationary one. Commonly asserted sources of growth economies are, that the propensity to attract and keep good quality management is a positive function of growth, and that given STEADY STATE GROWTH, the average age of the capital stock of the growing firm will be lower than that of the zero growth firm. Thus we can expect over some range of growth rates a positive association between productivity, profitability and growth. (See also DESECONOMIES OF GROWTH and GROWTH-PROFITABILITY FUNCTION.)

economies of learning. See LEARNING.

economies of scale. Reductions in the AVERAGE COST of a product in the LONG RUN, resulting from an expanded level of output. The economies can be classified as internal or external. The former arise from the expansion of the individual firm. They may be technological, managerial, financial or risk-spreading. External economies arise from the expansion of the industry, an increase in whose size may make possible things like a specialist press or specialist training, which reduce the costs of all firms in the industry. (See RETURNS TO SCALE.)

economy of high wages. The proposition that high wages cause high productivity: wages and the MARGINAL PRODUCT of labour are suggested to be positively associated. Thus, in LESS DEVELOPED COUNTRIES, an enhanced wage rate might permit higher nutritional intake and improved standards of health care which would enhance the productivity of workers. In developed countries, on the other hand, it is unlikely that higher incomes operate to increase worker efficiency, although the environment of higher consumption standards might be such as to lead to improved attitudes and performance with higher wages. There are limits to which wages can be raised on this principle, and it is to be expected that a LAW OF DIMINISHING RETURNS will operate.

ECSC. See EUROPEAN COAL AND STEEL COMMUNITY.

ECU. See EUROPEAN MONETARY SYSTEM.

Edgeworth, Francis Ysidro (1845-1926). Professor of Political Economy at Oxford University from 1891 to 1922 and edited or co-edited the Economic Journal from 1891 to 1926; his published work includes Mathematical Psychics (1881); Theory of Monopoly (1897); Theory of Distribution (1904); and Papers Relating to Political Economy (1925). A utilitarian, he is generally held to have invented the tool of INDIFFERENCE CURVES and the CONTRACT CURVE which he used in his theory of BARTER. In doing so, he made the original assumption that the UTILITY of every commodity is a function not only of that commodity but of all commodities consumed. He is also renowned for his work in statistical methods and particularly his Generalized Law of Error, INDEX NUMBERS and index functions. In contrast to SENIOR, whom he succeeded at Oxford, he extended the LAW OF DIMINISHING RETURNS from agriculture to manufacturing as a general principle.

Edgeworth box. A diagrammatic construct which in the case of consumption using the INDIFFERENCE MAPS of the two individuals A and B, one sited with origin in the 'south-west' corner of the box and the other in the 'north-east', illustrates the opportunities for mutually beneficial exchange. The dimensions of the box represent the total quantity of the two goods 1 and 2 available. In the production case the dimensions of the box are determined by the factor inputs available and two ISOQUANT MAPS are combined to show output maximizing substitutions. (See also CONTRACT CURVE.)
efficiency wage theory

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Good 1

Good 2

Edgeworth box

EEC.
See EUROPEAN ECONOMIC COMMUNITY.

effective demand. AGGREGATE DEMAND for goods and services which is backed up with the resources to acquire them. This is to be distinguished from notional demand which refers to a desire for goods and services, which is unsupported by the ability to pay, and can thus not be communicated to suppliers through the PRICE MECHANISM.

The importance of the distinction is that, since the price mechanism cannot signal notional demand, it may be possible for a DISEQUILIBRIUM position to persist in a market economy, thus casting some doubt on the ideas of GENERAL EQUILIBRIUM put forward by WALRAS. (See DUAL DECISION HYPOTHESIS.)

effective rate of protection. This is defined as the increment in VALUE ADDED, made possible by the tariff structure, as a proportion of the free trade value added. If under free trade a good which sells at £100 uses imported inputs worth £50, the domestic value added is £50. If a 10 per cent tariff is imposed on imports of this good, the nominal tariff rate is 10 per cent. If the imported inputs remain free of duty, the effective rate of tariff protection will be 20 per cent since the good produced domestically can now sell at £110, which represents an increment of £10 on free trade value added of £50. The effective rate exceeds the nominal rate because the 10 per cent rate effectively applies to only half the inputs into the good, namely those which are supplied domestically. It is possible for the effective protective rate to be negative, if the imported inputs are subject to higher rates of duty than the final good. Though the nominal rate of protection will always be positive, an industry can be 'anti-protected' by the tariff structure and end up with a negative effective rate. See Corden, W.M., Trade Policy and Economic Welfare, Oxford University Press (1974).

effective rate of tax.
See AVERAGE RATE OF TAX.

efficiency coefficient of investment. A term used by Eastern European economists to denote the INCREMENTAL CAPITAL-OUTPUT RATIO.

efficiency earnings. Earnings per EFFICIENCY UNIT. When economists speak of the tendency of competition to equalize earnings in the same LOCAL LABOUR MARKET, they are implicitly referring to efficiency earnings. Two workers may receive very different earnings in equilibrium, abstracting from NON-PECUNIARY ADVANTAGES, yet efficiency earnings will be equalized. The higher paid worker can be thought of as embodying, say, twice as many EFFICIENCY UNITS as the worker who is paid exactly half his remuneration. In other words, when examining evidence of earnings dispersion in local labour markets care must be taken to ensure that like is being compared with like: an attempt must be made to standardize for worker efficiency, proxied by schooling, seniority and work experience.

efficiency units. A method of measuring the labour force in actual labour service inputs used, which distinguishes 'effective labour force' (i.e. that measured in efficiency units) from that in natural units (i.e. number of employees). The 'effective labour force' or labour force in efficiency units grows at a rate equal to the sum of the rate of growth of the labour force in employees plus the rate of HARROD NEUTRAL TECHNICAL PROGRESS.

efficiency wage theory. A theory proposing that the MARGINAL PRODUCT of workers and the wages that they are paid are interrelated. For this reason firms pay wages in excess of those that clear the market and
high wages and unemployment coexist. Four main versions of the theory have been proposed: 1. The shirking model. This proposes that firms can induce employees to work efficiently if they pay wages in excess of the opportunity wages of their workforce. Such payments ensure that any dismissals for poor performance effectively penalise workers and thereby discourage shirking. 2. The turnover model. Firms are suggested to pay higher wages to reduce labour turnover. 3. The superior job applicant pool. This version of the theory suggests that where firms are unable to distinguish the most productive among the applicants for jobs, they may adopt a strategy of paying high wages. By paying high wages the firm will attract more high quality, more high productivity workers into the pool of applicants, with the result that even though they hire at random from this pool, they will recruit a more productive workforce. 4. The fair wages model. Higher wages satisfy individuals' demands for equitable and fair treatment and produce superior performance in return. See Elliott, R.F., *Labour Economics: A Comparative Text*, McGraw Hill (1991), pp. 346-52 and Weiss, A., *Efficient Wage Theory*.

efficient market hypothesis. The view that the prices of shares on the stock market are the best available estimates of their real value because of the highly efficient pricing mechanism inherent in the stock market. There are three levels of efficiency. First, the market is held to be 'weak-form efficient' if share price changes are independent of past price changes. Second, semi-strong form efficiency is present if share prices fully reflect all publicly available information. Third, strong-form efficiency will imply share prices have taken full account of all information whether publicly available or not.

This is a highly controversial subject; weak-form efficiency is generally accepted, and semi-strong form efficiency is becoming more so. There are few adherents to the strong form version.

The efficient market hypothesis also arises in the context of foreign exchange rates, where the hypothesis is that the forward exchange rate is the best unbiased predictor of the future spot rate. The empirical findings throw doubt on the efficiency of the forward market in this respect; this does not necessarily imply irrationality on the part of market participants, for the failure of the forward market to be an unbiased predictor may be due to a risk premium, transaction costs or changes in government policy.

effort aversion. A formal concept used to represent the assumption that effort enters as a negative argument in the utility function of individuals, i.e. effort yields a marginal disutility. This is an assumption commonly used in economic analysis of the allocation of time between work and leisure activities.

EFTA. See European Free Trade Association.

EIB. See European Investment Bank.

elasticity. A measure of the percentage change in one variable in respect of a percentage change in another variable. Measures of elasticity tend to be carried out for very small changes in the variable causing the response - e.g. a percentage change in quantity due to a very small change in price. (See price elasticity of demand.)

elasticity of demand. Usually taken to refer to the (own) price elasticity of demand, but care should be taken to specify which elasticity of demand is being discussed. (See price elasticity of demand, cross elasticity of demand.)

elasticity of input substitution. A measure of the responsiveness of the optimal labour/capital combination to a change in the relative prices of the two inputs (or the term may be generalized to refer to any two inputs). Since the detailed expression is somewhat unwieldy we present it here in its general form:

\[ e_s = \frac{\text{percentage change in } K^*/L^*}{\text{percentage change in } P_L/P_K} \]

where \( K^*/L^* \) is the optimal capital/labour ratio and \( P_L \) and \( P_K \) are the prices of labour and capital.

If the elasticity of substitution is zero, then factors are always used in fixed proportions. An elasticity of substitution greater than
zero implies that the CAPITAL-LABOUR RATIO WILL RESPOND TO CHANGES IN RELATIVE FACTOR PRICES.

eligible assets ratio.  See RESERVE ASSETS RATIO.

eligible paper.  Financial ASSETS which the CENTRAL BANK is prepared to buy (rediscound) or accept as security for loans, in particular circumstances and usually in dealings with defined institutions. The rediscounting of, or lending against, eligible paper is the means by which a central bank relieves a shortage of CASH in the financial system where it considers it appropriate to do this. The need for such assistance arose originally in periods of financial crises when public confidence in banks and in the financial obligations of private borrowers was collapsing. In such circumstances the BANK OF ENGLAND, for example, learnt to act as LENDER OF LAST RESORT, evolving the practice of rediscounting or making advances on COMMERCIAL BILLS carrying two 'good' British names for approved DISCOUNT HOUSES and BILL BROKERS. The object of requiring eligible paper as the vehicle of such assistance was an attempt to maintain standards of credit-worthiness in bill finance and to discourage its use for speculative, consumption or other purposes regarded - at particular periods - as undesirable. In the UK under the arrangements of monetary control introduced in August 1981, the list of banks whose names on a BANK BILL establishes it as eligible paper has been greatly extended to include all the major foreign banks operating in London - almost a hundred institutions in all. Of course it also includes Treasury bills and local authority bills.

elitist good.  See LUXURY.

EMA.  See EUROPEAN MONETARY AGREEMENT.

embodied technical progress.  Technical progress which cannot take place unless it is embodied in new capital. For example the silicon chip has rendered the capital of whole industries obsolete, requiring completely new physical capital to realise its potential. The silicon chip therefore represents embodied technical progress. (See DISEMBODIED TECHNICAL PROGRESS.)

dominium.  Are defined as that portion of management's SALARY and NONPECUNIARY benefits which are not part of the ENTREPRENEURIAL SUPPLY PRICE. They characterise firms which have MONOPOLY POWERS sufficient to allow managers discretion over the distribution of returns.

Employee Stock Ownership Plan (ESOP).  A plan which permits employees in US firms to share in profit and growth of a business by owning shares of common stock in the firm. The most popular current form for such plans is called an ESOP. This type of programme allows employees to share ownership while also permitting the business more access to capital markets. Under this plan, an employee benefit or pension plan borrows money to buy newly issued company stock. The company annually contributes additional stock to the fund as well as cash payments sufficient to cover interest and AMORTIZATION on the loan. These payments are tax deductible for the business. This provides significant financing benefits to the company which could not deduct amortization if it borrowed the money directly. ESOPs began to be adopted in the UK in 1986 on the basis of case law but they were given statutory recognition in 1989. The financial inducements to start a plan are that the employee avoids INCOME and CAPITAL GAINS TAX, while the company can offset the costs of purchasing the shares against corporation tax. In 1991 about 100,000 employees participated in the schemes.

Employment Act of 1946.  Section 1 of this Act mandates that the Federal Government of the United States do everything within its power to create and maintain employment opportunities, sustained growth, and a stable purchasing power for its currency. In short, the Act sets out what are considered to be the three major goals of FISCAL and MONETARY POLICY. The Act also established two groups to evaluate the government's progress in meeting these goals: the council of Economic Advisors and the Joint Economic Committee of the Congress. The Council of Economic Advisors is a three-person panel charged with keeping the Presi-
dent of the United States informed about the current economic situation, preparing an annual Economic Report of the President, and helping the President construct a budget for the next fiscal year. The Joint Economic Committee is an eleven-member group whose responsibility is to aid Congress with its legislative duties by evaluating the Council’s Report and the President’s proposals.

employment service. Public or private agencies which attempt to match job applicants with existing job vacancies. Firms notify employment agencies of the type and number of their job vacancies and the agencies then frequently conduct a preliminary screening of applicants before referring them on to the firms.

employment subsidies. See job creation.

EMS. See European monetary system.

encompassing test. This non-nested test is based on the principle that a model should account for the salient features of different, and perhaps rival, models. It can be seen as a mean encompassing test and a variance encompassing test with the j-test mean encompassing and the F-test (see F-statistic) variance encompassing. See G.E. Mizon and J.F. Richard, The Encompassing Principle and its Application to Testing Non-nested Hypotheses, *Econometrica*, Vol. 54, 1986, pp. 657-678

endogenous income hypothesis. A theory which suggests that utility is a function of both consumption expenditure and of wealth. The implications are that once some optimum level of wealth has been achieved, all income will be spent whereas normally one would expect some saving still to occur. The approach is derived from a microeconomic approach to the consumption function which basically presents the household with a choice between commodities and wealth, both of which have positive marginal utility, but with a diminishing marginal rate of substitution of consumption for wealth. The theory does not ‘explain’ why wealth would be included in the individual utility function in the first place, but suggests wealth is a buffer against an uncertain future rather than against latent future consumption. (See wealth effect, real balance effect, Pigou effect, monetarism, demand for money.)

endogenous money supply. The level of the money supply is on this view determined by forces within the economy itself, such as rates of interest and the level of business activity. The central bank does not impose any limit but merely provides what the market needs. (See money supply, monetarism, monetary policy.)

endogenous variable. A variable whose value is determined within the framework of an economic or econometric model. Thus, if a variable appears as a dependent variable in an equation, it is an endogenous variable. (See simultaneous equations, reduced form.)

endowment effect. Individuals demand more to induce them to give up a commodity they already possess than they would be willing to pay to acquire that same commodity. Such an anomaly reflects an asymmetry of value called loss aversion.

energy intensity. An indicator of efficiency in the use of primary energy in the production of one unit of gross domestic product. For example, in the 1980s the Soviet Union and the Eastern Bloc countries used respectively three and a half times as much and two and a half times as much primary energy to produce one unit of GDP as the industrialized Western countries.

enfranchisement of the nomenklatura. An informal and dubious approach to the rapid privatization of state property in the former communist (and some other) countries, by means of which former party activists and state officials acquire state property at below market prices. The term nomenklatura refers to those persons, who were selected for top posts not on the basis of merit but according to the arbitrary criteria of the then ruling party.

engagements. (also known as new hires.) The total number of people entering
employment in any single period. These individuals may previously have been among the REGISTERED UNEMPLOYED or HIDDEN UNEMPLOYED or they may be new entrants into the LABOUR FORCE. Engagements are one aspect of LABOUR TURNOVER.

Engel curve. A line which plots the relationship between an individual's income and his consumption of a specified good. An Engel curve is illustrated in the diagram below. The slope of the curve at any point is the individual's marginal propensity to consume the good and indicates the ratio of change in consumption to change in income. The ratio of total consumption of the good to total income is the average propensity to consume the good - this is equal to the slope of a line such as CA. The ratio of the marginal propensity to consume the good to the average propensity to consume is the INCOME ELASTICITY OF DEMAND for the good. This may be seen mathematically, let Y be consumer income and Q consumption of the good in question:

\[
\frac{\Delta Q}{\Delta Y} = \frac{AQ}{AY} \cdot \frac{Y}{Q}
\]

is the marginal propensity to consume where \( \Delta \) refers to change in a variable

\[
\frac{Q}{Y}
\]

is the average propensity to consume then

\[
\frac{\Delta Q/\Delta Y}{Q/Y} = \frac{AQ}{AY} \cdot \frac{Y}{Q}
\]

which is the INCOME ELASTICITY OF DEMAND for the good.

Engel's Law. An empirical 'law' of consumption developed by Ernst Engel. The idea that the proportion of a nation's income spent on food is a good index of its welfare. The lower the proportion, the higher is welfare.

engineering method. A method used in STATISTICAL COST ANALYSIS, where engineers' estimates of the input-output relationship form the basis upon which to calculate minimum production cost at different levels of output. The advantages of this method are that input prices and technology can be held constant and homogeneity of output and inputs can be satisfied. A major drawback is that non-production costs are not included.

entitlement principle. A principle of DISTRIBUTIVE JUSTICE which holds that individuals are to be regarded as 'entitled' to their possessions so long as these were obtained by 'legitimate' means such as voluntary EXCHANGE or gifts. The adoption of such a principle would severely limit the scope for REDISTRIBUTION by government.

entrepreneur. The organizing factor in the process of production. Entrepreneurs are responsible for such economic decisions as what to produce, how much to produce and what method of production to adopt. Given that time elapses between the decision to produce and marketing of the product being produced, the entrepreneur must anticipate demand. It follows therefore that entrepreneurs bear the risks attendant upon fluctuations in demand which may take place during this interval.

The input of the entrepreneur is often regarded in economic analysis of the firm as a factor of production in its own right. The distinction between it and LABOUR INPUTS being based on the far reaching nature of the
entrepreneurial supply price. That return which is just sufficient to keep an executive of some given quality in his current employment. The supply price will then be that portion of an executive's salary and perquisites left after the deduction of EMOLUMENTS. (See also NORMAL PROFITS.)

entrepreneurship. See ENTREPRENEUR.

entry barriers. See BARRIERS TO ENTRY.

entry forestalling price. See LIMIT PRICING.

entry preventing price. The price which established firms within an industry can afford to charge without fear of inducing new entrants. This price will be at a level just below the minimum point of the LONG-RUN AVERAGE COST CURVE of the most favourably placed new entrant. (See BARRIERS TO ENTRY, LIMIT PRICING.)

environmental conditions. Although the level of world scientific and technical knowledge is increasing at an accelerating rate, there are major gaps in this knowledge, especially with relevance to the environmental conditions in DEVELOPING COUNTRIES. Machinery and techniques are often imported into an underdeveloped country with no prior knowledge of the long-run effects on climate or any other environmental condition. (See APPROPRIATE TECHNOLOGY.)

environmental determinism. The hypothesis that the physical environment is a major determinant of the level of a country's economic development. This question features prominently in development economics for if the UNDERDEVELOPED COUNTRIES of the world are plotted on a map, it can be seen that they are either in tropical areas or very cold climatic zones. This raises the question as to whether the physical environment is a major determinant of the level of development: however the differences in rates and levels of development between countries suggest that although important, environmental conditions are not the only cause of underdevelopment. Indigenous resources are nonetheless more significant in countries which have limited supplies of capital, skilled labour, technology and entrepreneurial experience; so their lack would be more keenly felt in the less developed areas.

environmental impact analysis. An analysis which seeks to identify the effects on the whole environment of any investment project. This would include the forecasting of potential pollution emission, loss of visual amenity etc.

EPU. See EUROPEAN PAYMENTS UNION.

equal advantage. See COMPARATIVE ADVANTAGE.

Equal Employment Opportunity Act of 1972. An act which extended the coverage of Title VII of the US Civil Rights Act of 1964 to state and local governments, and enabled the Equal Employment Opportunity Commission to file suits on its own behalf. (See EQUAL EMPLOYMENT OPPORTUNITY COMMISSION.)

Equal Employment Opportunity Commission. A commission set up to resolve complaints resulting from the passage of the US Civil Rights Act of 1964, which prohibits discriminatory action by employers. The Act's focus is on the employment process: recruitment, hiring, promotion, and
discharge of workers, the EQUAL EMPLOYMENT OPPORTUNITY ACT OF 1972 empowered the Commission to bring suits. The influence of the EEOC grew throughout the 1970s, but has been sharply curtailed by the leadership of the Reagan and Bush administrations.

equalization grants. Funds made available by a national government to sub-national or local governments with the objective of reducing the degree of inequality in the levels of income or revenue raised by the local governments. Thus the lower the amount of revenue per head of population raised by a given rate of local taxation, the greater the amount received by way of the equalization grant. The RATE SUPPORT GRANT which is the means by which the British government provides funds to local authorities, functions, to some extent, as an equalization grant.

equalizing differences, the theory of. See NET ADVANTAGES.

equal pay. Equality between the sexes as regards the terms and conditions of employment: a concept of equal pay for work of equal value, although the precise definition of 'equal pay' and 'work' differs by country. In Britain, under the Equal Pay Act of 1970 which became fully operational in December 1975, employers are required to grant equal treatment to men and women where they are employed on the same or broadly similar work or where, with respect to different jobs, a woman's job has been rated as equivalent to that of a male employee by means of a JOB EVALUATION exercise. Subsequently this was broadened to require equal pay for work of equal value.

The British equal pay legislation is designed to prevent WAGE DISCRIMINATION. It does not seek to ensure equality of opportunity as regards access to jobs. Employment discrimination is covered by separate legislation; namely, the Sex Discrimination Act of 1975, which created new rights for women and established an Equal Opportunities Commission with wide investigative powers.

equal sacrifice theories. The sacrifice by tax-payers of an equal amount of UTILITY. In the ABILITY-TO-PAY theory each tax-payer makes the same sacrifice of utility which he obtains from his income. There are three definitions of equal sacrifice, namely equal absolute sacrifice, equal proportional sacrifice and equal marginal (or least aggregate) sacrifice. Under the first each tax-payer sacrifices the same absolute amount of utility which he obtains from his income. Under the second each gives up the same proportion of utility which he receives from his income and under the third each sacrifices the same utility from the last unit of income which is sacrificed in tax. Whether or not the income tax system is PROGRESSIVE, PROPORTIONAL or RECESSIVE depends partly on which definition is employed and on what assumptions are made about the slope of the MARGINAL UTILITY OF INCOME schedule. Each definition of equal sacrifice can justify all three tax systems depending on what assumption is made about the marginal utility of income schedule. If it is assumed that the latter declines, only the equal marginal sacrifice definition gives unqualified support to progressive income tax. On the other two definitions the outcome depends on how fast the marginal utility schedule falls. No definition can be proved superior to another without involving VALUE JUDGEMENTS. The whole approach depends on making interpersonal comparisons of utility which is not permitted in modern WELFARE ECONOMICS.

equation of exchange. See QUANTITY THEORY OF MONEY.

equilibrium. A term borrowed from physics to describe a situation in which economic agents or aggregates of economic agents such as markets have no incentive to change their economic behaviour.

Applied to an individual agent, such as a CONSUMER or FIRM, it denotes a situation in which the agent is under no pressures or has no incentive to alter the current levels or states of economic action, because given his aspirations and the constraints he faces he cannot improve his position in terms of any economic criteria. When applied to MARKETS, equilibrium denotes a situation in which, in the aggregate, buyers and sellers are satisfied with the current combination of prices and quantities bought or sold, and so are under no incentive to change their
present actions. If, for some reason, the equilibrium price is not observed then forces will occur which bring the market back to the equilibrium price. Thus, if supply exceeds demand, producers' stocks (inventories) will increase, signalling to them a state of excess supply. They will lower prices until supply and demand are just equal again. Such an equilibrium is known as a stable equilibrium.

Unstable equilibria will occur if some divergence from the equilibrium price sets up forces which move price further and further away from the equilibrium price. In supply and demand analysis this can occur if both supply and demand curves are negatively sloped and the supply curve cuts the demand curve from above. If it cuts it from below, the equilibrium will still be a stable one. Equilibria may not in fact exist. Using the supply and demand example again, the curves may not intersect at all, in which case no equilibrium price exists since there is no price at which suppliers and demanders are willing to trade. Lastly, supply and demand curves may intersect more than once in which case it is possible to have more than one equilibrium price, each of which is stable. This is said to be a situation of 'non-uniqueness'.

Although the supply and demand context has been used here, the features of existence, uniqueness and stability are more often discussed in the context of GENERAL EQUILIBRIUM theory. All three features are regarded as desirable attributes of a general equilibrium system.

equilibrium error. Where a group of variables linked in a REGRESSION model are co-integrated (see COINTEGRATION) then the disturbance term is known as the equilibrium error.

equilibrium level of national income. That level of NATIONAL INCOME which exhibits no tendencies to change. In the simple Keynesian INCOME-EXPENDITURE MODEL this would be where the level of INJECTIONS equalled the level of WITHDRAWALS. In this model such an equilibrium could exist at full employment or at less than full employment: an UNEMPLOYMENT EQUILIBRIUM. Neoclassical economists would argue that equilibrium is possible at full employment only and that if INVOLUNTARY UNEMPLOYMENT exists we are Off the LABOUR SUPPLY CURVE. For NEO-CLASSICAL economists the equilibrium level of national income is the FULL EMPLOYMENT LEVEL OF NATIONAL INCOME; the level of income consistent with the NATURAL RATE OF UNEMPLOYMENT. (See also NEO-CLASSICAL SYNTHESIS.)

equilibrium price. The PRICE at which a MARKET is in EQUILIBRIUM.

equilibrium rate of inflation. The fully anticipated rate of INFLATION. That rate of price inflation at which expectations are fully realized; that rate at which the EXPECTED INFLATION rate equals the actual inflation rate. (See VERTICAL PHILLIPS CURVE.)

equities. Otherwise known as 'ordinary shares', these are shares in the issued capital of a COMPANY which are held on terms that make the holder a 'member' of the company, entitled to vote at annual meetings and elect directors, and to participate through dividends in the profits of the company. The holders of the ordinary shares carry the residual risk of the business: they rank after DEBENTURE holders and PREFERENCE SHAREHOLDERS for the payment of dividends and they are liable for losses, although in a limited liability company this liability is limited to the value of the shares themselves plus any uncalled liability on them. If the company is a PUBLIC COMPANY and has a STOCK EXCHANGE listing, its shares may be traded on the exchange. (See UNCALLED CAPITAL, VOTING SHARES.)
equity. Fairness or justice. This concept is of importance to economists in a number of situations. For example, judgements of economic arrangements sometimes distinguish issues of efficiency - the production of maximum output - from issues of equity - the manner in which that output is distributed. Conversely, the burden of taxation may also be judged in terms of equity considerations. To some extent the distinction between equity and efficiency may be held to be a false dichotomy as the theory of PARETO OPTIMALITY indicates that a change in the distribution of income will change the OPTIMAL pattern of output. Equity should not be confused with equality since one need not
imply the other. For example, equity may or may not be held to require equality of incomes - depending upon one's view of the nature, sources and implications of income differences. (See HORIZONTAL EQUITY, VERTICAL EQUITY, DISTRIBUTIONAL EQUITY.)

equity capital.
See EQUITIES.

equivalence scale. A ratio or 'weighting' factor employed in evaluating levels of income or consumption required for households in different circumstances to reach a given 'standard of living'. The scales rest on the assumption that one can validly compare levels of living standards or UTILITY for different individuals and households, even although this assumption is generally rejected in theoretical WELFARE ECONOMICS. (See also EQUIVALENT INCOME SCALE, EQUIVALENT COMMODITY SCALE.)

equivalent commodity scale. A numerical factor applied to the level of consumption of certain commodities by households in different circumstances in order to indicate levels of consumption required for each type of household to reach a given standard of living. Thus a couple with a child will require more total food consumption than a childless couple to achieve the same standard of living. The equivalent commodity scale seeks to quantify this difference in requirement and express it as a ratio - thus it may be that the addition of a child requires food consumption to be increased by 1.25. (See also EQUIVALENT INCOME SCALE, EQUIVALENCE SCALES.)

equivalent income scale. A numerical factor applied to the incomes of households in different circumstances to give estimates of the income required for each household to reach a given standard of living. Thus a couple with a child will require a higher income in order to achieve the same living standard as the smaller household. Equivalent income scales attempt to quantify these differences. For example it might be estimated that the addition of a child required household income to be multiplied by 1.25 in order to maintain living standards. Such scales can be used in studies of poverty and in setting levels of social security benefits. The income scale represents an attempt to measure the INCOME EFFECT of different household circumstances. (See EQUIVALENCE SCALES, EQUIVALENT COMMODITY SCALE.)

equivalent variation.
See CONSUMER'S SURPLUS.

ERM.
See EXCHANGE RATE MECHANISM.

error correction models (ECMs). In REGRESSION analysis an ECM combines long and short run interaction amongst a group of variables. It is closely related to COINTEGRATION amongst the same group of variables and implies that differences (the short run effect) and levels (the long run effect) of the variables may be specified in the same regression model without introducing a SPURNOUS REGRESSION problem.

If \( y_t \) and \( x_t \) are both of the same order of integration \( (d) \) (see INTEGRATED TIME SERIES), and assuming that \( d = 1 \), then an equation of the form

\[
\Delta y_t = \alpha \Delta x_t + \tau (y_t - \beta x_t) + \nu_t
\]

is a valid equation provided \( y_t \) and \( x_t \) are cointegrated. Thus \( \Delta y_t, \Delta x_t, (y_t - \beta x_t) \) and \( \nu_t \) are all integrated of order zero.

error learning process.
See ADAPTIVE EXPECTATIONS.

errors in variables. (also known as MEASUREMENT ERROR.) An econometric problem whereby particularly the EXPLANATORY variables in a REGRESSION analysis are imperfectly measured, either because their actual values are unobservable, or through imprecision of recording. This problem can give rise to biased and inconsistent ORDINARY LEAST SQUARES estimates, and is usually corrected by the use of INSTRUMENTAL VARIABLES.

escalators. Cost of living clauses in collective bargaining agreements. Escalators provide a mechanism for periodic adjustments of wage rates based on movements in a specified PRICE INDEX. Escalators rarely fully compensate for price changes. This results
from a number of factors. First, the relevant formula is generally insufficient to produce full compensation at other than relatively low wage earnings. Second, limits or caps may be placed on the maximum cost of living adjustment. Third, escalator adjustments typically lag behind price changes. Fourth, escalators may not be 'triggered' until a significant rise in the price index occurs. Finally, escalators are, of course, not the sole wage adjustment mechanism.

Escalators are less common in UK than in the US, largely because of greater contract length in the latter country. In mid-1991 nearly 2 million of the 5.7 million workers covered under major collective bargaining agreements in the USA (i.e. those agreements covering 1000 or more workers) were covered by escalators.

estate duty. (also known as death duty.) The main form of wealth taxation in the UK before its replacement by the CAPITAL TRANSFER TAX in 1974. It was levied at PROGRESSIVE tax rates on estates at the death of the owner. The progressive rates applied to the whole estate rather than simply to increments of WEALTH. It is doubtful whether this tax made a major contribution to the redistribution of wealth in the UK. Liability could be escaped by transfers of wealth \textit{inter vivos} and by the setting up of discretionary trusts. Under the latter scheme a settler provided trustees with a list of beneficiaries and before 1969 no estate duty was paid when a beneficiary died as he had no right to any part of the fund. After 1969 the position was changed and someone who received income or capital from a discretionary trust was liable to estate duty. Gifts \textit{inter vivos} made within 7 years of death were made subject to estate duty in the 1969 budget. The shortcomings of the tax led to its being replaced by the INHERITANCE TAX.

estimation. The quantitative determination of the parameters of economic models through statistical manipulation of data. This is achieved through the use of estimators (i.e. formulae) which convert observations into parameter estimates. Examples of econometric estimators include ORDINARY LEAST SQUARES and FULL INFORMATION MAXIMUM LIKELIHOOD. (See POINT ESTIMATION, INTERVAL ESTIMATION, STATISTICAL INFERENCE.)

estimator. A formula, or procedure by which estimates of statistical quantities (such as the MEAN or VARIANCE of a variable), or the parameters of an equation are obtained from data. Examples of econometric estimators include ORDINARY LEAST SQUARES and FULL INFORMATION MAXIMUM LIKELIHOOD. (See ESTIMATION, STATISTICAL INFERENCE, LINEAR ESTIMATOR, BEST LINEAR UNBIASED ESTIMATOR.)

EUA. See EUROPEAN UNIT OF ACCOUNT.

Euler's Theorem. The theorem states that if the function

\[ Y = f(X_1, \ldots, X_n) \]

is HOMOGENEOUS of degree 1, then it can be written as

\[ Y = \frac{\partial Y}{\partial X_i} \cdot X_i + \frac{Y}{X_2} \cdot X_2 + \ldots + \frac{\partial Y}{\partial X_n} \cdot X_n \]

where \( X_1, \ldots, X_n \) are INDEPENDENT VARIABLES, and

\[ \frac{\partial Y}{X_i}, \ldots, \frac{\partial Y}{X_n} \]

are the first PARTIAL DERIVATIVES with respect to the independent variables.

The theorem is often used to point out that under CONSTANT RETURNS TO SCALE, the value of output is just exhausted in FACTOR payments if each factor is paid the value of its MARGINAL PRODUCT, since if \( Q = f(K, V) \) is

estate economy. This term refers to a sector or whole economy in an UNDERDEVELOPED COUNTRY which is used solely for large-scale production of export crops normally managed and owned by foreign powers; it was very prevalent during the colonial era. There is usually a marked difference between this sector and the subsistence agriculture of the local people and it was always very much in the interests of the estate owners to maintain that differential; if the native people were very poor, they would be more ready to work hard for low wages.
PRODUCTION FUNCTION expressing output as a function of CAPITAL and LABOUR, then if it displays constant returns to scale (i.e. homogeneous of degree 1) then it can be written

\[ n \frac{\partial Q}{\partial K} + \frac{\partial Q}{\partial L} \cdot L \]

where

\[ \frac{\partial Q}{\partial K}, \frac{\partial Q}{\partial L} \]

can be interpreted as the marginal products of capital and labour respectively.

**Eurocurrency market.** An international offshore market in the currencies of the major (Western) industrialised countries. The market started life in the late 1950s as one in US dollars held in banks in European financial centres, but it has since been extended to cover all major currencies and to have locations outside Europe such as North America and the Far East. The distinguishing feature of the market is that the lending and borrowing of a particular currency takes place outside the country, whose currency is the subject of the transaction. The dollar is still the most important currency accounting for about 80 per cent of transactions, while Europe is still the major centre with between 40 and 50 per cent of the business. The market has grown very rapidly since its inception; it is estimated that its gross size has increased from $20 billion in 1964 to $4920 billion in 1989. There are few Eurobanks as such, since the market is made mainly by branches or divisions of existing banks in close electronic communication with other market participants. About 70 per cent of transactions are thought to be between BANKS themselves, so that the gross size of the market overstates its lending power to ultimate borrowers. The depositors and the borrowers in this market come from the same categories and include CENTRAL BANKS and international financial institutions, Industrial and commercial enterprises and some private individuals. Borrowing may range from periods of one day to ten years and the rates charged are linked to LIBOR. The spread between deposit and lending rates is small, since the transactions are of high value and the banks' costs small.

Since 1968 the Eurocurrency market has been complemented by the Eurobond market, which is now the most important segment of the international capital market. A Eurobond is underwritten by an international syndicate of banks or other securities firms and sold principally in countries other than the country in whose currency the issue takes place. (See MONEY MARKETS.)

**Eurodollars.**

*See EUROCURRENCY MARKET.*

**European Agricultural Guidance and Guarantee Fund.** A special fund of the EUROPEAN COMMUNITY created in 1962 to finance the Community's COMMON AGRICULTURAL POLICY. The Guidance section finances structural improvements and reforms in agriculture and agricultural marketing. The Guarantee section both controls agricultural IMPORT prices using variable import levies and supports internal agricultural markets via minimum price guarantees.

**European Bank for Reconstruction and Development.** An institution established in 1991 with a capital of 10 billion ECU to foster the development of the former Eastern bloc countries. The Bank aims to supply both technical advice and loans and investments, the latter often in conjunction with private Western investors or international institutions. No more than 40 per cent of its investments are to be in the public sector, as most of its activities are to be directed towards the promotion of the private sector and a MARKET ECONOMY.

**European Coal and Steel Community.** The original executive managing the COMMON MARKET in coal and steel between the six founding members of the EUROPEAN COMMUNITY. In 1950 the French foreign minister, Robert Schuman, outlined a proposal for pooling European coal and steel resources which was designed to encourage the development of a united European community. The 'Schuman Plan' was later incorporated in the Paris Treaty, ratified by France, Italy, West Germany and the BENELUX countries in 1952, which established a European Common Market for coal and steel. By the end of 1954 nearly all customs duties, quota restrictions and other barriers to community trade in coal, coke,
steel, pig-iron and scrap iron had been removed. A gradual harmonization of external tariffs on these products culminated in the adoption of a common external tariff by the Community in 1958. The Commission of the European Community, which superseded the High Authority of the Community in 1967, is empowered to fix prices and production quotas, limit imports from third countries, impose fines on firms violating treaty regulations and raise finance by means of a levy on the value of coal and steel production in the Community. In 1977 the Commission introduced the Simonet Plan which regulates price controls and production quotas throughout the coal and steel industries. The Commission also grants and guarantees loans for redevelopment and investment programmes, finances resettlement and retraining schemes for redeployed or redundant workers and provides financial aid for the housing of miners and steel-workers. In 1967 the original institutional structure of the European Community, was merged with that of the EEC and EURATOM to create the common institutions of the European Community. (See CUSTOMS UNION.)

**European Community Budget.** A budget which raises funds from members of the European Community to finance communal activities. Payments are obtained from members in the form of 90 per cent of the revenue from AGRICULTURAL LEVIES and the COMMON CUSTOMS TARIFF and from up to 1 per cent of VALUE-ADDED TAX revenue calculated for this purpose as if it had been levied on a harmonized basis. Transitional arrangements were made for the members joining in 1973 whereby contributions were based on different principles. On the revenue side the system discriminates against countries which have a relatively large amount of imports from non-member states. The UK which obtained considerable food imports from third countries particularly in the Commonwealth has been particularly disadvantaged. On the expenditure side the overwhelmingly biggest item has been on the COMMON AGRICULTURAL POLICY especially in the form of intervention buying and export subsidies. Other categories of expenditure include regional and industrial development and aid. The system discriminates in favour of members which have large agricultural sectors and particularly those which export agricultural products.

**European Common Market.** See EUROPEAN ECONOMIC COMMUNITY.

**European Community.** The collective designation of the EUROPEAN COAL AND STEEL COMMUNITY, EUROPEAN ECONOMIC COMMUNITY and EUROPEAN ATOMIC ENERGY COMMUNITY.

**European Currency Unit.** See EUROPEAN MONETARY SYSTEM.

**European Development Fund.** A special fund established by the EUROPEAN ECONOMIC COMMUNITY to provide financial and technical assistance to the countries associated with the EC by, respectively, the TREATY OF ROME, YAOUNDÉ CONVENTIONS and LOME CONVENTION. (See EUROPEAN INVESTMENT BANK.)

**European Economic Area.** See EUROPEAN FREE TRADE ASSOCIATION.

**European Economic Community.** The European Economic Community was formally established on 25 March 1957 by the Treaty of Rome, agreed to by the governments of Belgium, France, the German Federal Republic, Italy, Luxembourg and the Netherlands. The treaty provided for the gradual development of a full CUSTOMS UNION, removal of all barriers to the free movement of CAPITAL, LABOUR and SERVICES and the establishment of common agricultural and transport policies among member countries. It also created the EUROPEAN INVESTMENT BANK and the EUROPEAN SOCIAL FUND, two common institutions designed to assist and co-ordinate economic development in the Community. By 1961 the Community had removed all QUOTAS on industrial goods. The removal of all internal TARIFFS and adoption of a common external tariff resulted in the establishment of a full customs union in July 1968. The level of the common external tariff was agreed upon following the KENNEDY ROUND of trade negotiations, held under the auspices of the GENERAL AGREEMENT ON TARIFFS AND TRADE, in which the Community had negotiated as a single unit. In 1977 the Community concluded a customs union agreement with the
EUROPEAN FREE TRADE ASSOCIATION which was the culmination of a series of bilateral free trade agreements originally introduced in 1973 between several EFTA member countries and the EEC. The Community has also reduced a number of non-tariff barriers to intra-Community trade by standardizing trade and customs procedures, abolishing national discrimination in road, rail and water transport rates and banning discrimination in awarding public works contracts. CARTELS and MONOPOLIES are also banned if they engage in, for example, market sharing or PRICE DISCRIMINATION practices which restrict or distort trade among member countries. Although restrictions on the free movement of labour were largely removed by 1969, the Community has yet to harmonize the disparate licences and professional qualifications which control the provision of services in member countries. Likewise, a wide range of controls on capital movements have persisted despite efforts to liberalize capital flows throughout the Community. The removal of these final barriers and the creation of a single market by 1992 is the objective of the SINGLE EUROPEAN ACT of 1987.

In 1962 the Community adopted a COMON AGRICULTURAL POLICY which guarantees common internal price levels, using a combination of internal price supports and variable import levies adjusted to reflect the difference between an internal support or 'target' price and the world price. The Community has also attempted to coordinate a common transport policy regarding the development and regulation of road, rail and inland water networks. Following the collapse of the BRETON WOODS system of FIXED EXCHANGE RATES in 1971, the Community has increasingly sought to coordinate its economic and monetary policies. In 1972 the Community introduced the European Currency Snake which narrowed the margin of exchange rate fluctuations between member currencies. Furthermore, the EUROPEAN MONETARY CO-OPERATION FUND was created in 1973 primarily to act as a clearing union for the snake margin system of floating exchange rates. In 1979 the EUROPEAN MONETARY SYSTEM, comprising a new exchange rate intervention and credit system, was introduced as a means of increasing monetary co-operation and stability in the Community. The original six members of the Community were joined by Denmark, the Irish Republic and the UK in 1973 following ratification of the Brussels Treaty, or Treaty of Accession, in 1972. By 1977 Denmark, Ireland and the UK had adjusted their respective trade policies to coincide with the absence of intra-Community tariffs and the common external tariff. The Common Agricultural Policy was also adopted by the three new members over a five year transition period which ended in 1978. Greece joined the Community in 1982 and Portugal and Spain joined the Community in 1986. The Community has also established strong links with developing countries. It has concluded a large number of association, cooperation and trade agreements, including the YAOUNDE CONVENTIONS and the LOME CONVENTIONS, adopted the generalized system of preferences which enables duty-free imports of manufactured goods from DEVELOPING COUNTRIES, and provided financial aid for development programmes via the EUROPEAN DEVELOPMENT FUND. In 1967 the Community's institutional structure was merged with that of the EUROPEAN COAL AND STEEL COMMUNITY and the European Atomic Energy Community to create the common executive, judicial and legislative institutions of the EUROPEAN COMMUNITY. See El-Agraa, A.M., The Economics of the European Community, Philip Allan, London (1990).

European Free Trade Association. Created in 1960 following approval of the Stockholm Convention by Austria, Denmark, Norway, Portugal, Sweden, Switzerland and the UK. The association attained its initial objectives of establishing free trade in industrial goods among member countries and negotiating a comprehensive trade agreement with the EUROPEAN COMMUNITY (EC). All internal export QUOTAS were eliminated in 1961 while internal import quotas and TARIFFS were removed in eight stages by 1966. All members are free, however, to impose tariffs or quotas on goods produced in non-association countries. Bilateral trade agreements have also been negotiated to increase trade in agricultural products. Finland became an associate member in 1961 and Iceland has enjoyed full membership since 1970. Denmark and the UK left the association.
ation upon their accession to the European Community in 1973. In 1973 Free Trade Agreements between individual members and the EC were introduced, leading eventually to the establishment of a full customs union in manufactured goods between the association and the EC in July 1977. The association has also addressed the problems of eliminating non-tariff barriers to trade.

Highly integrated into the EC, which accounted in the early 1990s for nearly 60 per cent of the Association’s exports and imports and being in turn the largest market for EC exports (greater than the US and Japan combined), the EFTA countries feared substantial trade diversion after 1992 as a result of the single market following from the SINGLE EUROPEAN ACT. To forestall this, EFTA engaged in discussions with the EC in an attempt to create a European Economic Area, which would extend the free trade in industrial goods to services, capital and persons. An agreement to this effect was reached between the two groups in October 1991, under which EFTA accepted the existing EC regulations in the area and also undertook to accept EC competition policy, social policy and environmental policy. The implication of the agreement is that EFTA countries will be fully integrated into the single market. (See TRADE CREATION.)

European Fund. The EUROPEAN MONETARY AGREEMENT, approved in 1955 by the OEEC Council, provided for a European Fund to help finance temporary BALANCE OF PAYMENTS deficits arising from the decision of member countries to make their currencies convertible into dollars. Although it began operations in 1958 with an initial capital account of approximately $600 million, including $272 million from the old EUROPEAN PAYMENTS UNION, the fund was eventually drawn upon only to finance a few small loans to Greece, Ireland, Spain and Turkey.

European Investment Bank. A development bank created in 1957 by the TREATY OF ROME which established the EUROPEAN ECONOMIC COMMUNITY. The Bank’s primary function is to promote the development of the European Common Market by providing long term loans and loan guarantees which facilitate the financing of investments in less developed regions, industrial modernization or conversion schemes and joint industrial projects. Although the bank’s activities were initially confined to EUROPEAN COMMUNITY (EC) countries, various association agreements and conventions have enabled the Bank to extend its services to overseas dependencies of member countries, to the African, Caribbean and Pacific countries of the LOME CONVENTIONS and to Mediterranean countries that have association or co-operation agreements with the EC. Moreover, the Bank’s Board of Governors, comprising the finance ministers of each member country, may authorize loans to countries not linked to the Community, especially if the projects under consideration are of interest to EC members. The Bank finances its operations by borrowing on both Community and international capital markets. As the Bank is a non-profit institution its interest rates closely correspond to those charged on the capital markets where it obtains its funds. Individual project loans, which generally represent less than 40 per cent of the project’s fixed assets, may be made directly to firms, public authorities or through financial institutions. In addition, the Bank may finance projects via ‘global loans’ granted to financial institutions who in turn extend sub-loans for specific investments approved by the Bank. In 1981 the Bank adopted the European Currency Unit (ECU) as its Unit of Account in place of the European Unit of Account (EU A) which had the same composition and value in relation to the currencies of member states. The banks loans are disbursed in various currencies according to the Bank’s currency holdings and the borrower’s currency preferences.

European Monetary Agreement. The European Monetary Agreement was approved by the ORGANIZATION FOR EUROPEAN ECONOMIC CO-OPERATION Council in August 1955. The Agreement represented the decision of European countries to make their currencies gradually convertible into dollars, thereby replacing the EUROPEAN PAYMENTS UNION by a new international payments system in which all transactions had to be executed in gold or convertible currencies. The agreement was finally implemented in December 1958, using the BANK FOR INTERNATIONAL SETTLEMENTS as agent for financial operations. Although the granting
of automatic credits was eliminated, the agreement created a EUROPEAN FUND which could be drawn upon to finance temporary BALANCE OF PAYMENTS deficits.

**European Monetary Co-operation Fund.** A special fund of the EUROPEAN COMMUNITY established in 1973 to implement the 1972 BASLE AGREEMENT which created the Community's system of managed currency margins, commonly known as the European Currency Snake. The fund, via the BANK FOR INTERNATIONAL SETTLEMENTS acts as a clearing agent for the settlement of debits and credits arising from intervention in Community currencies on the exchange markets. In addition, the fund manages the Community's system of short term credits which can be extended to member countries experiencing temporary BALANCE OF PAYMENTS difficulties. The Fund has continued to play a similar role under the European Monetary System.

**European Monetary Fund.**

*See EUROPEAN MONETARY SYSTEM.*

**European Monetary System.** Introduced in March 1979 the European Monetary System (EMS) represents an attempt to create an area of exchange rate stability among members of the EUROPEAN COMMUNITY, for most members undertook to limit the fluctuations in their exchange rates to plus or minus 2.25 per cent of the agreed central rate for their currencies. Though a member of the system the UK remained outside the Exchange Rate Mechanism (ERM) until October 1990; until then there was no par value for sterling against other currencies. On joining the ERM the UK entered with a 6 per cent spread on either side of the central rate, a position similar to that of Spain.

As part of the EMS there was introduced a new international currency, the EUROPEAN CURRENCY UNIT (ECU), composed of weighted averages of currencies of EC members, including the UK, and equal in value to the EUROPEAN UNIT OF ACCOUNT. As parties to the EMS have agreed on the limits to which their currency parities may depart from their ECU central rates and as these are narrower than the 2.25 per cent of the currency grid above, the 2.25 per cent limit is effectively superseded. The ECU is the currency in which debts and credits in the EMS are denominated and the intention was that the ECU should become an international reserve asset. Member countries have deposited part of their reserves with the European Monetary Co-operation Fund in exchange for an ECU account, which can be used for settling inter-member debts including the repayment of credits extended by the Monetary Co-operation Fund. The EMS is an attempt to revive a previous effort at currency stability among members of the EC plus Norway but one which was much impaired when appreciation of the Deutsche Mark and depreciation of the French franc made it necessary for France to leave the arrangement. This was the so-called SNAKE or snake-in-the-tunnel, since the time path of a currency’s exchange rate could exhibit a snake-like movement within the constraints set by the limits to the degree of fluctuation. In its early years the EMS had only limited success in maintaining exchange rate stability, for there were nine currency realignments between March 1979 and April 1986 but only a further one to the end of 1991. The snake and EMS were seen by some as steps towards complete MONETARY UNION within the EC and the establishment of one European currency, a view vindicated in the Delors Report, while others saw them as brought about to hide some of the absurdities of the COMMON AGRICULTURAL POLICY, which had constantly been broken when exchange rates diverged. *See GREEN POUND.*

**European Monetary Unit of Account.**

*See EUROPEAN UNIT OF ACCOUNT.*

**European Payments Union.** In 1950 the ORGANIZATION OF EUROPEAN ECONOMIC CO-OPERATION created the European Payments Union which replaced the system of European payments schemes introduced by the Intra-European Payments Agreements of 1948 and 1949. Its purpose was to enable the multilateral settlement of surpluses or deficits between European countries (and their respective overseas monetary areas) and encourage trade liberalization policies by offering automatic credit facilities to members experiencing balance of payments deficits. The Union, utilizing the BANK FOR
INTERNATIONAL SETTLEMENTS as agent, consolidated member's debts and claims on a monthly basis. Each member's cumulative net debt or claim was settled by a combination of automatic credit and gold and dollar transfer schedules. As the Union's clearing facilities were restricted to member's central banks, full currency convertibility and multilateral settlement of payments in the foreign exchange markets was not realized until the Union was replaced by the EUROPEAN MONETARY AGREEMENT in 1958.

**European Recovery Programme.** In 1947 the US Secretary of State, General George Marshall, delivered a speech at Harvard University which proposed US Assistance for a European economic recovery programme co-ordinated by the European countries. Following this proposal, representatives of sixteen western European countries set up a Committee for European Economic Co-operation which evolved into the ORGANIZATION FOR EUROPEAN ECONOMIC CO-OPERATION, established in 1948 to administer a European Recovery Programme in collaboration with the US ECONOMIC CO-OPERATION ADMINISTRATION. The recovery programme, popularly known as MARSHALL AID or the Marshall Plan, consisted of aid in the form of actual goods shipments and loans which financed public investment projects. At its peak the programme provided recipient countries with additional goods and services equivalent to approximately 3 to 4 per cent of their national income.

**European Regional Development Fund.** A special EUROPEAN COMMUNITY fund, created in 1975 to help reduce regional development disparities in the Community. The fund provides financial assistance for project development and general regional aid, especially in fringe or depressed farming areas and declining or obsolete industrial centres.

**European Social Fund.** A special fund of the EUROPEAN COMMUNITY which seeks to improve employment opportunities in the Community by providing financial assistance for retraining or resettling workers, especially those whose employment has been reduced due to the functioning of the Common Market.

**European Unit of Account.** Unit of account used within the EUROPEAN COMMUNITY for such purposes as preparing the community budget and determining the price of agricultural products under the COMMON AGRICULTURAL POLICY. Since the members of the EC use different currencies, it was necessary to establish a common unit for community transactions. This unit, initially linked to gold, was equal to one US dollar prior to the devaluation of the dollar in 1971. With the ending of the system of fixed currency exchange rates after 1971, the unit of account was defined as a composite unit comprising member countries' currencies in various proportions. When the EUROPEAN MONETARY SYSTEM was introduced in March 1979 the new EUROPEAN CURRENCY UNIT, to which the currencies of participating members are linked, was set equal to the European Unit of Account.

**Eurostat.** Statistical Office of the EUROPEAN COMMUNITY.

**exact test.** When the PROBABILITY DISTRIBUTION of a test statistic is known exactly instead of a distribution which is known asymptotically so that the critical region can be defined the test is known as an exact test. An example would be the DURBIN WATSON test based on BLUS RESIDUALS.

**ex ante.** The planned, desired or intended level of some activity. Thus ex ante demand will be the planned level of demand. This contrasts with the EX POST level of demand which will be the realized or actual level of demand. Plans and their realization obviously need not be the same since expectations may not be fulfilled. Thus ex post and ex ante need not coincide.

**excess capacity.** Rigorously defined, a firm is said to be producing with excess capacity if its OUTPUT level is below that at which average costs are at a minimum. The more common usage refers to firms operating plant at a rate of utilization below that considered normal, e.g. at some percentage level of output that could be achieved.

**excess capacity theory.** Used to describe the MONOPOLISTIC COMPETITION model's prediction that firms in long-run EQUILIBRIUM
excess capacity theory

will produce on the downward sloping segment of their long-run AVERAGE COST curves, therefore producing at more than minimum cost.

Thus, in the diagram, the forces of competition are assumed to drive the demand curve facing firm to the left until the demand curve (D) is tangential to the long-run average cost curve (LRAC). At this point, each firm earns NORMAL PROFITS, and also produces at a point higher than minimum average cost (at $X_N$ rather than $X_M$ in the diagram). Note that while there is excess capacity, the normal profits earned are at a maximum since marginal cost and marginal revenue are equated for the firm. (See EXCESS CAPACITY.)

excess demand. A state in which DEMAND exceeds SUPPLY at some given price. The excess demand curve will slope downwards from left to right and will cut the vertical (price) axis at the equilibrium price. To construct the excess demand curve, subtract supply from demand at each given price. In the diagram, for example, demand level $D_1$ is less than supply at that relevant price, $P_1$. Excess demand is therefore negative, as shown. At $P_2$, supply and demand are equal, so excess demand is zero. At $P_3$, there is excess demand equal to $D_3-S_3$.

excess supply. A state in which SUPPLY exceeds DEMAND at some given price. An excess supply curve can be constructed by subtracting the level of demand from the level of supply at each level of price. The resulting excess supply curve will, for normal demand and supply situations, slope upwards from left to right but will He to the left of the vertical axis at first, cutting the axis a the equilibrium price.

excess wage tax. A tax designed to deter large wage increases in an attempt to reduce the rate of inflation. The tax has been introduced in Poland and some other countries. Wage increases above the growth of labour productivity by more than a certain percentage are subject to a progressive excess wage tax.

exchange. See TRADE.

exchange control. The system whereby the State exercises control over all or some transactions in foreign currencies and gold undertaken by its nationals. Exchange con
Exchange Equalization Account is applied for BALANCE OF PAYMENT reasons, and in the final analysis to avoid the depreciation of the EXCHANGE RATE, which, it is supposed, complete freedom in foreign transactions would produce. Exchange control was introduced in the UK in 1939, to meet war-time conditions; and while it has been considerably and progressively relaxed since the 1950s it was completely dismantled only in October 1979 when controls on capital transactions and dealings in gold were finally abolished. (See BRETTON WOODS, CONVERTIBILITY, STERLING AREA.)

Exchange Equalization Account. The system or arrangement, rather than simply an 'account', established in 1932 and operated by the BANK OF ENGLAND, for controlling undesired fluctuations in the sterling exchange rate following the UK's departure from the GOLD STANDARD in 1931. Initially endowed with a quantity of TREASURY BILLS, with which to acquire sterling, and some FOREIGN EXCHANGE transferred from the Treasury and the Bank, the Account was, and continues to be, operated essentially on BUFFER STOCK lines with purchases or sales of sterling according to whether the aim is to support the rate or to moderate its upward movement. In 1939, at the outbreak of war, the entire gold holdings of the Issue Department of the Bank were transferred to the Account. Since then it has effectively been the agency for holding and managing the country's external reserves, as well as the instrument for exercising control over the exchange rate. (See FIDUCIARY ISSUE.)

Exchange rate. The price of a currency in terms of another currency. Exchange rates are regularly quoted between all major currencies, but frequently one important currency, e.g. the dollar, is used as a standard in which to express and compare all rates. The exchange rate of all fully convertible currencies is determined, like any price, by supply and demand conditions in the market in which it is traded, i.e. the FOREIGN EXCHANGE MARKET. More fundamentally, such supply and demand conditions are determined by whether the country's basic balance of payments position is in surplus or deficit.

An alternative view of the exchange rate deriving from a MONETARIST perspective sees the exchange not as a price equating the flow supply and demand for a currency but as the relative price of two currencies, so that any factor which influences the value of a currency will influence its international exchange rate. The most important factor is held to be changes in domestic money supplies, and since people begin to form expectations about the likelihood of such changes and of their effects, expectations are given a considerable role in determining the exchange rate and help to explain the observed volatility of exchange rates since 1973.

When there is no official intervention in the foreign exchange market, the rate is freely floating and will rise or fall to equilibrate the supply of and demand for that currency. 'Intervention' may take a number of forms, from EXCHANGE CONTROL to action which does not interfere with the operation of the market, but aims to stabilize or control the movement of the exchange rate. Under the BRETTON WOODS system in force from the late 1940s to the early 1970s, exchange rates were stabilized at agreed PAR VALUES, though changes in these values by REVALUATION and DEVALUATION were permitted. The STABILIZATION was effected by the central bank operating as buyer or seller of its currency when it was tending to move outside a permitted range of movement. Since the abandonment of this 'adjustable peg' system in 1971, exchange rates have generally been subject to a system of managed flexibility, with central banks intervening to smooth out what were considered to be inappropriate fluctuations, although (in theory) not opposing movements considered to reflect longer-term, underlying forces. In the case of some groups of currencies, the exchange rates have been linked so as to limit the range of movement between them, as in the European 'Snake' and the EUROPEAN MONETARY SYSTEM. The situation of managed flexibility of exchange rates is sometimes referred to as 'dirty floating' implying that the influences exerted by countries over their own rates is dictated by self-interested motives. (See CRAWLING PEG, PORTFOLIO APPROACH.) See MacDonald, R and Taylor, M.P., Exchange Rates and Open Economy Macroeconomics, Blackwell, Oxford (1989).
Exchange Rate Mechanism. The Exchange Rate Mechanism (ERM) is a system by which members of the EUROPEAN MONETARY SYSTEM (EMS) may be obliged to maintain their EXCHANGE RATES within certain bands. All countries in the EMS except Greece and Portugal are members of the ERM. Each currency in the ERM has a central exchange rate with each of the other currencies in the system, and each is permitted to move up to 2.25 per cent above or below the central rate. The peseta and the pound sterling have a wider margin of ± 6 per cent. CENTRAL BANKS have undertaken to maintain the value of their currencies within these limits, by MONETARY POLICY and if necessary by direct intervention in FOREIGN EXCHANGE markets. If the bands are unsustainable a realignment conference may be called and new mutually agreed exchange rates adopted.

exchange reserves. 
See EXTERNAL RESERVES.

Exchequer. The central account of the UK government held by the TREASURY at the BANK OF ENGLAND. (See CONSOLIDATED FUND.)

excise duty. 
See CUSTOMS, EXCISE AND PROTECTIVE DUTIES.

excludable. 
See EXCLUSION PRINCIPLE.

exclusion. The procedure whereby a consumer is 'excluded' from the purchase of a good by virtue of the fact that his willingness to pay for it is less than the market price. In some cases, as with PUBLIC GOODS, exclusion may not be technically possible, whatever is supplied to one consumer being automatically supplied to all others. (See EXCLUSION PRINCIPLE.)

exclusion principle. A criterion by which we may distinguish PUBLIC GOODS from non-public goods. Where a producer or seller can prevent some individuals from consuming his product - generally speaking, those individuals who do not pay for the good - then the product can be supplied by means of a market. Where this principle does not hold, the provision of the good to one individual automatically make it available to other individuals. Individuals will then have an incentive to pay for the good but will be FREE TRADERS. The provision of such as National Defence or environmental protection, where the exclusion principle does not hold, generally requires some government action. Although exclusion by the supplier is used as a criterion to distinguish public and non-public goods, it does not suffice to define the case of a pure public good. In this case we must also consider whether exclusion can be practised by the consumer - i.e. is the consumer 'forced' to consume the good and (2) whether the person's consumption reduces the quantity available to others.

effective. An individual who has responsibility with respect to some branch or part of a firm's activities. The term is often used to cover a fairly wide range of managerial levels from the executive DIRECTORS to echelons where responsibilities are limited.

exempt goods. 
See VALUE-ADDED TAX.

exhaustive voting. A form of COLL CHOICE in which each voter indicates his favoured alternative. The alternative ranked lowest by the greatest number of votes is then removed. The process is repeated with the remaining alternatives until only one is left. This is the chosen alternative. In some complex, this system may be said to more about individual preferences than the preferences of a single voter. It may be said to cover a fairly wide range of management levels from the executive DIRECTORS to echelons where responsibilities are limited.

existence, theorem of. Any theorem which seeks to establish, usually in a general equilibrium context, that there exists a set of equilibrium prices and quantities. (See EQUILIBRIUM, GENERAL EQUILIBRIUM.)

exit-voice model. A classification systems which individuals use to respond to preferences which distinguishes the mode of exit from those which require some
communication. An example of the former would be a private market where individuals can increase (enter) or reduce (exit) demand. Most systems of politics involve the voice method i.e. the 'voicing' of a vote. The distinction was introduced by A.O. Hirschmann (*Exit, Voice, and Loyalty*, Cambridge, Massachusetts, Harvard University Press, 1970). While most analysis of COLLECTIVE CHOICE has focused on the 'voice' approach, some attention has also been given to 'voting with the feet' in which people indicate their preferences by moving between communities - thus employing the exit/entry method. (*See TIEBOUT MODEL.*)

exogeneity. If the explanatory variables in a single equation ECONOMETRIC MODEL can be treated as fixed in repeated samples they are said to be exogenous. The concept applies to models estimated using TIME SERIES data and implies that there must be no feedback between explanatory variables and the dependent variable. Thus lagged values of the dependent variable do not cause (see CAUSALITY) current values of any of the explanatory variables. If the distribution of each explanatory variable \( x_t \) is independent of past values of the dependent variable \( y_{t-1}, y_{t-2}, \ldots \) then \( y_t \) does not Granger cause \( x_t \) and \( x_t \) is strongly exogenous. See Engle, R.F., Hendry, D.F. and Richard, J.F., 'Exogeneity', *Econometrica*, 51 (1983), pp. 277-304.

exogeneity of money supply. 
*See MONEY SUPPLY.*

exogenous. A term which describes anything pre-determined or given in a piece of economic analysis. (*See EXOGENOUS VARIABLE.*)

exogenous variable. (also known as predetermined variable). A variable whose value is not determined within an economic model, but which plays a role in the determination of the values of endogenous variables. Thus an exogenous variable is an explanatory variable (i.e. appears on the right hand side of an equation), but never appears as a DEPENDENT VARIABLE in the model. Exogenous variables can include lagged values of ENDGENOUS VARIABLES. (*See SIMULTANEOUS EQUATIONS.*)

expansionary phase. The phase of the TRADE CYCLE following a trough or lower turning point, lasting to the next upper turning point or peak. (*See TRADE CYCLE.*)

expansion path. With reference to the FIRM, this is the curve traced out by joining up the factor input choices at each output level as in the diagram below, i.e. the locus of the points of tangency between a set of ISOQUANTS and ISOCOST lines. For given input prices, the curve indicates what the firm's chosen path of expansion will be in terms of factor input combinations. With a cost minimizing firm any point on this curve will satisfy the condition that the ratio of the marginal physical product of any two factor inputs will equal the ratio of their prices. (*See COST MINIMIZATION.*)

![Expansion Path Diagram](image)

expatriate. A general term referring to someone of foreign nationality which tends to be used very specifically for personnel from ADVANCED COUNTRIES working in UNDERDEVELOPED COUNTRIES. Many work under aid schemes but some are employed by governments of less developed countries at relatively high cost because of the high wage differential between the two countries.
expectations. Beliefs or views on the future values of economic variables. Because of uncertainty about the future, individuals, firms, and governments form expectations on the future values of economic variables. It has become an important topic since its introduction in the 1930s through the EX ANTE and EX POST concepts applied to saving and investment. Expectations relate to the EX ANTE concept, i.e. they refer to some view of a future event or set of events which, EX POST, may turn out to be realized or not. The correctness or otherwise of expectations is crucial to the notion of equilibrium; a state of economic affairs arrived at through decisions taken on the basis of expectations which turn out to be incorrect cannot be considered an equilibrium one. There is currently no universally accepted theory about expectations. For the three main areas of theoretical work, see ADAPTIVE EXPECTATIONS, RATIONAL EXPECTATIONS, and BEHAVIOURAL EXPECTATIONS.

expectations, augmented. Modifications to an economic model to allow for an expectations effect. Probably the most widely known example is the expectations AUGMENTED PHILLIPS CURVE, where the expected price inflation rate is included as an explanatory variable augmenting the basic model.

expectations lag. The lag in the revision of the expected value of a variable as a result of changes in its current value. This is often dealt with by the ADAPTIVE EXPECTATIONS hypothesis. (See EXPECTATIONS.)

expected inflation. Anticipated INFLATION: the rate of inflation that is expected to occur over some specified time in the future. Expectations about just what the rate may be are hypothesized to be formed by a number of mechanisms. (See ADAPTIVE EXPECTATIONS, RATIONAL EXPECTATIONS)

expected net returns. The flow of expected gross revenue minus expected costs, i.e. the flow of expected profits, from an investment project. (See MARGINAL EFFICIENCY OF INVESTMENT.)

expected utility theory. The dominant theory of individual behaviour under uncertainty, associated particularly with von NEUMANN and MORGENSTERN. It provides logical description of how rational people ought to behave in an uncertain world. If this has been very widely applied in economics, it is its heart lies the demonstration that an individual whose preferences satisfy certain axioms (usually ordering, continuity and independence) will make choices as though maximising expected utility. The empiric validity of the theory has been strongly challenged in recent years (see, for example, the ALLAIS PARADOX). This has encouraged the development of non-expected utility theories, the most famous of which is PROSPECT THEORY.

expected value. (also known as mathematical expectation; $E(X)$) The expected value of a RANDOM VARIABLE is the mean value of its distribution and is defined as

$$ E(X) = \int_{-\infty}^{\infty} x f(x) \, dx $$

where $X$ is the variable concerned, and $f(x)$ is its PROBABILITY DENSITY FUNCTION.

expenditure-switching policies. This is one of the policy alternatives necessary to move an international trade imbalance. Examples are DEVALUATION, and import restrictions which are intended to encourage domestic expenditure on domestic output and also foreign expenditure on domestic output. These will raise NATIONAL INCOME and NATIONAL PRODUCT via the MULTIPLIER process. (See ABSORPTION APPROACH, EXPENDITURE VARIATION CONTROLS.)

expenditure tax. A comprehensive tax on consumer expenditure. It has been suggested as an alternative to an INCOME TAX, a tax could be levied on a PROGRESSIVE basis. Advocates such as Lord KALDOR and MEADE recently Professor MEADE have argued that expenditure tax may be a superior tax base for both EQUITY and efficiency viewpoints. Critics of income tax have argued there are great difficulties in finding a definition of income for tax purposes which is both conceptually sound from an equity viewpoint and readily operational. For example, there are problems in dealing with windfall gains, irregular income flows a CAPITAL GAINS in an inflationary situation. Advocates of the expenditure tax argue that
these problems disappear if expenditure is used as the tax base. Critics of the tax argue that there will be corresponding conceptual problems and that there will be greater difficulties in operating an expenditure tax system than an income tax. Under an expenditure tax there may be problems of the definition of taxable expenditure. For example, the border line between consumption and investment may not be clear in practice. There would be problems from large, irregular items of expenditure and special provisions would be necessary for family size. A fairly large amount of additional information would also be necessary to effectively administer the tax. This is especially the case if the tax is to be progressive as its advocates generally would desire on equity grounds. Thus the current VALUE-ADDED TAX would not alone be suitable - at least as it stands - as a substitute. Ideally increments to total expenditure would be taxed at increasing rates and it is a system which achieves this which is difficult to operate.

Advocates of the expenditure tax also argue that it is superior from an incentive viewpoint to an income tax. The argument that investment will be higher under this tax compared to an income tax because incremental earnings are not taxed is not fool-proof when the effect of loss-offsetting arrangements under an income tax is considered. There is certainly a greater incentive to save under an expenditure tax than an income tax. Whether work effort would be higher under an expenditure tax than an income tax is arguable. Taking all aspects into account it is difficult to give convincing evidence that the radical change would be worthwhile.

**expenditure-variation controls.** Correcting a trade imbalance by varying the level and composition of the budget and by controlling the extent of, and cost of, credit. The ABSORPTION APPROACH concentrates on the relationship of real EXPENDITURE to real INCOME as affected by changes in price levels between countries through changes in the value of the EXCHANGE RATE. The foreign balance, \( B = Y - A \). To improve the foreign balance, \( Y \) must rise relative to \( A \) in response to a change in the exchange rate. (See ABSORPTION APPROACH, EXPENDITURE-SWITCHING POLICIES.)
exponential. An exponential function is a **POWER FUNCTION**, usually relating the dependent variable to the number $e$, raised to some power containing the independent variable where $e = 2.718$, and is the base of the **NATURAL LOGARITHM**. An example is

$$y = a.e^{bX}$$

where $X$ is the independent variable, and $a$ and $b$ are constants.

Exponential relations are useful in describing time paths of economic variables. For instance, a constant growth rate implies an exponentially increasing level of income through time.

export. A good or service which is produced in one country and sold to and consumed in another. A visible export is a good which is physically tangible and an invisible export is the provision of a service which is consumed by someone from another country.

export-import bank. A US public agency, created in 1937, which encourages US foreign trade by providing capital in the form of direct loans and loan guarantees to overseas countries. The bank also extends export credit insurance facilities to cover risks undertaken by US exporters. *(See EXPORT CREDITS GUARANTEE DEPARTMENT.)*

export-led growth. The expansion of an economy, which is stimulated by a rising volume of exports. Such a source of growth not only has real linkage effects and **MULTIPLIER** effects on the rest of the economy but also ensures that growth will not be constrained or halted by **BALANCE OF PAYMENT** difficulties, since it makes available any **FOREIGN EXCHANGE** necessary to pay for additional **IMPORTS** required for expansion.

export promotion. The development of those industries whose main markets are overseas. This is considered the main alternative strategy to an **IMPORT-SUBSTITUTION STRATEGY** in less developed countries. Relatively few developing countries have pursued this strategy though the most spectacularly successful rates of progress have been achieved by countries which followed this path. Hong Kong, Taiwan, Singapore and Korea are examples. The strategy involves the taking of more initial risks if success is to be attained. Success depends on the availability of several factors to enable production and distribution to take place at comparatively low costs. Thus the provision of an efficient infrastructure such as a transport and communications network and educated manpower is necessary. This requires the expenditure of possibly large amounts of government funds. Countries successfully pursuing this strategy have also ensured that foodstuffs and raw materials are always made available as cheaply as possible. Generally open trading policies have been pursued by countries successfully adopting this policy. There is debate among economists about the extent to which other developing countries could pursue this strategy. Some fear that if attempts were made by many developing countries to expand exports of industrial products to the advanced countries there would be a danger of increased unemployment in the latter countries. The governments of these countries would respond by adopting protective policies and the development efforts of the poorer countries would be thwarted. This issue continues to be debated.

Export Credits Guarantee Department. A UK government department, established in 1930, which provides various forms of **INSURANCE** against risks undertaken by British exporters. The principal risks covered include insolvency of the buyer, political restrictions delaying payment, cancellation of a British **EXPORT** licence and imposition of new IMPORT licensing restrictions and **EXCHANGE CONTROLS** in the buyers country. Proposals were made for hiving off parts of its activities to the private sector in 1991.

ex post. *(See EX ANTE.)*

extensive margin. The situation of **DIMINISHING RETURNS** to land as a whole. The **CLASSICAL SCHOOL**, following David **RICARDO**, talks of the extensive margin where, as the population increases, additional land of lower fertility must be brought into cultivation. At such a stage equal amounts of other productive resources applied to these areas produce less and less output. *(See INTENSIVE MARGIN.)*
external balance. Usually defined as a situation where the BALANCE OF PAYMENTS of a country is in EQUILIBRIUM in the sense that autonomous monetary inflows match autonomous outflows, without the need for accommodating monetary flows into or from the FOREIGN EXCHANGE or gold reserves.

external deficit. A BALANCE OF PAYMENTS deficit.

external diseconomy. See EXTERNALITIES.

external economies and diseconomies of scale. The beneficial or adverse effects which the production activities of one firm have on those of another firm. (See EXTERNALITIES.)

external economy. See EXTERNALITIES.

external finance. The funds raised by firms either by issuing SHARES (equity capital) or borrowing (debt finance or bonds) to aid the financing of their activities. (See INTERNAL FINANCE.)

external financial limits. The UK government sets limits to the EXTERNAL FINANCE public corporations can raise and effectively limits the capital expenditure that the corporation can make without an increase in internally generated funds. External finance comprises governmental grants and loans, market and overseas borrowing and the capital value of assets acquired by financial leasing.

external growth. That part of the expansion of a firm which is brought about by acquisition and MERGER activity.

externalities. Externalities are variously known as external effects, external economies and diseconomies, spillovers and NEIGHBOURHOOD EFFECTS. The term 'technological external effects' is also sometimes used, the adjective 'technological' being introduced in order to differentiate it from PECUNIARY EXTERNAL ECONOMIES. Externalities involve an interdependence of UTILITY and/or PRODUCTION FUNCTIONS. For example, the upstream pulp mill which discharges effluent in the river thus reducing the scope for fishing downstream is said to impose an externality on the fishermen. Some economists add the qualification that the interdependency must not have been taken account of through trade.

A beneficial externality, known as an external economy is, where an externality-generating activity raises the production or utility of the externally-affected party. For example, a beekeeper may benefit neighbouring farmers by incidentally supplying pollination services. An external diseconomy is where the externality-generating activity lowers the production or utility of the externally-affected party. Examples of these are the numerous forms of environmental pollution.

A distinction is drawn between marginal and inframarginal externalities. In the former small changes in the level of the externality-generating activity will affect the production or utility of the externally-affected party. In the latter, while the activity itself generates an externality, small or marginal changes in the level of the activity do not have any effect on the production or utility of the externally-affected party.

A Pareto-relevant externality occurs when the extent of the activity may be modified in such a way that the externally-affected party can be made better off without the acting party being made worse off, that is, where there exists the possibility of gains from trade.

Externalities arise because of the nonexistence of markets, i.e. there are no markets in clean air, peace and quiet and so on. A major, although not the only, source of such MARKET FAILURES is the inability to define and enforce PROPERTY RIGHTS. (See COASE'S THEOREM.)

external labour market. The market for a particular number of workers that are either immediately available or potentially available for new jobs. Within the external labour market, pricing and allocating decisions are controlled directly by economic variables - there is a competitive market for the jobs in question. (See LOCAL LABOUR MARKET, INTERNAL LABOUR MARKET)
external reserve. This normally refers to a country’s holdings of internationally acceptable means of payments for the purpose of covering short to medium-term deficits on its external BALANCE OF PAYMENTS, and the related purpose of exerting control over the movement of the EXCHANGE RATE of its currency. Such reserves are held principally in gold or in one or other of the major currencies widely used in international trade and settlements. Historically, the two principal currencies held for this purpose have been the pound sterling and the dollar. But sterling’s role as a reserve, and also a trading currency, has much diminished since the mid-1960s; while the dollar is now subject to the recurrent crises of confidence that have affected sterling, it is still the major reserve currency in international use. For many countries one attraction of holding a reserve currency rather than gold is that they derive some return from the reserves in that the currency holdings are normally invested in short-term income-yielding SECURITIES of the reserve currency country.

It should be noted that one of the original roles of the INTERNATIONAL MONETARY FUND was to provide foreign currency resources for member countries faced with balance of payments deficits for which their own reserves were inadequate. The Fund’s powers to fulfil this role have been extended by the establishment in 1970 of SPECIAL DRAWING RIGHTS (SDRs) which are in effect a new form of international means of payment, created by the Fund, distributed among its members, and transferable between them in settlement of international indebtedness. The need for external reserves is greatest where a country or group of countries is maintaining a régime of stabilized exchange rates: such countries have to be prepared and able to intervene in the FOREIGN EXCHANGE MARKET to support the exchange rate of their currency at times when it is weakening due to an adverse balance of payments or a decline of confidence in it. The power to do this depends on the possession of the necessary stocks of international means of payment with which to make the intervention. Even under conditions of variable rates, CENTRAL BANKS intervene extensively and frequently to oppose or moderate what are regarded as inappropriate movements of exchange rates. (See EXCHANGE EQUALIZATION ACCOUNT, INTERNATIONAL LIQUIDITY.)

extraneous information. Prior information (possibly a previous parameter estimate), which is combined with sample information for the purposes of STATISTICAL INFERENCE OR ESTIMATION of parameters in REGRESSION analysis, usually to improve prevision or overcome problems such as MULTICOLLINEARITY. (See BAYESIAN TECHNIQUES, RESTRICTED LEAST SQUARES, PRIOR DISTRIBUTION.)

extrema. (also known as extreme points or extreme values). The highest and lowest values of functions. (See MAXIMUM MINIMUM.)
factor augmenting technical progress. TECHNICAL PROGRESS which raises the level of output even though the stock of CAPITAL and the LABOUR FORCE have not been changed.

factor endowment.  
1. The levels of availability of FACTORS OF PRODUCTION in an area, or country: these are usually defined as land, LABOUR, CAPITAL and entrepreneurial skills. The high-level technology of the western world uses a very different factor mix to that which is available in underdeveloped countries which causes many problems with transfer of technology. (See TRANSFER OF TECHNOLOGY, APPROPRIATE TECHNOLOGY, INTERMEDIATE TECHNOLOGY.)

2. The quantities of FACTORS OF PRODUCTION in a country. The different relative abundance of factors of production is made the basis for explaining comparative cost differences in the HECKSCHER-OHLIN APPROACH TO INTERNATIONAL TRADE.

factor incomes. Incomes derived directly from the current production of goods and services. The reward to the FACTORS OF PRODUCTION for services to current production of goods and services. It is usual to distinguish four main categories: rent; wages and salaries; interest; profits. (See NATIONAL INCOME and TRANSFER INCOMES.

factoring. A method of disposing of trade DEBTS where a company 'sells' these debts to a financial institution.

factor-price differentials. Two distinct prices for a factor of production. For example the price of labour in capitalist wage-based production and in family based production activities. (See FACTOR-PRICE EQUALIZATION.)

factor-price equalization. A proposition derived from the HECKSCHER-OHLIN APPROACH TO INTERNATIONAL TRADE, which argues on a set of restrictive assumptions that FREE TRADE is a perfect substitute for factor mobility and will have the effect of equalizing the rate of payment to any factor of production throughout the world, e.g. the wage rate should be the same in all countries. Apart from the obvious need for free trade and the absence of transport costs, other crucial assumptions must be fulfilled such as the closeness in the factor endowments of countries and the absence of factor reversals.

factor-price frontier. The name given by Paul SAMUELSON to the negatively sloped trade off between the wage rate and the rate of profit in growth theory. CAMBRIDGE SCHOOL economists preferred the title 'wage/rate of profit frontier', while John HICKS referred to the same notion as the wage frontier. In equilibrium the elasticity of the factor-price frontier is equal to the ratio of the shares of output going to the two factors. (See RES WITCHING.)

factor proportions. The ratio in which FACTORS OF PRODUCTION are combined.

factor reversals. One of the assumptions of the HECKSCHER-OHLIN APPROACH TO INTERNATIONAL TRADE is that the PRODUCTION FUNCTIONS for commodities differ in the ratios (intensities) in which they use FACTORS OF PRODUCTION and that a commodity which uses a higher ratio of, say, labour to capital than another will do so at all possible relative factor prices. It is logically and empirically possible for intensities to reverse themselves so that e.g. the original labour intensive commodity might become capital intensive if the relative price of labour rises, through being able to substitute capital for labour at a faster rate than the originally capital intensive commodity. The possibility of factor reversals throws doubt on some of the accepted conclusions of international trade theory such as FACTOR-PRICE EQUALIZATION and the STOLPER-SAMUELSON THEOREM.
factors of production. The resources of society used in the process of production. These are usually divided into three main groups LAND, LABOUR, CAPITAL, but may also include ENTREPRENEURSHIP.

factor utilization. The amount of the available factors of production which are actually being utilized; full utilization is dependent on the implementation of an appropriate technology, such that highly CAPITAL-INTENSIVE TECHNIQUES should not be used in areas with little capital endowment and surplus labour. (See APPROPRIATE TECHNOLOGY.)

fair comparisons. Wage comparisons which emphasise that workers doing roughly similar jobs should be paid the same wage. Frequently such beliefs form the basis of COERCIVE COMPARISONS but take no account of the differing levels of PRODUCTIVITY in the two jobs. As a result they can serve as a basis for inflationary wage claims. (See COMPARABILITY.)

fair rate of return. The ruling principle in US public utility regulation has been a 'fair rate of return' on the fair value of the capital being used in producing the utility services. This means establishing a rate base that reflects the value of the utility's assets and authorizing rate structures sufficient, after non-capital costs are covered, to allow the firm to realize a respectable return on its investment. A respectable rate, or fair rate, is that rate which just allows the utility to continue attracting capital.

fair trade law. In the US several efforts have been made to set legally mandated minimum retail prices (resale price maintenance agreements) for brand-name and trade-marked goods. (See MILLER-TYDINGS ACT OF 1937, MCGUIRE ACT.)

Fair Trading Act 1973. This UK legislation extended competition policy to cover oligopolistic markets, and centralized responsibility for the implementation of MONOPOLY and restrictive practices legislation with the new office of the Director General of Fair Trading. The latter took over the Powers of referral in cases of restrictive agreements from the Registrar of Restrictive Practices. This Act also extended restrictive practices legislation to cover agreements involving the supply of commercial services.

In the area of monopoly policy, the definition of a monopoly situation was changed from a market share of one-third to a share of one-quarter. Furthermore OLIGOPOLIES became subject to investigation in situations where two or more companies account for a market share of 25 per cent, and engage in practices which circumvent competition. The Director General of Fair Trading was empowered to refer monopoly and oligopoly situations for investigation by the Monopolies and Mergers Commission, subject to the approval of the relevant Secretary of State. (See RESTRICTIVE TRADE PRACTICES ACT 1956, MONOPOLIES AND MERGERS ACT 1965.)

Fair Trading, Office of. Introduced by the FAIR TRADING ACT 1973, this office is responsible for the collection of information relevant to the structure of industries and business conduct. It also has the duty to keep under review commercial activities and policies in the UK. The Director General of Fair Trading has the power to refer for further investigation, restrictive agreements, monopoly and oligopoly situations. These powers of referral are subject to the approval of the relevant Secretary of State, who has the right to veto.

fair wages. In general, fair wages are those fixed under national MINIMUM WAGE LEGISLATION. In the UK, unlike the US, governments have adopted a piece-meal approach to the question of fair wages, imposing a minimum wage in limited areas in which collective bargaining is weak or non-existent. The chief instrument here is the WAGE COUNCIL. In addition, there were, until 1982, Fair Wage Resolutions of the House of Commons. The first such resolution aimed at enforcing the payment of the 'current' rates of wages to workers engaged on government contracts. Under the terms of the most recent resolution a government contractor is required to pay the wages that have been fixed by collective bargaining or ARBITRATION, to observe 'fair' conditions and not simply 'fair' wages, and to give workers freedom of association. The ultimate sanction is the elimination of the contractor from the
false trading. Trading at DIS-EQUILIBRIUM prices. (See AUCTIONEER, WALRAS, WALRAS’ LAW.)

family credit. See BEVERIDGE REPORT.

family expenditure survey. An annual sample survey of household expenditure patterns carried out by the British government. About 7000 household units (defined as a group of individuals sharing living or eating arrangements) are surveyed over a two-week period. The results are published by Her Majesty’s Stationery Office. The information is useful in analysing changes in living standards and patterns of consumption.

family-unit agriculture. An agricultural system prevalent in less-developed areas, which is based on the family unit. Production is usually for SUBSISTENCE purposes with some produce being sold or traded locally to provide other needs. Agricultural methods are often primitive and inefficient and are usually on a very small scale and very LABOUR-INTENSIVE.

FAO.
See FOOD AND AGRICULTURE ORGANIZATION.

FASB.
See FINANCIAL ACCOUNTING STANDARDS BOARD.

FCI.
See FINANCE FOR INDUSTRY.

featherbedding. Make-work practices that encompass over-manning and/or rejection of technologically advanced machinery. Featherbedding often has its origin in technical change and can thus be viewed as the carrying forward of a set of practices appropriate for one technology to another where it is alien - more a ‘protective’ than a ‘restrictive’ practice. Featherbedding tends to be more of a problem with CRAFT than INDUSTRIAL UNIONS. This is because industrial unions generally comprise a number of diverse groups, some of which will be helped and others harmed by a given technological change. Accordingly, concerted action is less easily practised. Featherbedding will certainly increase unit costs and, in the general case, prices too. But because of the potentially smaller impact on prices in monopolistic industries, featherbedding tends to be more prevalent in precisely such industries.

Fed., the. Abbreviation for the FEDERAL RESERVE SYSTEM.

Federal Deposit Insurance Corporation (FDIC). A US corporation which insures deposits in COMMERCIAL BANKS and savings and loan associations up to a limit of $100,000 per account per institution. The FDIC also acts as one of the agencies which regulates financial institutions. Members pay to the FDIC insurance premiums which are invested and, when necessary, used to pay depositors of failed institutions. Since establishment in 1934, no depositor in the US has lost funds in an FDIC insured institution. However, the FDIC's potential liabilities far exceed its assets, so that questions have been raised as to its usefulness in times of general financial crisis.

Federal Funds Market. In the US the market in which 'immediately available' funds are lent and borrowed, mostly on an overnight basis, between member banks of the FEDERAL RESERVE SYSTEM, other major financial institutions and branches and agencies of non-US banks. The market originated in the borrowing and lending of surplus reserve balances (i.e. balances in excess of required minima) at Federal Reserve Banks by member banks, and served to redistribute reserves, from temporarily overprovided to underprovided banks. In recent years the market has extended greatly to include other financial operators and the balances lent are no longer confined to funds in Federal Reserve accounts. It is thus a general MONEY MARKET.

Federal Home Loan Bank System (FHLBS). US government agency which uses its power in money markets to provide liquidity to SAVINGS AND LOAN ASSOCIATIONS. Created in 1932, it was originally viewed as a rescue mechanism, but in the postwar period it became an important source of funds for
new lending by savings and loans associations. Particular strain is put on the FHLBS in periods of tight credit, such as 1973-4 and 1980-2.

Federal National Mortgage Association (FNMA). Agency established in 1938 by the US government to support the market for government-sponsored mortgages. In 1968 FNMA became a private corporation, now listed on the New York Stock Exchange, and makes secondary mortgages of all types. FNMA’s former function is now fulfilled by two US government agencies, the Government National Mortgage Association and the Federal Home Loan Mortgage Corporation, which is part of the FEDERAL HOME LOAN BANK SYSTEM (FHLBS). Also known as ‘Fannie Mae’.

Federal Open Market Committee. See FEDERAL RESERVE SYSTEM.

Federal Reserve Note. A debt instrument issued by the FEDERAL RESERVE SYSTEM in various denominations. Federal Reserve Notes, like all legal notes, are a promise to pay the bearer the designated amount on the note. At one time the Federal Reserve issued Certificates for gold or silver. The bearer of these Certificates could demand the gold or silver backing the certificate. Now, the bearer of a Federal Reserve Note can only request another note in exchange for its surrender. Nonetheless, Federal Reserve Notes, along with the coin minted by the US Treasury, are legal tender in the United States; that is, they must be accepted in payment of all debt.

Federal Reserve System. The system established in the US in 1913 to discharge the function of a CENTRAL BANK and provide a strengthened framework of regulatory control over the commercial banking system. The System has a federal structure, comprising 12 Federal Reserve Banks each responsible for day-to-day operations within their Districts and acting as a two-way channel of contact between the System and the business community; and a Federal Reserve Board of Governors, sited in Washington, which effectively if not formally controls the policy of the System. All banks registered under Federal laws are obliged to be members and observe the regulations of the System; membership is optional. The System is responsible for currency issue; holds reserve balances (other than vault cash) of member banks and engaging in OPEN MARKET OPERATIONS (under the Federal Open Market Committee); is responsible for MONETARY MANAGEMENT and MONETARY POLICY with the US and in conjunction with the Treasury for EXCHANGE RATE policy and external monetary relations. Although a creation of government, with the Federal Reserve Board Governors (and the Chairman) appointed by the President, the System generally maintained a considerable independence in its own policy decisions, an independence that did not lead to clearer definition of what constitutes unfair and deceptive practices, but has left interpretations to the Commission and, ultimately, the Supreme Court.

Federal Reserve Act. Enacted in the US in 1914 to create a Commission (FTC) with competence in business affairs in order to investigate ‘the organization, business conduct, practices and management of companies engaging in interstate commerce’ and to challenge ‘unfair methods of competition’. The FTC also was to chalk out ‘unfair or deceptive acts or practices affecting commerce’. The act includes a clear definition of what constitutes unfair and deceptive practices, but has left interpretation to the Commission and, ultimately, the Supreme Court.

feedback/entrapment effects. The hypothesis that conditions in the secondary labour market (see DUAL LABOUR MARKET HYPOTHESIS) cause workers to acquire work habits. Unstable employment relationships in the secondary labour market thus said to encourage workers who ‘bad’ jobs to become ‘bad’ workers. It is that once the worker has acquired habits (or received feedback) he is the less skilled and less trainable than his primary sector counterpart.

This phenomenon is only one aspect of a larger system of feedback in which workers are influenced by many socio-economic factors.
feudalism. A type of political and economic system dominant in Europe in the Middle Ages. It was characterized by a social pyramid extending from the dependent peasant through the 'fief endowed lords and knights to the monarch. A rigid class or status structure linked to the land was the basis of the society. The lord who was granted an estate in return for a military obligation to the monarch rented this land to serfs in return for a rent in kind or money, and having his estate cultivated by these serfs. This decentralized economic system relied on the legal immobility of the serf and went into demise with the growth of the urban population and a system of wage labour.

fiat money. Money the status of which derives from legal enactment. Normally, this decrees that the money concerned shall be 'legal tender', i.e. the law will recognize the offer of it as evidencing intention to settle a debt. Fiat money may be distinguished from commodity-based moneys, e.g. gold and silver coin, or paper money convertible into such coin; or from money based on the credit of - in the sense of trust in - the creating authority, e.g. BANK DEPOSITS.

fiduciary issue. That part of the Bank of England's note issue which, under Sir Robert Peel's BANK CHARTER ACT, 1844, it was empowered to make against government securities as distinct from gold (and to an extent, silver) coin and bullion. In 1844 the amount was fixed at £14 million, but this was subsequently increased, e.g. as the note issues of other note issuing banks lapsed. In 1939, at the outbreak of war, all the gold held in the Bank's Issue Department was transferred to the EXCHANGE EQUALIZATION ACCOUNT, the Bank's note issue becoming wholly fiduciary which it has remained ever since. The size of the issue is still subject to Treasury, and ultimately Parliamentary, control. The fiduciary issue is now, effectively, that part of the government's debt which exists in the form of circulating CURRENCY. (See CURRENCY SCHOOL, GOLD STANDARD.)

filter. A name given to any formula or procedure which removes unwanted variation from data. A low pass filter will remove high frequency variation, such as seasonal or random variation, leaving low frequency components such as business cycles or the TREND. A high pass filter has the opposite effect, removing trends etc., leaving short-run cycles and random variation. Examples of filters include MOVING AVERAGES (low pass) and DETRENDING (high pass).

filtering. A term used in URBAN ECONOMICS to describe a process by which housing changes in quality, generally passing from occupation by higher income groups to occupation by lower income groups. Thus if a house is divided into units for multiple occupancy, or merely loses value by a process of decay, it will become available to lower income groups. In this way, it is argued that construction of new housing for high income groups can benefit those on lower incomes as the former residence of the rich 'filter down' to the poor. Filtering also provides an explanation of the process by which slums are formed; in many cities areas of low-quality housing are in fact the converted former residences of middle-class households.

FIML.
See FULL INFORMATION MAXIMUM LIKELIHOOD.

final goods. Those goods used for the purposes of consumption and not utilized as INPUTS by firms in the process of production. As such they should be distinguished from INTERMEDIATE PRODUCTS. It is of COURSE possible for a good to be produced for use in both functions.

final offer arbitration. Intervention in an INDUSTRIAL DISPUTE by an independent and impartial third party who examines the arguments of both sides and recommends that the final offer, the final position, of one of the parties to the dispute be implemented. The award of the arbitrator is binding and
the practice is frequently used in the US. *(See ARBITRATION, CONCILIATION and MEDIATION.)*

**final product.** (also known as gross domestic product.) All those goods and services which are purchased by their ultimate users. The total output of the economy after eliminating INTERMEDIATE PRODUCTS. *(See NATIONAL INCOME.)*

**finance.** Narrowly interpreted it signifies CAPITAL in monetary form, that is in the form of funds lent or borrowed, normally for capital purposes, through financial markets or institutions. But in common parlance the term is applied to funds from almost any source, used to undertake any kind of expenditure.

**Finance Corporation for Industry.** A holding company created in 1973 for the Finance Corporation for Industry (FCI) and the Industrial and Commercial Finance Corporation (ICFC). FCI and ICFC were established in 1946 by the BANK OF ENGLAND, the London clearing banks and the Scottish banks to provide medium- and long-term loans for firms which experience difficulty raising capital from other sources. FCI continues to finance loans of over £200,000 for industrial conversion and development projects whereas ICFC grants smaller 10- to 20-year loans to small and medium size firms. *(See ‘MACMILLAN GAP’, EQUITIES.)*

**finance house.** A FINANCIAL INTERMEDIARY, not a BANK, which may obtain funds from its own capital resources, by accepting deposits (usually for fixed periods) or even by borrowing from other institutions and which it on-lends for a variety of purposes, especially to finance hire purchase contracts, but also leasing. Their numbers have dwindled as the larger houses have taken the status of banks under the Banking Acts of 1979 and 1987.

**finance houses market.** One of the group of interrelated MONEY MARKETS which developed in London in the 1960s. Like the LOCAL AUTHORITIES’ MARKET it is distinguished by the borrowers, not the lenders who comprise a wide range of financial institutions and commercial companies and who are lending and borrowing actively in the other money markets, notably the INTERBANK, EURO CURRENCY and CERTIFICATE OF DEPOSIT MARKETS. The FINANCE HOUSES attract money from small depositors, but they also take up considerable funds, through MONEY BROKERS, in the wholesale money markets. As in these other markets the funds are lent without security. *(See ‘LIFEBOAT’.*

**Financial Accounting Standards Board (FASB).** An independent body created in the US by the accounting profession to establish generally accepted accounting principles and financial reporting practices. The members of the FASB are appointed by the nine trustees constituting the Financial Accounting foundation, who are appointed by the board of directors of the America Institute of Certified Public Accountants, the professional organization for CPAs.

**financial capital.** The liquid as opposed to physical assets of a company. Companies can have a variety of types of capital. The principal distribution is between share capital and loan or DEBENTURE capital. Share capital is split between ordinary and preference capital with the holders of ordinary shares being the owners of the company. They accept more risk than the owners of other classes as their DIVIDENDS are paid last. It is possible to have classes of ordinary shares with preferred shares being allowed priority to dividends up to a specific amount before the owners of deferred shares receive payment. Ordinary shares may also be split between voting and non-voting or ‘A’ shares. Preference shares rank just before ordinary shares regarding dividend payments, which in their case is usually fixed. In any year profits are insufficient to pay dividends the owners have to go without, but owners of what are known as cumulativ shares will be entitled to be paid the missed dividend in later years if profits permit. This does not happen with non-cumulative shares. Some preference shares are participating, meaning that they can share in the dividend paid on ordinary shares. Some preference shares are redeemable at a specified price and date. The latter is subject to the option of the directors. Other preference shares are irredeemable. Debentures
or loan shares rank first in the capital line. They have least risk attached to them, and generally the (fixed) interest has to be paid even if profits are not earned in a particular year. Often the loan is secured on the fixed assets of the company, though unsecured loan stock where no stock security exists is fairly common. Debentures may be irredeemable, meaning the capital is not repaid until the company goes into liquidation, or redeemable at a specified price and date(s). Loan stocks may be inconvertible or convertible, the latter meaning that the holders have the option at certain times to convert into ordinary shares.

**financial instrument.** Any document which is an evidence of DEBT, and the sale or transfer of which enables the seller to acquire FINANCE. Examples are BILLS, BONDS and other securities, CERTIFICATES OF DEPOSIT.

**financial intermediary.** In the wide sense, any operator engaged in bringing together ultimate providers and ultimate users of FINANCE. An important distinction is between intermediaries engaged as BROKERS in bringing together borrowers and lenders, or buyers and sellers of securities, without entering into the transaction as principals; and intermediaries who themselves borrow or take up funds in order to on-lend them. Prominent among the latter are institutions like BANKS, BUILDING SOCIETIES, and INSURANCE COMPANIES, which in taking up funds create claims on themselves, these being matched by the assets, largely claims on others, which they acquire. The term 'non-bank financial intermediaries' distinguish those institutions, e.g. building societies and insurance companies, which create claims that are not normally reckoned as part of the money stock.

**financial ratios.** Ratios between particular groups of the ASSETS or LIABILITIES of an enterprise and corresponding totals of assets or liabilities; or between assets or liabilities and flows like turnover or revenue. A leading example is the price/earnings ratio which is the ratio of the current quoted STOCK EXCHANGE price of an EQUITY to the most recent declared dividend per share. Another is the ratio of equity to DEBT FINANCE (the GEARING RATIO) within a company's overall capital structure. Financial ratios are used to give summary indications of the financial performance, prospects or strength of a company.

**financial risk.** See CORPORATE RISK.

**Financial Times Actuaries Share Indices.** A set of PRICE INDICES and AVERAGE EARNINGS and yields for UK SECURITIES on the STOCK EXCHANGE. These are published every day by the Financial Times newspaper. The London and Edinburgh Actuary Institutes assist in their production. The index summarizes over 700 securities, about a quarter of all quoted securities on the Stock Exchange. Of the securities in the indices approximately 92 per cent are EQUITIES and the other 8 per cent fixed-interest STOCKS. This index differs from the Stock Indices of the Financial Times in that it is a base-weighted chain-link index with base year 1962 = 100. (See INDEX NUMBERS, FINANCIAL TIMES INDUSTRIAL ORDINARY INDEX, FT-SE 100 INDEX.)

**Financial Times Industrial Ordinary Index.** Prior to the advent of the FT-SE 100 INDEX in 1984 the most commonly quoted index of SHARE prices used as a general indicator of the state of the STOCK MARKET in the UK. It has a base year of 1935 = 100 and is only one of a number of Stock Indices published daily by the Financial Times newspaper; it is simply an average of thirty BLUE-CHIPS. (See INDEX NUMBERS, STOCK MARKET.)

**financial year.** Different bodies use different financial years for financial accounting and this need not be coincident with the standard calendar year. Thus, the UK government's tax year is from 6th April in one year to the 5th April in the next year, whereas the USA tax year runs between 1st July of one year and 30th June of the next.

**fine tuning.** A term used to refer to government policies which aim to make small changes in taxation or expenditures which in turn are designed to influence employment levels, NATIONAL INCOME and price levels.
finite memory. A property of a TREND STATIONARY PROCESS.

**firm.** In standard neo-classical economics an analytical label for the institution which transforms inputs into output. Thus the firm is viewed as an abstract entity which fulfils a mainly technical role. Though simple, when combined with the assumption of profit maximization it provides useful insights into firm behaviour and the determination of industry output and price as in PERFECT COMPETITION and MONOPOLY. A more sophisticated definition of the firm would take into account its role as a coordinating device which allocates resources within itself. This role has been a central concern of BEHAVIOURAL THEORIES OF THE FIRM.

**firm, theory of the.** The theory of the FIRM is an important topic in MICROECONOMICS which is concerned with explaining and predicting the behaviour of firms, particularly with respect to pricing and output decisions. (See THEORY OF PRICE.) It also includes consideration of such topics as choice of production process, ADVERTISING, PRODUCT INNOVATION, INVESTMENT decisions and DIVIDEND policy. The traditional theories are based on the assumption of profit maximization and generate different pricing and output predictions depending on the degree of competition in the markets in which the firm operates. Modern theories of the firm emphasize the separation of ownership and control that has taken place historically. This separation, in the presence of imperfections in the capital market and product markets, permits the managers of firms to pursue policies other than profit maximization. MANAGERIAL THEORIES OF THE FIRM analyse the consequences for firms conduct and performance, when objectives other than profit maximization are adopted. (See SALES MAXIMIZATION HYPOTHESIS, DISCRETIONARY PROFITS and GROWTH THEORIES OF THE FIRM.) Another modern departure from traditional theories are the BEHAVIOURAL THEORIES OF THE FIRM where the assumption that something is maximized is replaced with one of SATISFYING BEHAVIOUR. See Archibald, G.C., 'The Theory of the Firm', *The New Palgrave - A Dictionary of Economics*, Macmillan, London (1987), Vol. 2, pp. 357-363

**first difference.** The difference between a variable and its own value lagged by one time period. We can also calculate a second difference as the first difference of the first difference. Similarly, the third difference is the first difference of the second difference, etc.

**first order condition.** Generally the condition which states that the first derivative(s) of the OBJECTIVE FUNCTION with respect to the CHOICE VARIABLE(S) should be equal to zero for the determination of an EXTREME VALUE (maximum or minimum). (See SECOND ORDER CONDITION.)

**fiscal decentralization.** See FISCAL FEDERALISM.

**fiscal drag.** The effect of inflation on AVERAGE OR EFFECTIVE TAX RATES. Thus under an unindexed PROGRESSIVE income tax system the effective tax rate is increased when money incomes increase even though real incomes may not be increasing. This is because income earners are pushed into income brackets where high MARGINAL RATES apply. The result of this is to cause a dampening effect on the volume of economic activity. Its prevalence led to a campaign for indexation of tax allowances.

**fiscal federalism.** A system of TAXATION and PUBLIC EXPENDITURE in which revenue raising powers and control over expenditure are vested in various levels of government within a nation, ranging from the national government to the smallest unit of local government. Most western nations operate some degree of fiscal federalism though, for example, the autonomy of local governments in the US is rather greater than that of local authorities in the UK.

A system of multi-level finance may be justified in terms of ALLOCATIVE EFFICIENCY on the grounds that while some PUBLIC GOODS, such as national defence, confer benefits on the nation as a whole, the benefits of other goods, such as refuse collection, are more limited in geographical incidence. It is argued that by making decisions concerning the provision and financing of the latter type of goods at the level of local rather than national governments, the 'best' or OPTIMAL level of provision is more likely
fiscal illusion. A situation in which the benefits of particular government expenditure are clearly identified by recipients but the costs are not, these being widely dispersed over time and population. The direct fiscal costs may be spread over the entire tax-paying community and individual costs hidden amongst a large number of other government spending programmes which the tax-payer is called to finance by general taxation. The fiscal illusion of the tax-paying public thus tends to produce a structure of incentives facing political decision-makers that leads to the adoption of public spending programmes. (See ECONOMICS OF POLITICS.)

fiscal multiplier. A coefficient that indicates by how much an increase in fiscal expenditure affects the equilibrium level of income. For example, in the simple Keynesian model

\[
\begin{align*}
Y &= A \\
A &= C + I + G \\
c &= \frac{1}{1 - c} \\
I &= I \\
G &= G
\end{align*}
\]

the reduced form for income, \(Y\), is

\[
Y = \left(\frac{1}{1 - c}\right)(C + I + G) = \alpha A
\]

where \(\alpha\) is autonomous expenditure and \(\alpha\) is the fiscal multiplier. (See MULTIPLIER, MONEY MULTIPLIER(2)).

fiscal policy. Generally refers to the use of taxation and GOVERNMENT EXPENDITURE to regulate the aggregate level of economic activity. Thus if UNEMPLOYMENT is regarded as excessive, INCOME and EXPENDITURE TAXES may be varied to stimulate the level of AGGREGATE DEMAND for this purpose. The overall effect on economic activity will depend on the size of the tax cut and the value of the MULTIPLIER. Increasing government expenditure will raise the level of activity by an amount equal to the change in expenditure times the multiplier. It is argued by some economists who advocate the use of fiscal policy that the changes in taxation together with TRANSFER PAYMENTS proportional to the existing distribution of income are the appropriate weapons to regulate aggregate activity. They argue that changes in government expenditure should only be made if there is a shift in demand for PUBLIC GOODS.

The use of fiscal policy entails changes in the government's budget including the possibility of deficits. The conventional view is that the use of deficit finance in this situation is perfectly proper though attention has to be given to the impact of this as well, although this view has recently been challenged by MONETARISTS and the NEW CLASSICAL MACROECONOMISTS who emphasize the inflationary consequences of budget deficits. (See also BUDGET DEFICIT, CROWDING OUT.)

fiscal welfare benefits. See TAX EXPENDITURES.

Fisher, Irving (1867–1947). American economist, described by SCHUMPETER in 1948 as America's greatest scientific economist. After training in mathematics he turned to economics. He was a joint founder and first President of the Econometric Society in 1930. His work is permeated by a search for numerical application; for him no theory was of use unless it led to applied work and the quantitative analysis of factual data. His abilities lay less in original thought than in the provision of logically-consistent and extremely lucid syntheses of existing theories. He made significant contributions to the problems of capital, interest, money and INDEX NUMBERS and to the theory of DISTRIBUTED LAGS.

In The Nature of Capital and Income (1906) Fisher analysed the relationship between the two concepts and explained the value of capital in terms of the discounted value of expected future income. In The
purchasing Power of Money (1911) he developed the QUANTITY THEORY OF MONEY, $MV = pQ$, (where $M$ is the stock of money in circulation, $V$ its velocity of turnover and $Q$ the overall volume of transactions) to explain changes in the price level $P$. He was well aware of the limitations of this theory, namely that $V$ and $Q$ might be variable. In The Theory of Interest (1930), which represents a definitive treatment of earlier work, especially that of BOHM-BAWERK, he explains the determination of the rate of interest by the balance between the supply of capital funds, influenced by the psychological forces of TIME PREFERENCE, and the productivity of investment, or the rate of return over cost as he calls it.

In The Making of Index Numbers (1922) he set out to identify the characteristics of the best feasible index of prices for measuring changes in the purchasing power of money, and he recommended the geometric mean of the PAASCHE and LASPEYRES indices as the ideal index. While the present is linked to the future in measuring capital as the discounted value of future income, Fisher also saw the systematic dependence of the present on the past and this led him to investigate the properties of DISTRIBUTED LAGS.

Fisher equation.
See FISHER, IRVING, CAMBRIDGE SCHOOL, FRIEDMAN, QUANTITY THEORY.

Fisher open.
See UNCOVERED INTEREST PARITY.

fixed asset. Any non-financial capital ASSET of a company which is relatively long-lived and specific to particular productive processes, and the cost of which is normally recoverable only over an operating period of some duration, e.g. plant and buildings. Such assets are illiquid compared with current (or short-term) ASSETS such as stocks of materials or semi-finished or finished goods. (See LIQUIDITY.)

fixed coefficients production function. A production function in which INPUTS must be combined in fixed proportions. (See FIXED PROPORTIONS IN PRODUCTION.)

fixed cost. For a firm the SHORT RUN is defined as the period of time over which some FACTORS OF PRODUCTION cannot be varied. The latter are known as FIXED FACTORS and the costs associated with them as fixed costs. Fixed cost does not therefore vary with output. An example would be the cost of a factory which, in the short run, cannot be expanded to meet increased demand. Only labour and perhaps other inputs can be varied - these are the variable factors the costs of which are VARIABLE COSTS. (See also AVERAGE COST.)

fixed exchange rate.
See EXCHANGE RATE.

fixed factors. Those FACTORS OF PRODUCTION which cannot be changed in quantity. Usually this will apply to some factors such as CAPITAL, in the SHORT RUN.

fixed investment. All FINAL GOODS purchased by FIRMS other than those additions to INVENTORIES which are not intended for eventual resale. Additions to the CAPITAL STOCK. (See INVESTMENT.)

fixed labour costs. These comprise costs of employment that vary less than proportionately with hours worked. There are two main forms of fixed cost. First, there are turnover costs associated with the hiring, lay-off or dismissal of employees. These include the costs of recruitment, screening and initial training, in addition to termination costs in the form of SEVERANCE PAY. Second, there are those costs which, although continuing throughout the period of employment, are not related or fully related to hours of work. Examples include employment taxes that are based on numbers of employees, and contribution to private pension schemes whose base has an annual earnings limit.

The presence of these costs introduce an element of capital or fixity into the use of labour, and because of this labour is commonly said to be a quasi-fixed factor. As a result, we would expect greater employment continuity among workers with high fixed costs of employment, a pro-cyclical behaviour of labour productivity, and more reliance on OVERTIME working in those industries and time periods where fixed costs of
fixed-price models. Models which assume that transactions occur at non-equilibrium prices and that these prices remain fixed. Such models are based on the assumption that prices and wages do not move immediately and effortlessly to clear the market. They describe a temporary equilibrium and are, therefore, of greatest relevance in the short run. The development of such models is most closely associated with the work of Malinvaud. In *The Theory of Unemployment Reconsidered* (Basil Blackwell, Oxford, 1977), Malinvaud builds on the work of Clower and Leijonhufud who provided more rigorous microeconomic foundations for Keynesian economics. He distinguishes the characteristics of temporary equilibria and identifies circumstances in which real wage rises will increase unemployment, which he labelled classical unemployment, and circumstances in which real wage rises will reduce unemployment, labelled Keynesian unemployment.

fixed proportions in production. This refers to production processes in which the CAPITAL/LABOUR RATIO is fixed - i.e. they can only be used in fixed proportions. The resulting ISO-PRODUCT CURVE is 'L' shaped. Since fixed proportions characterize INPUT-OUTPUT analysis this type of iso-product curve is sometimes called an input-output isoquant, or LEONTIEF isoquant.

fixprice and flexprice. A distinction first introduced by J.R. Hicks between prices which do not respond to underlying changes in SUPPLY and DEMAND, fixprices, and prices which respond immediately to excess supplies or demands, flexprices (see FIXED-PRICE MODELS). Hicks explored the implications for the MULTIPLIER process of these two types of prices in *The Crisis in Keynesian Economics*, Basil Blackwell, 1974.

flat yield. The annual amount paid in interest on a security expressed as a percentage of the purchasing price.

flexible exchange rate. *See* EXCHANGE RATE.

flexitme. The name given to flexible working hours. Economic theory indicates that there are gains to be made by following flexitime because of the divergent tastes and preferences of different workers. The benefits obtain from reduced absenteeism and turnover, and perhaps from increased morale and productivity. The basic argument is that flexible working hours enable individuals to make optimal supply choices whereas rigid working hours lead to instances of suboptimization because of the different tastes and preferences of workers. Flexitime has its attendant costs in the form of monitoring, supervision, communication and co-ordination expenses. Recent increases in the use of flexitime would indicate that the benefits are outweighing the costs in many employment situations.

flight from cash. This refers to moving WEALTH from cash into interest-bearing ASSETS; either because of EXPECTATIONS of price increases or a fall in the INTEREST RATE.

float. The difference between uncollected cash items or cash items in the process of collection and deferred availability cash items. Float occurs because the records of the money balances of the parties involved in a transaction are not adjusted simultaneously. There are delays (internal and external) between the time one party's account is credited with a payment and the time another party's account is debited by a payment. For example, if a cheque was written on a New York bank and presented for payment in California, the New York bank would have the money still on deposit while the cheque is clearing through the Federal Reserve System. Thus, the New York bank would have more reserves than it should have for a few days.

floating capital. A term with the same meaning as working capital; it refers to money invested in work in progress, wages paid or any other type of investment which is not a fixed ASSET. It is still considered an investment as it is part of productive capacity being utilized.

floating charge. A form of security given by a borrower for loans, or other debt, e.g. DEBENTURES. The security is not attached to
specific items of the borrower's assets but constitutes a floating charge on stocks or other assets which individually are turning over in the course of trading.

**floating debt.** That part of the NATIONAL DEBT borrowed on very short-term SECURITIES, and frequently denoting the part represented by TREASURY BILLS. It is 'floating' in that it is continuously falling due for repayment. Unless met from a fiscal surplus or the proceeds of selling longer-term debt, such repayment requires the issue of new short-term debt or the creation of money.

**floating exchange rate.**  
See EXCHANGE RATE.

**floating pound.**  
See EXCHANGE RATE.

**floor.** The limit to downward movements in output in TRADE CYCLE theory. The fundamental element in the lower limit to movements in output (or incomes) is AUTONOMOUS INVESTMENT but in certain theories (i.e. that of J.R. HICKS) the interaction of the MULTIPLIER and ACCELERATOR will ensure that the floor is never actually reached, in contrast to the CEILING along which income 'crawls' in the same theory.

**flotation.** The practice of issuing shares to the public in order to raise new CAPITAL. (See SHARES.)

**flow.** The quantity of an economic variable measured over a period of time. Thus, the flow of INVESTMENT may be measured as the amount of investment expenditure per year. The term is used to distinguish such measurements from STOCKS, which measure the physical quantity as an economic variable existing at any moment in time (e.g. MONEY STOCK.)

**flow of funds analysis.** An analysis, at various levels of aggregation, of the flow of funds from sectors in financial surplus to those in deficit. At the most aggregate level in the UK (which considers the personal sector, the public sector, the corporate sector and the overseas sector) the personal sector usually has a surplus and the public sector a deficit, while the position varies from time to time in the other two sectors.

**FOB.** Free On Board. A term which describes a price for or valuation of a good which is calculated on the basis of the process of manufacture, and does not include the cost of transporting the good to the consumer. This may be contrasted with CIF (cost, insurance, freight or charged in full pricing or valuation which includes all of the costs of delivering the good to the point of consumption. Where a firm prices its good FOB we can be sure that the consumer pays the transport costs. This eliminates the possibility of SPATIAL PRICE DISCRIMINATION. Note that in the UK overseas trade account imports are valued CIF while exports are valued FOB. However, in calculation of the BALANCE OF PAYMENTS both exports and imports are measured FOB, the various TRANSFER COSTS being entered in the INVISIBLES.

**Food and Agricultural Organization (FAO)** Established in 1945 the FAO has its headquarters in Rome. With a view to improving the production and distribution of agricultural commodities and food, the Organization is entrusted with the task of collecting and studying relevant data and of promoting international commodity agreements and technical assistance. As a specialized agency of the UN, the FAO has concentrated its activity upon technical assistance towards less developed countries.

**footloose industries.** Industries which are not bound to particular locations by specific locational requirements and thus can effectively locate anywhere.

'footsie'. The popular name for the FT-SE 100 SHARE INDEX.

**forced riders.** The mirror image of the FREE RIDER. Forced riders are those who value the pecuniary and non-pecuniary benefits of belonging to an organization which enforces membership at less than the pecuniary and non-pecuniary costs. Where coercion is used to eliminate the free rider problem, the forced rider emerges. The issue of forced-rider has traditionally taken second place to free-rider problems assoc
ated with the characteristics of PUBLIC GOODS. Yet the presence of public goods may be a necessary but not sufficient condition for free riders. Moreover, it has been argued that the 'public goods' dimension of certain services, and in particular those provided by trade unions, has been overstated in the public choice literature.

**forced saving.** A form of saving which occurs because consumers are unable to spend their money on desired consumption goods simply because those goods are unavailable. In FREE MARKETS such a situation is likely to be temporary - suppliers of goods will observe the unmet demand through such 'signals' as decreases in INVENTORIES and will react by increasing supply. In PLANNED ECONOMIES such a response may not occur if increases in the supply of such goods are deemed inconsistent with the overall planning of the economy. Forced saving may therefore be persistent in such circumstances.

**forecast error.** The difference between the predicted value of a variable obtained by forecasting methods and the actual outcome. Tests of the acceptability of an ECONOMETRIC MODEL may be based on forecast errors.

**forecasting.** A systematic method of obtaining an estimate of the future value of a variable, usually based on an analysis of observations on its past behaviour. Forecasting is normally based on one of two techniques involving TIME SERIES data. The first is the BOX-JENKINS methods, which are particularly suitable for short-term forecasting but less valuable for long-term forecasts. The second approach is to use an ECONOMETRIC MODEL, which specifies the variable of interest as an ENDGENOUS variable, which is part of a system. Forecasts can then be made which take account of the interactions amongst many variables, provided appropriate values of the exogenous variables are available.

Often forecasts are based on a combination of both methods, with the forecasts of the endogenous variables generated from the REDUCED FORM of the econometric model and the exogenous variables from Box-Jenkins methods. A comparison of the forecast values of a variable against the actual outcome is the normal test of the acceptability of an econometric model. (See FORECAST ERROR, VECTOR AUTOREGRESSION.)

**foreign aid.** Any capital inflow or other assistance given to a country which would not generally have been provided by natural market forces. There are four main types of aid. First, long-term loans which have to be repaid in foreign currency but are usually repayable over ten or twenty years. The advantage to the recipient is that the annual repayments are far less burdensome than those of short and medium-term loans. Secondly, there are 'soft loans' which can be repaid in local currency. Some are paid in foreign currency but over long periods such as 99 years with very low interest rates while some which are repaid in local currency will then be lent back to the recipient for further development work. Sometimes straight grants are given. The third type of aid is the sale of surplus products to a country in return for payment in that country's local currency, as with the PL480 programme of the USA. This can be very valuable to an underdeveloped nation with very little FOREIGN EXCHANGE as it will enable them to buy from abroad. They often need to import foodstuffs and other consumption goods as their own agricultural sectors cannot produce enough to maintain the urban workers involved in construction or other investment-oriented work. The fourth type of aid, although not strictly a capital inflow, is technical assistance given to underdeveloped countries.

**foreign balance.** See BALANCE OF PAYMENTS.

**foreign exchange.** CURRENCY or interest-bearing BONDS of another country, for example holdings by UK nationals of US dollars, EURO-DOLLARS, Deutsche marks, Swiss francs, or US government bonds. (See FOREIGN EXCHANGE MARKET, EXCHANGE CONTROLS, BALANCE OF PAYMENTS, EXTERNAL RESERVES.)

**foreign exchange market.** The international market in which currencies are transferred between countries. The transactions, mainly carried out by telephone or cable are between financial institutions
buying and selling foreign currencies thus making profits when the exchange rates and interest rates differ between financial centres. The 'market' operates 24 hours a day as each centre throughout the world begins trading during 'office hours' or when their respective STOCK MARKETS and BANKS are open. (See EXCHANGE RATES, STOCK-MARKET BANKS, INTEREST RATES.)

foreign exchange reserve. See EXTERNAL RESERVE.

foreign investment. This usually refers to any investment in another country which is carried out by private companies or individuals as opposed to government aid. There are arguments for and against foreign investment in underdeveloped countries: those against say that it constitutes economic colonialism and is an attempt to retain control of ex-colonies. In addition, the country becomes reliant on the foreign firms which may delay the setting up of domestic industry or the training of experts while there are expatriates paid from abroad who will do the job. In addition, foreign investment often involves the importation of totally inappropriate technology, in order that the foreign company can benefit from cheap labour or a cheap power source. The arguments supporting foreign investment are that this type of investment achieved beneficial results in the Western world and therefore will succeed elsewhere; that there will be spread effects and that local people can be trained in the foreign firms. There can be no general solution to this debate since each individual case has to be judged on its own merits. (See APPROPRIATE TECHNOLOGY, FOREIGN AID.)

foreign payments. Any payment that has to be made to a foreign country whether in return for goods and services or as repayment of debt: these usually have to be made in HARD CURRENCY. (See FOREIGN AID.)

foreign trade multiplier. The ratio which a change in income bears to the change in exports responsible for this change in income. If, for example, a country experiences a rise in exports to the value of $100 million, its national income will rise by a multiple of this, until the induced leakages (or withdrawals) in the economy, i.e., savings, imports and taxes, sum to $100 million. Of this part will be taxation, part will be spent on imports which will be saved and only that used on home-produced goods will generate further income.

The foreign trade multiplier is simply the conventional MULTIPLIER but viewing $c$ as the multiplicand so that its formula is

$$k = \frac{1}{1 - MFC}$$

where $k$ is the multiplier and $MPC$ the MARGINAL PROPENSITY TO CONSUME domestically produced goods. Alternatively it can be viewed as the reciprocal of all the mpropensities to withdraw, i.e.

$$k = \frac{1}{MPS - MPPT + MPM}$$

where $MPS$ is the MARGINAL PROPENSITY TO SAVE, $MPPT$ is the MARGINAL PROPENSITY TO PAY TAXES, i.e. the part of an increase in income which goes on taxes and $MPM$ is the MARGINAL PROPENSITY TO IMPORT.

The foreign trade multiplier has a significant impact on the BALANCE OF PAYMENTS equilibrium mechanism. A rise in exports, which improves the balance of payments, sets into motion forces which will tend to reverse the improvement, for out of the higher incomes brought about by the multiplier, most of the increase in imports will be induced, while the other side of the coin is that countries which have the extra imports will experience a reduction in income, which will cause an eventual reduction in imports, thus tending to restore balance by action on two sides.

The foreign trade multiplier also serves as an explanation of the international transmission of BOOMS and DEPRESSIONS. A decline in income in a major importing country will lead to a decline in its IMPORTS, which will affect some other country’s EXPORTS. That country will suffer a reduction in income and imports, which may affect the country or some third country.
forward contract. (also known as a future.) See FORWARD MARKET.

forward exchange market. A market in which currencies are bought and sold at rates of exchange fixed now, for delivery at specified dates in the future. A transactor expecting to acquire a currency, or to have to make a payment in it, at a future time, may sell or buy the currency forward, thus covering himself against any changes in its exchange value in the intervening period. Others may operate in the market as pure speculators; this is facilitated by the fact that no payment is due on a forward contract until it matures.

forward integration. See VERTICAL INTEGRATION.

forward linkage. The relationship between an industry or firm and other industries or firms which use its OUTPUT as an INPUT. A change in output or price will be transmitted forwards to users of its product.

forward market. Any transaction which involves a contract to buy or sell COMMODITIES, or SECURITIES at a fixed date at a price agreed in the contract, is part of a forward market. (See FORWARD EXCHANGE MARKET, OPTIONS.)

forward rate. The rate of exchange at which a currency may be bought or sold for future delivery, on the FORWARD MARKET. Different rates apply to different forward dates; and depending on expectations the forward rate of a currency may be at a discount or a premium on the SPOT RATE. With completely neutral expectations the forward rate between two currencies will theoretically reflect the difference between short-term interest rates in the respective countries, the currency of the country with the higher interest rate being traded at a forward discount on the spot rate. The cause of this is 'covered interest arbitrage'. Holders of internationally mobile short-term funds will move them to the centre where interest rates are higher, buy the currency of that centre on the spot market and invest in, say, three-month bills. At the same time, to cover the risk of an adverse exchange rate movement they will sell the centre's currency forward. The effect of these actions is to raise the spot rate and depress the forward rate. When the discount on the forward rate reaches a certain level it will cease to be profitable to move funds to the centre.

foundation grant. A form of INTERGOVERNMENTAL GRANT widely used in the USA which aims to equalize the cost to each local community (in terms of the tax rate which it must set) of providing a given minimum level of a public service. The required grant is calculated by taking the amount of money required to provide the service and subtracting from it the amount of revenue which the local government would obtain by levying the tax under consideration at the specified rate. If the revenue is less than the cost of the service the local government receives funds from a higher level government to fill the gap. (See EQUALIZATION GRANTS.)

Fourier analysis. A method by which TIME SERIES data can be transformed to the frequency domain. Suppose there are N points \( x_1, \ldots, x_N \) and it is possible to derive a function \( x(t) \) which passes through each of the N points. This can be done by making \( x(t) \) a linear function of N trigonometric terms. Fourier analysis is the method by which this can be done.

The Fourier version of the series \( x_t \) is given by

\[
X_r = \frac{V_2}{N} \sum_{\omega=1}^{N-1} a_i \cos \omega t + b_i \sin \omega t
\]

where \( N \) is even and \( a_0, a_i, \) and \( b_i \) are the Fourier coefficients. When time series are transformed in this way the effects of operations such as seasonal adjustment can more effectively be analysed. (See A.C. Harvey, Time Series Analysis, P.A. Allan, 1981.)

fractional reserve banking. The practice by which COMMERCIAL BANKS maintain a reserve of highly liquid assets equal to some
fraction, normally a small one, of their total asset portfolios. The purpose of the reserve is to meet unforeseen variations in the outflow of deposits by withdrawals or transfers (by CHEQUE) to other banks, and when calculated as a proportion of total deposits, as it usually is, the fraction is termed the 'reserve ratio'. The general level of the ratio may be determined by prudential considerations based on experience, and be subject to variations in the light of expectations and the attractiveness of other assets. But in most modern systems reserve ratios are subject to legal minima administered by the CENTRAL BANK in the interest of MONETARY and CREDIT POLICY. In the theory of bank CREDIT CREATION fractional reserve banking is a necessary condition of the creation of CREDIT and BANK DEPOSITS by the banking system, and the reserve ratio is one factor determining the size of the CREDIT and MONEY MULTIPLIERS. (See OPEN MARKET OPERATIONS.)

Franked investment income. This generally refers to income which has already borne CORPORATION TAX and is thus not subject to further corporation tax in the hands of a company which receives it. This normally arises with incoming dividends from other UK companies.

Free exchange rates. See EXCHANGE RATES.

Freedom of entry. The ability of a new firm to enter a market for a good or service. In the complete absence of BARRIERS TO ENTRY, entry is free.

Free good. A good, the supply of which is at least equal to the demand at zero price. Price in this context refers not simply to money price but rather to whatever has to be foregone in providing the good - OPPORTUNITY COST. A true 'free good' is one which is not scarce and should thus be distinguished from goods provided at zero price by governments (such as medical care in Britain) or available at zero price because of the absence of ownership or PROPERTY RIGHTS - such as clean air. In both of these cases, the good is available at zero cost to consumers but a real cost is involved in their consumption - medical care requires resources which could be used elsewhere and the 'use' of clean air by pollution imposes cost on society. Examples of free goods are rare and perhaps becoming rarer still - sunshine in the Sahara Desert provides an example.

Free market. A market in which there is a absence of intervention by government an where the forces of supply and demand are allowed to operate freely.

Free market economy. See MARKET ECONOMY.

Free on board. See FOB.

Free reserves. The total legal reserves held by a depository institution less the amount of required reserves and less the amount of reserves borrowed from the Federal Reserve. Free reserves are no longer a particularly important reserve measure. Excess reserves are now considered a much better indicator of potential availability of credit and monetary expansion. (See EXCESS RESERVES, REQUIRED RESERVES, and RESERVE RATIOS.)

Free rider. A phenomenon arising from the characteristics of PUBLIC GOOD. Basically, the fact that public goods are NON-RIVAL means that the provision of the good to one person entails its provision to another person. If potential consumers are therefore faced with the issue of financing the provision of the good, each one has an incentive not to state his true WILLINGNESS TO PAY since he can gamble on the good being provided by others who will express some willingness to pay. Where the good cannot be varied in size, the good may therefore be provided at less of the good to be provided than would otherwise be the case. Those understating their preferences may still gain however since they will receive the amount of the good in question and will still not pay for it. They are thus known as 'free riders'. If the free rider phenomenon is a strong or public goods will be systematically und<
provided and there is a *prima facie* case for the good to be provided through government action. Whether the degree of 'free rider' understatement is significant in practice or not is debated. Some experiments in seeking hypothetical expressions of willingness to pay suggest that true and 'revealed' preferences do not diverge significantly.

free trade. A policy of non-intervention by the state in trade between nations, where trade takes place according to the international DIVISION OF LABOUR and the theory of COMPARATIVE ADVANTAGE. Such a policy would lead to the most efficient allocation of resources on a world scale and to the maximization of world income. Despite its strong theoretical backing, free trade has rarely if ever been practiced by one country let alone by the community of all countries. Governments may intervene in international trade for non-economic reasons, e.g. for national defence or for social reasons such as the maintenance of a particular class like the peasantry, or for economic reasons. The latter include the protection of established industries under threat from IMPORTS, the protection of INFANT INDUSTRIES, the terms of trade (or optimum tariff) argument and the PAUPER LABOUR argument.

free trade area. A loose grouping of countries within which TARIFFS and other barriers to trade are removed, while each member country retains its own COMMERCIAL POLICY to countries outside the area.

frequency distribution. A summary, usually in the form of a table of numbers or a HISTOGRAM, of the number of times a RANDOM VARIABLE takes on certain values, or ranges of values in a sample of observations. If each of the frequencies is divided by the number of observations in the sample, the resulting figures constitute a relative frequency distribution, which approximates to the PROBABILITY DISTRIBUTION of the variable as the sample size becomes very large.

frictional unemployment. Traditionally thought of as SEARCH UNEMPLOYMENT that is the amount of unemployment that corresponds to job VACANCIES in the same LOCAL LABOUR MARKET and occupation. It takes time to match workers and jobs and as a result unemployment and unfilled vacancies can exist side by side. More recently, it has been suggested that SPECULATIVE and PRE-CAUTIONARY UNEMPLOYMENT should also be considered elements of frictional unemployment. (See also JOB SEARCH.)

Friedman, Milton (1912- ). Appointed Professor of Economics at the University of Chicago in 1948 and the leading member of the CHICAGO SCHOOL. He was awarded the Nobel Prize for Economics in 1976.

His major works in economics include *Taxing to Prevent Inflation* (1943); *Essays in Positive Economics* (1953); *A Theory of The Consumption Factor* (1957); *Price Theory* (1962); *A Monetary History of the United States 1867-1960* (1963); and *Inflation Causes and Consequences* (1963).

Friedman was a pioneer in developing the idea of HUMAN CAPITAL and his work on the CONSUMPTION FUNCTION led to the formulation of his PERMANENT INCOME HYPOTHESIS. His methodological stance of POSITIVE ECONOMICS, his libertarian ideology, and his formulation of the NATURAL RATE OF UNEMPLOYMENT have contributed to his stress on the limitations of Keynesian STABILIZATION policies.

With Anna Schwartz he wrote a monumental monetary history of US which provided much of the basis for his development of the QUANTITY THEORY OF MONEY and his revival of the pre-Keynesian faith in the automatic stability of the economic system. His expansion of the FISHER EQUATION to include such variables as WEALTH, rates of INTEREST and the expected rate of price INFLATION, has led to a growth in the MONE-TARIST literature on macroeconomics. (See PHILLIPS CURVE, DEMAND FOR MONEY, METHODOLOGY.)

fringe benefits. All those non-wage and salary elements in the total pecuniary rewards an employee receives from his employment. Example would be employers' pension contributions on behalf of the employee, the free use of a car, employers' payments of subscriptions to clubs and associations or discounts on purchases of certain goods and subsidized meals. (See also TOTAL LABOUR COSTS, NET ADVANTAGES, VARIABLE LABOUR COSTS and NON-WAGE LABOUR COSTS.)
Frisch, Ragnar (1895–1973). Norwegian economist and joint winner with Jan Tinbergen of the first Nobel Prize for Economics in 1969 for his achievements in rendering economic theory more mathematically stringent and giving it forms, which are capable of empirical quantification and statistical testing.

Frisch was responsible in the early 1930s for pioneering work involving the dynamic formulation of Trade Cycles, in which he showed how a dynamic system with certain mathematical properties produced a damped cyclical movement with wavelengths of 4 to 8 years. When the system was subjected to random shocks, the wave movements became both realistic and permanent. Another of Frisch’s achievements was to be a forerunner in devising methods for the statistical testing of hypothesis. In the field of economic policy Frisch devised a system of national accounting, which has been useful both for stabilization policy and longer term planning. More recently he has developed decision models for economic planning, introducing mathematical programming methods for use with modern computer techniques.

His major works are Statistical Confluence Analysis by Means of Complete Regression Systems (1943), Maxima and Minima (1966) and The Theory of Production (1965).

F-statistic. A statistic which follows the F-distribution. Often used to test the overall significance of a set of explanatory variables in regression analysis.

FT-SE 100. An index of the prices of the 100 most important shares quoted on the London Stock Exchange. It was introduced in 1984 with a base of 1000, because it was felt that the Financial Times Industrial Ordinary Index was too heavily biased towards manufacturing companies. The index, published in the Financial Times newspaper, is now the most commonly quoted index of share prices. (See Financial Times Actuaries Share Indices.)

full bodied money. See token money.

full cost. Is defined for any given level of output as the sum of average variable cost, average fixed cost and the net profit margin. It is a concept used with reference to firm pricing rules. (See also full cost pricing.)

full cost pricing. A pricing rule where firms add a net profit margin onto unit cost where the calculation for the latter includes all costs. (See average cost pricing.)

full-employment budget surplus. A measure of the thrust of fiscal policy which does not rely solely on the magnitude of the budget surplus. The budget surplus alone can be misleading as to the direction of fiscal policy for it can change passively as a result of autonomous changes in private expenditure. As the economy moves into recession tax revenues decline and expenditures may rise and therefore the budget moves into a deficit. Conversely an increase in economic activity will cause the budget to move into a surplus. The budget deficit alone therefore provides no guide as to whether fiscal policy is expansionary or contractionary. Frequently we wish to measure the way in which fiscal policy is being actively rather than passively used and by relating the surplus question to what it would be at the full employment national income we achieve just such a measure.

full-employment national income. (Also known as potential national income or national real output). A measure of the real value of the goods and services that can be produced when the country’s factors of production are fully employed; when the economy is at the natural rate of unemployment.

full-employment unemployment rate. See natural rate of unemployment.

full information maximum likelihood (FIML). A technique for estimating systems of simultaneous equations, which may be linear or non-linear. It is an estimator which takes account of the fact that errors may be correlated between equation (See maximum likelihood).

function. A mathematical formalization of the relationship whereby the values of a series of independent variables determine the value of the dependent variable.
functional costing

The usual notation is

\[ Y = f(X_1, \ldots, X_n) \]

where \( Y \) is the dependent variable, \( X_i \) is the \( i \)th independent variable, and \( f(\ldots) \) denotes the functional relationship.

In economics, to say that '\( Y \) is a function of \( X \)' normally implies that \( X \) in some sense 'causes' \( Y \) to take on certain values. (See also EXPLICIT FUNCTION, IMPLICIT FUNCTION.)

functional costing.
See OUTPUT BUDGETING.

function of a function rule.
See CHAIN RULE.

funded debt. Traditionally, that part of government debt which has no contracted redemption date. But the term is now applied more widely to debt in the form of medium or long-term securities, i.e., debt other than FLOATING DEBT. (See FUNDING.)

funding. Originally, the operation of substituting FUNDED DEBT for debt with a redemption date. The term is now used more widely for the substitution of longer for shorter-term debt. An example of funding is the net repayment of TREASURY BILLS (forming part of the FLOATING DEBT) from the proceeds of an issue of medium or long-term securities. Similarly, a private sector enterprise may fund borrowings by re-paying short term bank loans with the proceeds of an issue of EQUITIES or DEBENTURES. (See DEBT MANAGEMENT, OPEN MARKET OPERATIONS.)

future. (also known as a forward contract.) See FORWARD MARKET.

futures market.
See FORWARD MARKET.
GAB. General Arrangements to Borrow. (See INTERNATIONAL MONETARY FUND.)

Gains from trade. The increase in welfare to the world economy as a whole or to an individual country, depending on the viewpoint, as a result of engaging in international trade. The gains can take the form of a greater real income for the world or country for the same input of factors or the same real income for a lesser input of factors or some combination of the two. The gains originate in two sources, which are the possibility of EXCHANGE and the possibility of increased SPECIALIZATION. (See also COMPARATIVE ADVANTAGE.)


The major theme of his books has been that industrial societies, and in particular American industrial society, no longer resembles the descriptive model of conventional economic theory, namely the COMPETITIVE MARKET model of profit maximizing firms and utility maximizing sovereign consumers. As a consequence of this development, the capitalist economic system now produces an excess of waste and a multitude of undesirable products.

In American Capitalism Galbraith introduces the concept of 'countervailing power' and substitutes the Smithian idea of competition in the market between sellers for the idea of competition between buyers and sellers of commodities including labour. The growth of large scale companies and unions for example has meant that WAGES are no longer determined by competition for labour but by the relative power of buyers and sellers of labour. Such power varies with the level of activity in the economy.

In The Affluent Society Galbraith criticizes the emphasis which capitalist society places on the production of private goods to meet wants contrived by large scale business. Such an emphasis, he argues, leads to instability, INFLATION and unbalanced production which ignores social needs such as PUBLIC GOODS and SERVICES.

The New Industrial State summarizes much of Galbraith's thought on the giant firms. Such a predominance of large scale enterprise is the result of the complicated nature of modern technology. The SEPARATION OF OWNERSHIP FROM CONTROL has meant that decision making is undertaken by an overlapping bureaucracy of experts or what is called the 'technostructure'. Such a structure no longer finds profit maximizing its aim but rather survival, security and the elimination of risk. Such goals involve the use of internal financing, maximizing growth by means of advertising and enlisting support from the workforce, government and the population at large. In this way the aims of the technostructure become the ethic of society or what may be called the 'cult of gross national product'.

Galbraith discusses the other 'half of the economy - the market system - in Economics and the Public Purpose and advocates the strengthening of this sector, government control, the emancipation of women from their role of 'cryptoservant' in the economy and the emancipation of the state from its symbiotic relationship with the technostructure.

Whilst Galbraith's broad view of industrial society by no means commands wide acceptance amongst academic economists many of his observations on the theory of
firm, the role of ADVERTISING and CONSUMER SOVEREIGNTY are broadly accepted within the profession and his work, which has been extensively read by non-economists, has had considerable influence.

galloping inflation. 
See HYPERINFLATION.

game theory. A theory of individual rational decisions taken under conditions of less than full information concerning the outcomes of those decisions. Modern game theory begins with The Theory of Games and Economic Behaviour (1944) by Von Neumann and Morgenstern. The theory examines the interaction of individual decisions given certain assumptions concerning decisions made under RISK (see VON NEUMANN-MORGENSTERN EXPECTED UTILITY HYPOTHESIS), the general environment, and the co-operative or non-co-operative behaviour of other individuals. Whereas conventional microeconomic theory provides us with a theory of decisions under conditions of certainty it is by no means obvious what decisions a rational individual should make under conditions of uncertainty and interaction. Games are often described as 'zero sum' where one person's gain is another's loss, 'non-zero sum' where all players may gain from an individual decision, 'co-operative' where collusion is possible, and 'non-co-operative' where antipathy is the rule. The most famous example of a non-zero sum game is the PRISONER'S DILEMMA. This is an important example of game theory because it shows that contrary to the spirit of LIBERALISM individual pursuit of self interest in this case leads to a solution which is less satisfactory than a possible alternative. Game theory has also proved useful in analysing aspects of economic behaviour such as oligopoly, natural resource depletion and PUBLIC GOODS. The theory of co-operative games which allows collaboration between individuals has been used to analyse CARTEL formation and industrial and labour market collusion.

The limit theorem of F.Y. EDGEWORTH is an early example of an \( n \)-person co-operative game. This says that as the number of participants in a pure exchange economy grows large collusive behaviour becomes less useful and the set of possible equilibrium relative prices (the core) becomes smaller. As the number of traders tends to infinity only one set of relative prices is left. This corresponds to those prices ruling in GENERAL EQUILIBRIUM. See Bacharach, M., Economics and the Theory of Games, Macmillan, London (1976).

GATT. 
See GENERAL AGREEMENT ON TARIFFS AND TRADE.

Gauss-Markov Theorem. This states that under certain conditions (including HOMO-SCEDASTICITY, no SERIAL CORRELATION, etc.) that the ORDINARY LEAST SQUARES estimator is the BEST LINEAR UNBIASED ESTIMATOR. The latter is a desirable property of econometric estimators.

GDP. See GROSS DOMESTIC PRODUCT.

gearing. The indicator of the relative proportion of debt capital and equity capital. The higher the proportion of debt the more highly geared is the company. The degree of gearing affects the overall COST OF CAPITAL. The concept is difficult to measure in practice. The most elementary measure is nominal value of fixed-interest capital/nominal value of equity capital. This ignores the value of reserves which should be added to the denominator. Nominal values may not reflect current values and so a better measure is market value of fixed interest stock/market value of ordinary shares. Preference shares have been included in the denominator but it can be argued that if they are non-redeemable they are a permanent part of the investment in the firm and should therefore not be included in the denominator. The ratio has limitations as it ignores some types of interest bearing finance such as bank loans and mortgages. (See CAPITAL STRUCTURE.)

gearing ratio. The ratio of debt finance to the sum of debt and ordinary share capital finance. (See GEARING.)

General Agreement on Tariffs and Trade (GATT). An agreement signed at the Geneva Conference in 1947 which entered into effect on 1 January 1948. It is a
A multilateral trade agreement which both sets rules of conduct for international trade relations and provides a forum for multilateral negotiations regarding the solution of trade problems and the gradual elimination of tariffs and other barriers to trade. The agreement is based largely upon principles of non-discrimination and reciprocity so as to liberalize world trade. With the exception of customs unions and free trade areas, all contracting parties are generally bound by the agreement's most favoured nation clause. Protection is to be given to domestic industries only through customs tariffs, thereby prohibiting import quotas and other restrictive trade practices. The agreement also provides for the binding of the tariff levels negotiated among member countries and establishes a framework for the settlement of grievances put forward by members who argue that their rights, under the terms of the agreement, have been violated or compromised by other members' trade practices. Seven major trade negotiations, conducted under the auspices of GATT, have resulted in significant reductions in the average level of world industrial tariffs. The Kennedy Round, or sixth round of negotiations held at Geneva between 1964 and 1967, marked the first time in which tariff reductions were negotiated on whole groups of goods, as opposed to the traditional tariff negotiations which had proceeded on an item-by-item basis. Unlike previous rounds the Tokyo Round held between 1973 and 1979, addressed the problem of both tariff and non-tariff barriers to trade. The Uruguay Round of negotiations was the eighth and was scheduled to run from 1986 to the end of 1990. These were concerned with both old issues such as the unfinished business of previous GATT rounds and with grievances accumulated over the years, because of lack of political will on the part of member countries, and with new issues such as trade in services, the protection of intellectual property rights, e.g. copyrights, and trade related investment measures. The major difficulties arose over agricultural support and protection, with the negotiations failing to reach a conclusion by the end of 1990, because the European Community (EC) was not prepared to reduce agricultural support sufficiently to satisfy other countries, especially the USA. The talks were resumed in February 1991 with the hope that they might be concluded by the end of 1991 with any agreement coming into effect in early 1993. GATT has also directed special attention towards the trade problems of developing countries. In 1964 it established an International Trade Centre (jointly operated with UNCTAD since 1968) which provides information on export markets and assistance regarding the formulation and administration of export promotion programmes to developing countries. In addition, the General Agreement was amended in 1965 to include a section on Trade and Development which enables developing countries to trade with developed countries on a non-reciprocal basis and permits a system of generalized trade preferences by developed for developing countries, thereby waiving the most favoured nation clause. Since the conclusion of the Kennedy Round, GATT has also devoted attention to the problems of non-tariff barriers to trade and the effects on international trade of regional economic institutions like the European Community and the European Free Trade Association. See Corbet, H., 'Agricultural Issue at the Heart of the Uruguay Round', National Westminster Bank Quarterly Review (August 1991), pp. 2-19.

General Agreements to Borrow.

See International Monetary Fund.

General Classification of Economic Activities in the European Communities. An industrial classification of economic activities within the European Communities which is an alternative to the International Standard Industrial Classification. The classification replaces and consolidates previous partial classifications such as Nice.

general equilibrium. A situation where all markets in an economy are simultaneously in equilibrium, i.e. where prices and quantities do not change.

Economists have traditionally adopted two approaches in analysing economic systems. The simpler approach, associated with the name of A. Marshall, has been that of partial equilibrium, where only a part of the system is examined, e.g. the market for oranges, on the assumption of unchanged conditions in the rest of the economy.
The second and more difficult approach, both in conception and in its use of mathematical tools, is general equilibrium analysis, which looks at an economic system as a whole and observes the simultaneous determination of all prices and quantities of all goods and services in the economic system. WALRAS is credited with being the founder of this approach. Economists have paid particular attention to three questions, which arise in the context of general equilibrium systems usually on the assumption of perfect competition. These are: (1) does a general equilibrium system have a solution, in the sense that the values for the variables are consistent with each other? (2) is the solution unique, in that there is just one value for each variable consistent with the overall solution? and (3) is the system stable, so that it will return to the equilibrium values after some disturbance? Theoretical work has enabled definitive statements to be made on these questions. See Mukherji, A., *Walrasian and Non-Walrasian Equilibria*, Oxford University Press (1990).

**general grant.**
*See* GRANT.

**generalized least squares** (GLS). (also known as Aitken Estimator.) A member of the LEAST SQUARES family of ESTIMATORS applicable to cases where the VARIANCE-COVARIANCE MATRIX of the DISTURBANCE TERM of the REGRESSION equation does not consist of zeros in the off-diagonal positions, and/or does not have identical diagonal elements (representing the problems of AUTOCORRELATION and HETEROSCEDASTICITY respectively). Under these circumstances, ORDINARY LEAST SQUARES is not the BEST LINEAR UNBIASED ESTIMATOR, while GLS is. The estimator can take various specific forms. (*See* WEIGHTED LEAST SQUARES, COCHRANE-ORCUTT, PRAIS-WINSTEN.)

**general linear model** (GLM). The most commonly used functional form in econometric analysis, which specifies the DEPENDENT VARIABLE as a LINEAR FUNCTION of a Set of INDEPENDENT VARIABLES.

**generalized system of preferences** (GSP). Under the GSP, proposed at the first UNITED NATIONS CONFERENCE ON TRADE AND DEVELOP-MENT in 1964 and formally accepted at the second in 1968, the industrialized countries agreed to charge no duty on imports from developing countries, while maintaining them on imports from other industrialized countries, thereby conferring a margin of preference on developing countries. While it was hoped that the GSP would be a common scheme, eleven schemes have emerged as 'donor' countries have excluded different goods from the scheme. In the case of the USA it has been estimated that in 1978 the effect of the exclusions has been to limit preference to just 8 per cent of dutiable imports from all developing countries and 17 per cent from the beneficiaries alone.

**general price level.** The prices of all the goods in an economy. Changes in the general price level are best measured by the gross domestic product deflator, since this covers both CONSUMPTION and INVESTMENT goods, whereas the RETAIL PRICE INDEX measures changes only in the price of consumption goods.

**General Theory of Employment, Interest and Money.**
*See* KEYNES.

**general training.** Training which develops skills of equal value to the firm providing the training and to other firms. The MARGINAL PHYSICAL PRODUCT of the trainee increases by the same amount in the firm providing the training as in other firms. This training, therefore, provides skills which are transferable. For this reason the employee will tend to bear all of the costs of training. He does this by receiving a wage in his apprenticeship that is equal to his net marginal product (i.e. his contribution to value-added less the direct costs of training) which is below the wage an untrained individual could earn as an unskilled worker in the LABOUR MARKET on the workers investment in HUMAN CAPITAL. The return accrues in the form of a higher post-training wage, again equal to his now enhanced marginal product, that exceeds the unskilled wage. The worker, therefore, pays all the costs and obtains all the benefits. There is no appreciable wedge between wage and marginal product during the entire process. (*See* SPECIFIC TRAINING).
general unions. Trade unions which organize workers in a range of industries across a range of different skills. Unions do not confine themselves to organizing a particular industry or group of skills. (See CRAFT UNIONS, INDUSTRIAL UNIONS.)

Geneva Conference.
See GENERAL AGREEMENT ON TARIFFS AND TRADE.

Geneva Round. The popular name for both the first (1947) and fourth (1955-6) rounds of trade negotiations under the GENERAL AGREEMENT ON TARIFFS AND TRADE.

genegetic frontier. A term used in the theory of economic development to describe an area in which with the existing population, level of technical ability and tastes and preferences, there will be increasing returns to labour and capital. This constitutes a step forward from an economic frontier where a change in population, technical knowledge or preferences would be necessary for increasing returns. The word frontier is being used in the context of a barrier to development which has to be crossed. The geographic frontier is crossed when production reaches levels of maximum efficiency for the techniques in use.

gemetric lag. (also known as exponentially declining lag.) DISTRIBUTED LAG formulation in which the weights on successive values of the lagged variable decrease according to some multiplicative scheme. An example is

\[ Y_t = \lambda X_t + \lambda^2 X_{t-1} + \lambda^3 X_{t-2} + \ldots \]

with \( 0 < \lambda < 1 \). This type of formulation is usually estimated after a KOYCK TRANSFORMATION in econometric work.

gemetric progression. A series of numbers, or algebraic terms, in which each element bears some multiplicative relationship to its predecessor and successor. For instance, the series

\[ 1, a, a^2, a^3, a^4, \ldots \]

is a geometric progression, since each term is equal to its predecessor multiplied by \( a \). The Keynesian MULTIPLIER can be thought of as the sum of a geometric progression. (See ARITHMETIC PROGRESSION.)

Gibrat's law of proportionate growth. Due to R. Gibrat (Les inégalités économiques, Paris, 1931) this is a formulation describing how a process of random growth can produce a LOG NORMAL DISTRIBUTION of firm sizes. Specifically, the law assumes that the number of firms is fixed, the distribution of growth rates confronting each firm is identical, and is therefore independent of both firms' absolute size and past growth history. Thus whether the firm is large, medium or small it has the same average proportionate growth rate, and the dispersion around this common average will also be invariant across all firms. Such a law of growth can be shown to produce a lognormal size distribution of firms whose relative dispersion increases over time. The significance of such a distribution is that it conforms with that most typically found in real world industries, that is, positively skewed with a few large firms and many small firms. Thus some economists argue that the PARAMETERS of the lognormal distribution can be used as index of market CONCENTRATION.

giffen good. A good whose demand tends to fall as its price falls, thus apparently contradicting the law of DEMAND. So named after Sir Robert Giffen (1837-1910) who observed the poor buying more bread as the price rose. This situation occurs when the absolute size of the INCOME EFFECT (with respect to price) is greater than the negative size of the SUBSTITUTION EFFECT. The INCOME ELASTICITY OF DEMAND for an inferior good is negative. (See PRICE CONSUMPTION CURVE.)

gifts tax. See CAPITAL TRANSFER TAX.

gilt-edged securities. All government debt, other than TREASURY BILLS, in the form of marketable stocks (i.e. saleable on the stock exchange). Some gilt-edged stocks carry no final redemption date, and are described as 'undated'; but the majority, and all those issued in recent decades, are 'dated' - have a specified date by which they will be repaid. The term to maturity of newly issued stocks may vary from the very short - 2 or 3 years - to the very long - over 20 years. With
the exception of the recently introduced Treasury Variable Rate Stock, a short term security carrying an interest rate that varies with an average of recent Treasury bill rates, gilt-edged stocks are issued at fixed rates of interest on their nominal value (the 'coupon'); and these rates vary with the term of the stock and the level of market rates at the date of issue.

Issues of gilt-edged stock are offered for sale on specific dates, but stock unsold on that day (which may be much or little) is taken up by the BANK OF ENGLAND and other public agencies and subsequently sold through the 'tap', i.e. by the government broker operating in the market at prices determined by current conditions and policy considerations. (See DEBT MANAGEMENT.)

Gini Coefficient. A measure of the inequality of (usually) income DISTRIBUTION. It can be calculated as

$$G = 1 + \frac{1}{n} \sum_{i=1}^{n} \frac{y_i}{\bar{y}} [y_1 + 2y_2 + 3y_3 + \ldots + ny_n]$$

where $y_1, \ldots, y_n$ represent individual incomes in decreasing order of size, $\bar{y}$ is the mean income, and $n$ is the number of individuals.

A summary statistic of inequality derived from the LORENZ CURVE, it gives the area between the observed Lorenz Curve and the line of absolute equality as a proportion of the total area under the line of absolute equality. Clearly, the Gini Coefficient has a maximum value of unity (absolute inequality) and a minimum of zero (absolute equality). Note that the Gini Coefficient is only a measure of relative size. Also, one distribution might be more equal than another over one range, less equal over a succeeding range, and yet both might record the same coefficient.

giro system. A system of making payments by transfers of 'book' deposits, comparable with but structurally different from the traditional bank CHEQUE system. In a giro system the payer issues a direct instruction to the giro bank to transfer funds from his or her account to that of the payee (instead of delivering the instruction in the form of a cheque to the payee to be 'collected' by his bank). Giro originated on the Continent where it has a long history. The first British system, the National Girobank which operates postally and through Post Offices, was established in 1968 and offered an ordinary cheque service, as well as giro transfers. The National Girobank was sold to the Alliance and Leicester Building Society in 1990.

The lead set by the National Girobank was followed by the Bank Giro established jointly by the English and Scottish CLEARING BANKS as a system for handling giro type settlements through their combined organizations. (See CREDIT TRANSFER)

Glejser test. A test used to diagnose the problem of HETEROSCEDASTICITY in the RESIDUALS of a REGRESSION equation. It involves the regression of the ABSOLUTE VALUE of the residuals on various functional forms of the EXPLANATORY VARIABLES in the regression, and testing for the STATISTICAL SIGNIFICANCE of the PARAMETERS in this regression. (See GOLDFELD-QUANDT.)

GNP. See GROSS NATIONAL PRODUCT.

gold-bricking. The restriction of output by workers under INCENTIVE PAYMENTS SYSTEM so as to avoid the introduction of higher effort standards per unit of payment.

gold certificate. A debt instrument or note issued by the US Treasury indicating the Treasury's desire to monetize a given quantity of gold. At present, one troy ounce of gold can be monetized if the Treasury deposits $42.22 in gold certificates with the Federal Reserve. The Treasury is then free to draw on the $42.22 in its account at the Federal Reserve in order to make payments. Until the 1930s, all US currency was freely convertible into gold. From 1933 to 1971, the US was on a fractional reserve gold standard, meaning that $1 of gold certificates could support more than $1 of paper currency in circulation. Since 15 August 1971, all connections between gold and the number of dollars in circulation have been cut.

'golden age' growth. In growth theory a situation of BALANCED GROWTH in which
the WARRANTED RATE OF GROWTH is equal to the NATURAL RATE OF GROWTH at full employ-
ment. The term was coined by Joan ROBIN-
son indicating in her opinion the low probability of such a state of affairs arising in a capitalist economy without intervention by government. (See KNIFE EDGE.)

golden rule. The optimal growth path which gives the maximum sustainable level of consumption per person in an economy. The term is due to E.S. Phelps in his ‘Fable for Growthmen’ (American Economic Review, 1961) where the economic problems of an imaginary Kingdom of Solovia were considered, parodying the name of R. SOLOW who was an original contributor to NEO-
CLASSICAL GROWTH THEORY.

golden rule of accumulation. That path of balanced growth where each generation saves for future generations that fraction of income which past generations saved for it. The BIOLOGICAL INTEREST RATE is an aspect of the same idea. Sometimes called the biological interest rate rule.

gold exchange standard. A variant form of the GOLD STANDARD under which a country pegged the value of its currency to the value of the currency of a centre country, e.g. sterling, which was itself on gold. The pegging was effected by the monetary authorities holding all or part of the country's external reserves in reserve currency assets, and by exchanging the domestic currency for the reserve currency at determined and stable rates. The term itself and the wide use of the system originated in the 1920s when it was strongly advocated as a means of preserving the gold standard in the face of a feared shortage of metallic gold. Its antecedents, however, lay in the practice of colonial territories in pegging their currencies, formally or informally, to those of the metropolitan states. The international monetary regime in force between 1958 and 1970 is frequently described as a 'gold exchange standard' system, because of the wide use of the dollar, itself pegged to gold, as a VEHICLE CURRENCY and reserve currency, but it lacked some major features of the earlier gold exchange standard, e.g. unfe
terred convertibility of the reserve currency and general freedom of transactions in all other currencies.

gold export point. See GOLD POINTS.

Goldfeld-Quandt. The name of a test used to diagnose the problem of HETEROSCEDASTICITY in the RESIDUALS of a REGRESSION equation. It involves ordering the residuals according to increasing size of the variable with which it is suspected that the heteroscedasticity is associated, and calculating separate sums of squares for the top and bottom thirds (omitting the central third) of the observations. An F-STATISTIC can then be calculated to test for the level of significance of the difference between the sums of squares. If significant, then the problem is likely to exist. (See also GLEISER TEST.)

gold import point. See GOLD POINTS.

gold market. The market in which metallic gold, coin or bullion, is traded. There are gold markets in all the main financial centres except New York, but freedom to trade in gold is not everywhere unrestricted. The London market is now completely free, though until the abolition of EXCHANGE CON-
TROLS in October 1979 trading was restricted to authorized dealers and non-residents of the UK.

gold points. Those exchange rate levels at which, when a currency is on a GOLD STAN-
DARD, it becomes profitable to buy gold from the CENTRAL BANK and export it (the 'golg export point') or import gold and sell it to central bank (the 'gold import point'). These points lie on either side of the central gold parity, the export point below, the impor point above, the range being determined by the difference between the central banks buying and selling prices for gold (a differ ence applied to cover minting and othe costs), and in the earlier phases of the gold standard, the costs of shipping gold to other centres.

gold standard. The system of monetar organization under which the value of a country's money is legally defined as a fixed quantity of gold, and domestic curren
Goodhart's Law

A law attributed to the economist of that name that whichever monetary aggregate is chosen as a target variable becomes distorted by the very act of targeting it. (See MEDIUM TERM FINANCIAL STRATEGY.)

goodness of fit. A general term describing the extent to which an econometrically estimated equation fits the data. There are various ways of summarizing this concept, including the COEFFICIENT OF DETERMINATION and ADJUSTED $R^2$.

goods. Tangible COMMODITIES which contribute positively to ECONOMIC WELFARE. To be distinguished from BADS.

goodwill. A term used in accounting for intangible assets usually measured by the difference between the price paid for a going concern and its BOOK VALUE. If a firm is sold with a 'good name' or large set of customers or clients likely to remain after the sale, these are part of the firm's goodwill. For a separate meaning see BRAND LOYALTY.

Gosplan. A Russian term for the former State Planning Commission in the USSR. It was responsible for working out production plans and passing them on to the relevant organizations for execution. Its functions have been taken over by the Ministry of Economics and Forecasting, which makes a greater use of market principles in regulating the economy. (See PLANNED ECONOMY.)

government deficit. See BUDGET DEFICIT.

government expenditure. For a detailed description see PUBLIC EXPENDITURE. These expenditures form an important part of AGGREGATE EXPENDITURE which, though considered EXOGENOUS in the simple INCOME EXPENDITURE MODEL play an important part in this Keynesian model in determining the EQUILIBRIUM LEVEL OF NATIONAL INCOME. In particular, the government's manipulation of their expenditures, an element of FISCAL POLICY, is considered to be one of the main methods of ensuring that national income is at the FULL EMPLOYMENT NATIONAL INCOME level.

Successor agency to FEDERAL NATIONAL MORTGAGE ASSOCIATION in 1968. The GNMA often guarantees a package of mortgages and acts as agent in purchase of the package by private investors. Also known as 'Ginnie Mae'.

government securities. A general term for marketable debt of the Central Government, from the shortest term, i.e. TREASURY BILLS, to very long term and undated debt. (See GILT-EDGED SECURITIES.)

gradualism. An approach to economic development policy which suggests that the development process is a slow, steady, gradually increasing phenomenon and that the necessary policy measures should also be of this nature. The opposite type of theory is that of the 'big push' which rests on the alternative idea that the development process is full of discontinuities and a 'big push' is needed to start the process which is characterized by a series of discontinuous 'jumps'.

graduate tax. A scheme for financing university education whereby the student is lent money in order to meet educational and/or living expenses while studying and repays a specified proportion of his future income.

grand factor price frontier. A concept used by P. SAMUELSON in his attempt to rehabilitate the use of aggregate capital in neoclassical economic models. He used the assumption (equivalent to MARX'S assumption of a 'uniform organic composition of capital') that the capital to output ratios and labour to output ratios for different production sectors were equal. This enabled the FACTOR PRICE FRONTIER for each technique of production to be drawn as a straight line, ensuring that such lines with different slopes would only intersect once. A large number of these lines produced an envelope made up of linear segments. (See diagram).

If the underlying factor price frontiers were not linear then the same underlying factor price frontier could form part of the grand factor price frontier for different ranges of wage and rate of profit combinations leading to the problem of RESWITCHING or DOUBLE-SWITCHING.

grandfather clause. An arrangement whereby existing members of an occupation are exempted from higher OCCUPATIONAL LICENSING standards imposed for that occupation. This arrangement yields a windfall gain to incumbents.

Granger causality. See CAUSALITY.

grant. Funds provided by some agency to individual to other agencies or individuals which do not form part of some EXCHANGE but represent a one-way TRANSFER PAYMENT. Grants may be paid by one level of government to another (INTER-GOVERNMENT GRANT), from government bodies to private groups or individuals or from private groups or individuals to other private groups or individuals. A grant may be a 'general grant' which is available for any type of expenditure or a 'selective grant' tied to specific uses. Grants may also be matching grants which are calculated as some proportion of the recipient's total expenditure or may be non-matching grants, which are not determined by the recipient's expenditures. (See FOUNDATION GRANT.)

grant-in-aid. See INTER-GOVERNMENTAL GRANTS.

gravity model. A commonly used approach to certain problems in REGIONAL ECONOMICS and transport studies which represents the amount of interaction between...
two places as being determined by the size or importance of the places and the distance between them. One such form of interaction would be population movement. Others would be car travel or air travel. A general form of the gravity model would be,

$$I_{ij} = \frac{A \cdot P \cdot \frac{1}{D_{ij}}}{x \cdot y \cdot z}$$

where $I_{ij}$ is the amount of interaction between places $i$ and $j$, $A$ is a constant, $P$ is some measure of significance such as population or income level, $D$ is the distance and $x$, $y$ and $z$ are parameters. Thus migration between $j$ and $i$ might be represented as a function of the population of each centre and the distance between them. Despite its common use, the approach has been criticized as lacking firm foundation in economic theory.

'Great Leap Forward'. The name given to the development policy launched in China at the end of 1957, which was intended to speed the development process by a 20 to 30 per cent industrial growth rate. The basis was a simultaneous development in all types of industry and agriculture, although the emphasis was on heavy industry where the scarce available capital was used and elsewhere there was large scale substitution of labour for capital, and highly LABOUR-INTENSIVE techniques were implemented in small industries and agriculture. The success of this venture has been very difficult to assess because of other events which were occurring simultaneously. People's communes had been established in 1958 and although they helped to get rural labour involved they removed much of the incentive to work by taking away private land owning and disrupting family life. Technical experts who were not given the respect due to them as party officials took control. Between 1959 and 1961, various natural disasters occurred and Soviet experts left in 1960. Many of these other occurrences, although not related to the implementation of labour-intensive techniques, blur an accurate assessment; and it is not possible to assume that the economic slump which followed was a result of the policy. However one clear lesson was learnt, in that extensive use of labour-intensive techniques requires trained experts to guide it and not party officials.

**green pound.** The exchange rate for the pound sterling used for converting agricultural prices agreed under the COMMON AGRICULTURAL POLICY in terms of the EUROPEAN CURRENCY UNIT into domestic UK prices.

For most of the time since the UK entered the EUROPEAN COMMUNITY the value of the green pound has exceeded the market rate owing to the depreciation of the pound. By converting the agreed food prices at this higher (green pound) rate, food prices in the UK have been lower than they would have been had the market rate been used. So likewise have been the incomes of UK farmers. Despite devaluations of the green pound from time to time it has usually remained above the market rate.

The divergence between the green rate and the market rate has made necessary the payment of monetary compensatory amounts. A French farmer, selling a unit of his product in the UK at the CAP price determined by the green rate, would find on converting his sterling receipts into francs at the market rate that the price was below the guaranteed price expressed in francs. To make good the difference a monetary compensatory amount is paid to him from EC funds.

From April 1987 a new 'green' ECU was defined and tied to the strongest currency within the EC. A corrective coefficient (the highest percentage revaluation under any currency realignment) was also introduced; this is applied to the central EUROPEAN MONETARY SYSTEM rate for a currency and used to adjust farm prices in each country, so as to leave the farm price level unchanged in the strongest currency country. Thus a revaluation of a currency would leave farm prices unchanged in the revaluing country while the prices in the other countries would adjust upwards. The greater stability in exchange rates in the late 1980s has reduced the need for monetary compensatory amounts, while green currencies themselves would become redundant in the event of European monetary union.

**green revolution.** A term applied to the major increase in agricultural productivity obtained in developing countries by the
introduction of high-yielding, disease-resistant seeds. It has applied to rice and wheat in particular. Adequate water supplies and the use of artificial fertilizers are necessary requirements for the success of this policy. In some developing countries double and even triple-cropping have become possible as a result of the new seeds. Yields have increased dramatically in some areas. There is currently less euphoria about the progress that may be attained through this means than there was a few years ago. Some now think that the greatly increased yields are a once-and-for-all phenomenon. There is evidence that the distribution of income within the agricultural sector is becoming more unequal as a result of the 'revolution'. The poorer farmers cannot afford to buy the seeds and other inputs necessary to take advantage of the technical possibilities.

Gresham's Law. A 'law' formulated by Sir Thomas Gresham (1519-79), an English businessman and public servant. Although usually expressed in the phrase 'bad money drives out good' and applied to episodes of currency debasement or depreciation, the 'law' actually embodies a more general principle. It predicts that where two monetary media circulate together, then if their intrinsic relative values as determined by market forces diverge from their legally determined values, the money of higher intrinsic value will be withdrawn from circulation and hoarded. Such a situation can arise without any currency debasement; for example, historically, where gold and silver coin have circulated together at legally established values which have come to differ from the relative commodity values of the two metals.

gross barter terms of trade.
See TERMS OF TRADE.

gross domestic fixed capital formation.
See GROSS INVESTMENT.

gross domestic product.
See NATIONAL INCOME.

gross domestic product deflator. A price index used to correct the money value of all the goods and services entering Gross Domestic Product for price changes. This enables the changes in the real output of the goods and services in the economy to be isolated.

gross investment. The total investment that occurs in the economy within a specific time period. It comprises REPLACEMENT INVESTMENT and NET INVESTMENT.

gross margin. The difference between the price paid to the wholesale supplier and the price received by the retailer.

gross national income.
See NATIONAL INCOME.

gross national product.
See NATIONAL INCOME.

gross profit.
See PROFITS.

gross trading profit. PROFIT earned on operations before allowing for DEPRECIATION and interest on debt finance and stock APPRECIATION.

Group of Ten. The seven major industrial countries (Canada, France, Germany, Italy, Japan, the United Kingdom and the United States), whose heads of government or economics ministers meet from time to time in an attempt to co-ordinate macroeconomic policy, particularly with respect to appropriate exchange rates between countries. Their communiqués occasionally acquire names, such as the Plaza Agreement or the Louvre Accord, after the venue for the meeting.

Group of Seven. The seven major industrial countries (Canada, France, Germany, Italy, Japan, the United Kingdom and the United States), whose heads of government or economics ministers meet from time to time in an attempt to co-ordinate macroeconomic policy, particularly with respect to appropriate exchange rates between countries. Their communiqués occasionally acquire names, such as the Plaza Agreement or the Louvre Accord, after the venue for the meeting.

Group of 77. A loose coalition of over 100 predominantly developing countries, originally formed by 77 countries at the UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT in 1964 to express and further the collective interests regarding the institutional development of the world economic system. The group has played an important role in international trade and tariff negotiations, especially those regarding international commodity agreements. In addition, the group has proposed a number of general policies which aim to re-structu
the international monetary system, accelerate the transfer of technology and economic aid and extend national sovereignty over natural resources so as to redistribute wealth in favour of developing countries.

**growth-gap unemployment.** Long-run DEMAND-DEFICIENT UNEMPLOYMENT. The growth in the productive capacity of the economy through time is insufficient to provide jobs for all those who wish to work. The production techniques adopted are 'too capital intensive' and this is therefore one form of TECHNOLOGICAL UNEMPLOYMENT.

**growth path.** This is the pattern of change of a variable overtime; the variable is a measure of development, usually per capita income or consumption and the growth path represents its actual, or predicted pattern of change overtime. Development strategies will result in different paths; if large amounts of capital are being invested in the capital-goods industry, the growth path will rise slowly until such time as these industries are well established enough for further industrial development in consumer goods to take place when the growth path may rise sharply. (See ROSTOW MODEL, TECHNOLOGY, CHOICE OF.)

**growth pole.** A group or cluster of industries centred on and linked with one or more PROPULSIVE INDUSTRIES which form a centre of growth and dynamism in an economy. The concept was introduced by the French economist Perroux who thought of the growth pole as involving a close set of market relationships but not necessarily geographical concentration of the industries. However, the theory has been widely applied in REGIONAL ECONOMICS both as an explanation of the geographical clustering of particular industries and as a policy model for stimulating economic growth in DEPRESSED AREAS or underdeveloped regions of an economy.

**growth-profitability function.** Refers to the maximum PROFIT RATE which a firm can sustain at different rates of growth. The rationale concerning the nature of this FUNCTION is normally put as follows: at low growth rates positive increments in that rate are likely to generate an increased profit rate because of the stimulus to productivity that come from ECONOMIES OF GROWTH whose source is higher turnover and capacity utilization. However, it is intuitively plausible to argue that dynamic supply and demand constraints prevent the continuance of this positive relationship. On the supply side organization difficulties are likely to set in at higher rates of growth, while on the demand side DIMINISHING RETURNS will eventually set in with respect to demand creation expenditures. Such an argument implies a bell-shaped function with profitability initially an increasing function of the growth rate, but then beyond some point DISECONOMIES OF GROWTH begin to 'dominate' and profitability becomes negatively related to growth. (See also GROWTH THEORIES OF THE FIRM.)

**growth-stock paradox.** Refers to a situation where because the current DISCOUNT RATE is less than a firm's expected constant annual growth rate of dividend payments, the share valuation will tend to infinity. This can be shown formally under STEADY-STATE GROWTH conditions with no uncertainty: the price of a share will under such conditions be equal to the NET PRESENT VALUE of the expected dividend payments. If the dividend payment per share \(D\) grows at the constant annual rate of \(g_D\) then given a discount rate \(i\), the capitalized value of the expected dividend payments will be

\[
Sp = \frac{D}{i - gD}
\]

where \(Sp\) is the share price and \(g_D\) is treated as negative INTEREST. If however \(g_D \geq i\) then there will be no convergence and \(Sp\) will tend to infinity. This special case, the growth-stock paradox, is conventionally ruled out since any tendency for \(Sp\) to tend to infinity will cause the discount rate, in reflecting the OPPORTUNITY COST of capital, to rise in order to restore EQUILIBRIUM.

**growth theories of the firm.** Due to the pioneering work of E.T. Penrose (The Theory of the Growth of the Firm, Blackwell, Oxford, 1959) and R.L. Marris (The Economic Theory of ‘Managerial’ Capitalism, Macmillan, London, 1964) growth theories are a branch of the MANAGERIAL THEORIES OF THE FIRM, considered appropriate to a CORPORATE ECONOMY within which
corporations' managers have an element of discretion over the objectives they choose to pursue. In contrast to the other managerial models growth theories are, as the label implies, concerned with the time path of expansion of the firm. In this dynamic context, managers are presumed to satisfy instincts of power, dominance and prestige by pursuing growth as an objective, while motives such as security and professional excellence induce them to accept the firm's valuation ratio as an objective. The capital market imposes a constraint on the value of the valuation ratio through the merger and takeover mechanism. Representative of growth theories of the firm is the following formal presentation of the constrained optimization problem facing the firm

\[
\text{maximise } U_M = U_M(g, v) \\
\text{subject to } v \geq \bar{v}
\]

where \( U_M \) is the managerial utility function, \( g \) is firm's growth rate, \( v \) is the firm's valuation ratio and \( \bar{v} \) the capital market constraint. Given a growth-valuation function within which \( v \) becomes negatively related to \( g \) beyond some level of \( g \), managers will face a trade-off as illustrated in the diagram. An unconstrained optimum is achieved at the tangency point \( (g^*, v^*) \) between the highest possible managerial indifference curve \( I_m^* \) and the growth-valuation function. If this were however to yield a valuation ratio which does not satisfy the capital market constraint \( v \geq \bar{v} \) then the optimal growth rate will be given by the constrained maximization solution of \( v, g \).

**growth theory.** Models arising from the study of the economy when allowance is made for changes in the capital stock, the population size with its implication for the numerical strength and age profile of the labour force, and technical progress. Two main groups of theories may be considered:

1. **NEO-CLASSICAL GROWTH THEORY** which considers the economy to be inherently stable and tending to full employment. Such models consider factor prices to be flexible in the long run causing factor substitution response to such price changes, leading changes in factor proportions actually utilized in the aggregate production function in particular to changes in the capital output ratio. Perfect competition is assumed so that on the equilibrium growth path the real rate of interest equals the marginal product of capital and the real wage rate equals the marginal product of labour.

2. **KEYNESIAN (and NEO-KEYNESIAN GROWTH THEORY)** which considers the capitalist economy to be inherently unstable or a knife edge. It considers the conditions necessary for equilibrium to be so strict that it is extremely unlikely they will be met. Such models are addressed to the problem of instability and unemployment and may be seen as an extension of Keynesian theory in the dynamic context. Concern in particular is with the role of investment (and savings) as a component of aggregate demand and an addition to the capital stock.

Growth theory is often considered to be more interesting for its mathematical content than for its insights into the actual workings of the economic system. This was especially true in the 1970s when 'no-growth' economics became of importance due to environmental and resource constraints in general. (See Harrod-Domar model, turnpike theorem, technical progress.) See John Hywel G., *An Introduction to Modern Theories of Economic Growth*, Nels London (1975).
can sustain at different rates of growth and is a common feature of GROWTH THEORIES OF THE FIRM. Reflecting the growth-profitability relationship this function is likely to be bell-shaped. Assuming STEADY-STATE GROWTH conditions, initial positive increments in the growth rate stimulate GROWTH ECONOMIES producing a higher profit rate thus leading, for a given DIVIDEND-PAYOUT RATIO, to a larger initial dividend payment and faster expected growth of that payment. This has a positive effect on the valuation ratio. Beyond that rate of growth at which growth diseconomies have set in and are 'dominant', the consequent fall in the profit rate depresses the initial dividend payment and prevents the continuance of a positive relationship between growth and the valuation ratio. (See also GROWTH-PROFITABILITY FUNCTION.)

G7.
See GROUP OF SEVEN.

guaranteed week. Payments made to workers who through no fault of their own find that they are on SHORT-TIME WORKING. Such an eventuality is most likely to arise because of a strike elsewhere, a breakdown in production or a reduction in demand for the output of the industry concerned. These arrangements apply to MANUAL WORKERS in the main because salaries are usually paid regardless of whether or not there is work.

guidelines.
See INCOMES POLICY.

guidepost following behaviour.
See NORM FOLLOWING BEHAVIOUR.

guideposts.
See INCOMES POLICY.


Haavelmo, Trygve (1911- ). Norwegian economist who was awarded the Nobel Prize for Economics in 1989 for his work on the foundations of econometrics.

His most significant contributions were made in his Harvard University thesis, subsequently published as 'The Probability Approach in Econometrics', *Econometrica* Vol. 12, 118pp (1944). In this work he showed how the formulation of economic theories in probabilistic terms made it possible to use statistical inference methods to draw rigorous conclusions about underlying relations from 'the random sample' of empirical observations. This permitted the derivation of economic models, their testing and their use in forecasting. His thesis also contained advances in dealing with the problem of interdependence in economic variables, for he suggested methods for specifying, identifying and estimating economic relations, when interdependence is present. His techniques have been adopted and developed by other econometricians.

Apart from his work in econometric theory Haavelmo also made important contributions to the theory of investment and the theory of economic growth. His major publications apart from his thesis are *A Study in the Theory of Economic Evolution* (1954) and *A Study in the Theory of Investment* (1960).

Haberler, Gottfried (1900- ). Austrian-born American economist, best known for his work in international trade. In his *Theory of International Trade* (1936) he provided an alternative demonstration of THE GAINS FROM TRADE in terms of the opportunity cost of producing goods as seen in the goods foregone. This freed the case of trade from the REAL COSTS of the approach of RICARDO. His other major early work was *Prosperity and Depression* (1935) which surveyed the literature on business cycles. His other major works are *International Trade and Economic Development* (1959), an authoritative monograph *A Survey of International Trade Theory* (1961) and *Money in the International Economy* (1965).

habit-creating demand function. DEMAND FUNCTION for non-durable goods which reflects the fact that demand in any period may be influenced by the cumulative purchases of the good in the past. The higher this past 'stock' (it is not a stock in the strict sense since past goods will not be extant) the greater will be the influence of past consumption on demand in the current period.

Halesbury Committee. The UK Government’s Committee of Inquiry set up to give advice on organizing a system of DECIMJ COINAGE. It was set up in 1961 and reported in 1963.

hammered. Prior to the Big Bang of 1986 when a stockbroking firm was unable to meet its liabilities to a client or other stockbroker, its right to trade on the market was suspended. On the London STOCK EXCHANGE this suspension was announced after silence had been called by beating a wooden hammer. Hence the suspended firm was said to be 'hammered'. In similar conditions would now be suspended by the Securities and Investments Board.

hard-core unemployed. Those among the REGISTERED UNEMPLOYED who find it extremely difficult to obtain a job because of their mental and physical condition, their attitude toward work or their age. It has been argued that these may form an irreducible minimum number of unemployed but this ignores both the fact that devoting greater resources to these groups might reduce the undesirable characteristics and the fact that attitudes towards work are the selves likely to be a function of the level of unemployment. (See also the UNEMPLOYMENT RATE.)
hard currency. A currency which has a continuing high level of demand, relative to supply in the market for foreign exchange. Currencies of stable industrialized nations can usually be included, whereas those of UNDERDEVELOPED COUNTRIES and the former Eastern Bloc are not. (See EXCHANGE RATE, FOREIGN EXCHANGE MARKETS.)

harmony of interests. See INVISIBLE HAND.

Harrod, Sir Roy F. (1900–78). After teaching at Christ Church, Oxford, from 1922 he was appointed Nuffield Reader of International Economics in 1952. He was editor of the Economic Journal from 1945 to 1961.

His major publications include Trade Cycle (1936); Towards a Dynamic Economics (1948); The Life of John Maynard Keynes (1951); A Supplement on Dynamic Theory (1952); Policy Against Inflation (1958); Second Essay in Dynamic Theory (1961); and Economic Dynamics (1973).

He made significant contributions in the field of IMPERFECT COMPETITION and international trade theory, but his most celebrated achievement was his treatment of dynamic problems, and particularly growth rates. He linked Keynes' analysis with his own ideas into a model of the trade cycle incorporating the ACCELERATOR PRINCIPLE and MULTIPLIER mechanism. His major contribution to GROWTH THEORY was the formulation of the fundamental equation of economic growth rediscovered independently by DOMAR and now known as the Harrod-Domar equation. This analysis introduced into the Keynesian static system the conditions under which there would exist an equilibrium path of growth. He also pioneered a number of ideas on related topics such as the concept of neutral technical progress. (See HARROD-DOMAR GROWTH MODEL)

Harrod-Domar growth model. A one sector growth model developed by R.F. HARROD and E. DOMAR in the 1940s, very much in the tradition of the KEYNESIAN revolution with its concern for economic stability and unemployment, and also the rigid assumptions useful only for shortrun analysis. They were particularly concerned with the role of investment as CAPITAL ACCUMULATION and as a component of AGGREGATE DEMAND. Their model incorporated a simple ACCELERATOR investment function based on expected real income. (See NEOCLASSICAL GROWTH MODEL.) Other notable features are a constant desired capital-output ratio (v), following from an assumed constant long run real RATE OF INTEREST, savings are a constant proportion (s) of real income and the labour force is growing at some exogenously determined exponential rate (n) which may be effectively boosted by technical progress (l).

The ratio \( \frac{s}{v} \) is the WARRANTED RATE OF GROWTH \( G_W \).

Instability could arise if the warranted rate of growth \( (G_W) \) and the NATURAL RATE OF GROWTH \( (G_N)(G_N = n + \lambda) \) were different. If \( G_W = G_N \) it would be possible to have STEADY STATE GROWTH with either full employment or a constant rate of UNEMPLOYMENT. A situation called GOLDEN AGE GROWTH \( (G_W = G_N) \) arises if unemployment is zero. An important element of the model is the expected rate of growth of income \( y \). Only if \( G_w = y \) will the economy be in balance. However if \( y \) differs from \( G_w \) the model shows a tendency for actual income to diverge from the warranted growth path. This instability when \( G_w = G_N \) is called the knife edge.

The Harrod-Domar model neglected the effects OF RELATIVE PRICES ON FACTOR PROPORTIONS, implying they were in fixed ratio. So even though they implied an AGGREGATE PRODUCTION FUNCTION they escaped the main criticisms of the production function incorporated into the neoclassical growth model. In summary, the Harrod-Domar model considers three basic issues:

1. whether or not steady-state growth is possible;
2. the probability of steady-state growth at full employment;
3. the stability or otherwise of the warranted rate of growth.

The Harrod-Domar model set the scene for subsequent work on growth as their framework was sufficiently general to incorporate TECHNICAL PROGRESS, MONEY and other effects.

Harrod Neutral Technical Progress. A classification of a disembodied technical progress which compares points in the growth process at which the CAPITAL TO OUTPUT RATIO
Heckscher-Ohlin approach to international trade. This approach, introduced by a Swedish economist Heckscher and subsequently developed by his compatriot Olaf Ohlin, (Interregional and International Trade, 1935) accepts that international trade is based on differences in COMPARATIVE COSTS but attempts to explain the factors, which make for differences in comparative costs. It is assumed that PRODUCTION FUNCTION for different goods use FACTORS OF PRODUCTION in different proportions but that the production function for any good is similar across countries. On these assumptions differences in comparative costs in countries can be traced back to factor endowments. The model holds that a country which is abundant in, for example, LABOUR will specialize in the production and export of goods, which are intensive in the use of labour (because it can produce cheaply) and import goods which are intensive in the use of the country's scarce resource of production, e.g. LAND or CAPITAL.

The model has been extensively developed and used to analyse problems of economic growth and trade and income distribution. It has been shown that on restrictive assumptions free trade will perfect substitute for factor mobilization, lead to the equalization of factor prices: absolute and relative, between two countries. The intuitive reasoning is as follows. Assume two factors of production: labour and capital, two countries, $L$ and $C$; the former being land abundant and the latter capital abundant, and two goods, wheat and tractors, with wheat being LAND INTENSIVE and tractors CAPITAL INTENSIVE. In $L$ wheat will be abundant and cheap while capital will be cheap in $C$ will buy tractors from $C$, raising the price of capital in $C$ and reducing the price of tractors in $L$. The operation of forces will tend to equalize the prices of land and of capital in the two countries respectively.

The Heckscher-Ohlin approach has subject to much empirical testing as ability to explain the pattern of trade. The most celebrated test was by LEONTIEF...
1954 applied his INPUT-OUTPUT technique to examine the structure of US foreign trade. He examined the factor composition of US exports and of US imports, as they would be produced in the US if the US had to produce them domestically, and came to the surprising conclusion that US exports were labour intensive and import substitutes were capital intensive. Since on any definition the US is capital abundant, the finding appeared to refute the Heckscher-Ohlin model and now goes under the name of the Leontief paradox.

hedging. An action taken by a buyer or seller to protect his income against a rise in prices in the future. As an example, if there is uncertainty about the future price of a raw material required by a producer, that producer may buy a FORWARD CONTRACT for the quantity of the raw material. If the price of the raw material goes up he then buys the material, thus losing money compared to what would have been the case had he bought straightaway. Offsetting this, however, is the fact that his forward contract is now worth more (since it will have stipulated a price) and hence it can be sold for a profit. This will offset, at least in part, the losses made on the purchase of the more expensive raw material. If, on the other hand, raw material prices fall, he buys on the market and secures a gain which is partly offset by the fact that his forward contract is now worth less than he paid for it. Sellers can engage in similar activity. Hedging is also used more generally for any activity in which an ASSET is purchased in the expectation that its price will rise at least as fast as, if not more than, the rate of inflation. This is generally known as 'hedging against inflation'. Hedging in the narrower sense will also be common on FOREIGN EXCHANGE MARKETS where hedges are taken out against fluctuations in the exchange rate.

hedonic price. The implicit or SHADOW PRICE of a characteristic of a commodity. The quantity of a particular commodity may be resolved into a number of constituent characteristics which determine its quality. A part of the price of that commodity may be associated with each characteristic and variations in quality may thus be valued. The application of hedonic price theory to quality changes was pioneered by Zvi Griliches and has found applications in the analysis of housing demand and environmental economics.

hedonism. The philosophy which states that human behaviour ought to be guided by the search for pleasure. As a philosophy, however, hedonism is typically modified by concepts of duty, obligation, etc. As a school of positive thought it simply states that people do behave as pleasure-seekers, not that they ought to.

Herfindahl index. A measure of industrial market CONCENTRATION. To obtain the index, the individual market share of each FIRM in fractional terms must be squared. The H-index is given by the sum of these squared terms, thus

\[ H = \sum s_i^2 \]

where \( s_i \) is the market share of the \( i \)th firm.

The \( H \)-index takes into account both the number of firms in an industry and their size differences. The value of \( H \) will equal 1 when there is only a single firm in the industry and will tend towards 1 when there are few firms and/or greater degrees of inequality in market shares. Unlike the LOR-ENZ CURVE, therefore, the Herfindahl index records a positive level of concentration in industries where the firms are of equal size. The \( H \)-index can be translated into the number of equal sized firms that would yield an equivalent degree of concentration. This number equivalent is given by the reciprocal of the \( H \)-index. More generally, the numbers equivalent may be written

\[ n(\alpha) = (\sum s_i^\alpha)^{1/(1-\alpha)} \]

where \( \alpha \) is an ELASTICITY parameter - with \( \alpha = 2 \) in the \( H \)-index case - determining the weight given to large firms relative to small ones. The number equivalent facilitates the interpretation of different \( H \)-values obtained for two industries with different firm size distributions.

heterogeneity. The quality of goods, services or factors which allows their distinction in the minds of consumers and producers. A heterogeneous range of commodities may be close but not perfect substitutes for each other, and each will be subject to its own
demand and supply schedules attracting a separate price. Firms may produce products of a very similar substantive nature, but differentiate those products by means of advertising. They may then become heterogeneous commodities.

heterogeneous capital. Physical capital of different types highly specific to certain production processes and not transferable to alternative processes. This concept is at variance with the idea of a single malleable capital good which can be used for the production of many different goods by different processes. If capital is considered to be heterogeneous then, as noted by the CAMBRIDGE SCHOOL, it raises serious problems for the use of an AGGREGATE PRODUCTION FUNCTION such as is commonly the case in NEOCLASSICAL GROWTH MODELS. However, some critics of aggregate production functions are willing to concede the usefulness of some measure of aggregate capital provided this does not include incorporating such a measure into an aggregate production function.

heterogeneous product. When commodities or services supplied by economic agents in a given market have attribute combinations which are not identical in the eyes of buyers, the product is said to be heterogeneous.

heteroscedasticity. An ECONOMETRIC problem in which the variance of the error term in a REGRESSION equation does not remain constant between observations. The problem arises most often in CROSS SECTION data, and results in the ORDINARY LEAST SQUARES procedure not producing BEST LINEAR UNBIASED ESTIMATES. (See GLEJSER TEST, GOLDFIELD-QUANDT TEST, GENERALIZED LEAST SQUARES.)

Hicks, Sir John R. (1904–89). Sir John Hicks, a British economist, was a joint winner of the Nobel Prize for economics in 1972 with Kenneth ARROW. He taught at the London School of Economics and the universities of Cambridge, Manchester and Oxford.

The Nobel citation mentions his work in Value and Capital (1939) on GENERAL EQUILIBRIUM theory and in particular on the question of the stability of a general economic system in the face of external shocks. Work in WELFARE ECONOMICS on the construction of INDEX NUMBERS, and his reinterpretation of the concept of CONSUMERS’ SURPLUS, the Hicks-Hansen diagram. See ISLM DIAGRAM.

Hicks Neutral Technical Progress. This classification of DISEMBODIED TECHNICAL PROGRESS which compares points in time in different processes at which the CAPITAL RATIO is constant. The innovative idea was considered Hicks Neutral when the MARGINAL PRODUCT of capital and labour is left unchanged such that the proportions of output going to Labour (and Capital) are unchanged. (See HARROD NEUTRAL PROGRESS, TECHNICAL PROGRESS.)

hidden unemployment. (also disguised unemployment). Be unemployment rate varies procyclically, that the UNEMPLOYMENT count eration will understate the true unemployment by excluding DISGUISED WORKERS, who are said to form the disguised unemployed. On this definition, this would otherwise be a form of hidden unemployment which should be a

Hicks, however, has worked in many fields. His Theory of Wages (1932) and The Theory of Prices (1939) and The Theory of Wages (1932) were the seminal works in the development of the theory of wages and prices. He also worked on the theory of aggregate production functions and the theory of capital and labor markets. His later work focused on the theory of consumer choice and the theory of aggregate demand and supply. He was awarded the Nobel Prize in Economics in 1972 for his contributions to the theory of production and capital and labor markets. His work has had a lasting impact on the field of economics and continues to be widely cited and discussed.
official unemployment figures to obtain a true reading of labour market slack. The problem with this argument is not so much one of measurement as one of conceptualization because the ‘hidden unemployed’ are concentrated among precisely those labour force groups who exercise considerable discretion in the timing of their labour force participation decisions. (See LABOUR FORCE PARTICIPATION RATE.)

high-powered money. In the traditional theory of the CREDIT MULTIPLIER, the reserve assets which form the base on which the banking system creates BANK DEPOSITS, and which constrain the lending activities of the banks which lead to deposit creation, are collectively termed 'high-powered money' since, according to the theory, a change in the quantity of these assets will produce a multiplied change in the bank deposit component of the money stock. The term also refers to the fact that the clearest constituents of high-powered money are the monetary liabilities of the PUBLIC SECTOR, i.e. circulating CURRENCY and bankers' balances at the CENTRAL BANK. However, short-term assets, e.g. certain bills which can readily be converted into public sector monetary liabilities at the central bank, should arguably be included if they are treated as reserve assets by the commercial banks, if bank lending is influenced by the banks' holding of them, and if their supply is an object of central bank control. Prior to 1981 UK banks were required to keep reserve assets (operational balances with the BANK OF ENGLAND, money at call and short notice, bills of exchange and government bonds with less than a year to maturity) equal to 12.5 per cent of eligible liabilities. The Bank of England did not, however, try to control the money supply by operating on these, the high-powered asset base. Since 1981 the only statutory requirement has been for banks to maintain a 0.5 per cent cash ratio at the Bank of England and this largely to finance the operations of the Bank. The level of reserves kept by banks is determined by themselves for prudential reasons. The monetary authorities attempt to control the money supply by use of the interest rate. Hence the term, high-powered money, has limited significance in the UK under present techniques of monetary control. The term originated with the CHICAGO SCHOOL, whose present leading member, MILTON FRIEDMAN, is an exponent of the traditional theory of the credit multiplier. (See MONETARY BASE, MONEY SUPPLY, 'NEW VIEW' OF MONEY SUPPLY.)

hiring rate. See ACCESSION RATE.

hiring standards. The recruitment problem facing the employer is typically not one of making contact with the maximum number of job applicants. Rather, the problem is one of finding sufficient applicants promising enough to be worth the investment of thorough investigation. Workers are after all heterogeneous. The hiring standards used by many employers can thus be viewed as devices to narrow the intensive field of JOB SEARCH by reducing the number of applicants to manageable proportions. That is to say, employers benefit from the use of a pre-selection screening process before they invest in their own interviewing and testing procedures. Concern nonetheless arises with hiring standards because of the use by employers of STEREOTYPES.

histogram. A graphical representation of a FREQUENCY DISTRIBUTION (or PROBABILITY DISTRIBUTION) in which the frequency (or probability) with which a variable takes on values between certain limits is given by the height of a block covering the horizontal axis between those limits.

historical costs. The charge incurred at the time a factor INPUT or resource was originally purchased and which is thus not equal to the cost of replacing the input (replacement cost) if prices rise in the meantime.

historical models. Economic models which are capable of analysing changes and situations in the real world as opposed to EQUILIBRIUM models which are largely theoretical.

Historical School. A group of nineteenth century German economists whose methodology and analysis was extremely influential in the German speaking countries. The founders of the school, Wilhelm Roscher (1817-94), Bruno Hinderbrand (1821-98), and Karl Kries (1821-98) emphasized the
historical relativity of economic organization and doctrines. Historical study was held to be of utmost importance for any legitimate study of economics. They were particularly critical of the CLASSICAL SCHOOL and its search for economic laws comparable to the laws of natural sciences.

The basis of historicism was reformulated by Gustav Schmoller (1838-1917). Schmoller was less critical of economic laws as such but protested against the Classical School for relying on too narrow a basis for such laws. He sought a comprehensive economic history which would explain economic phenomena with reference to all aspects of human motivation. He claimed that Adam SMITH and David RICARDO had restricted the basis of economic action to the search for private gain.

The historicist position and its implied methodology was attacked by Carl Menger. The subsequent debate concerned the validity of deductive economic laws. Historicists had attacked the validity of economic laws logically deduced from a small number of simple premises. This axiomatic approach they claimed was unacceptable given its practical limitations. Economic laws operate under conditions of ever changing concrete circumstances and the Historical School deemed it inappropriate to abstract from reality to such a degree.

Although the formal basis for historicism has been severely criticized by Sir Karl Popper who has refuted the implied inductive method of predicting future events from past experience, the substance of the debate lingers on even today. Those economists who place most emphasis on the abstract deductive method of Ricardo and a propensity for logical-mathematical rather than philosophical theories may be contrasted with a smaller group who would place more stress on the empirical verification of the initial postulates and pay a great deal of attention to the facts of experience. To this extent the historical method can be said to have influenced MARXIST and INSTITUTIONAL ECONOMISTS and the CAMBRIDGE SCHOOL.

holding company. A company ti
control over a number of other com through ownership of a sufficient pro
of the latter's common stock. A st proportion is 51 per cent or over, he
where there is a dispersed and inert g stockholders MINORITY CONTROL can be
sised with a proportion of the commo
which is below 51 per cent. This "h
holding companies to acquire subsidi
a cost which is less than could have b
example if it had purchased their ph
This pyramiding of control, as it is a
subject to limitations imposed by co
legislation.

A holding company tends to concer
with control over the financial, mar
or marketing functions of its subsi
and thus performs more of a mon
role. The subsidiaries are then given
ment of independence, which facilitates
retention of the individual subsidiar
age and control over its producti
vestment plans. (See CONGLOMERATE)

homogeneity. The quality of good
ices or factors which ensures that the
ot be differentiated in the min
suppliers and consumers. A range of
modities is said to be homogeneous
commodities in that range are perfect:
utes for each other. The commoditie
be physically distinct but economic
omogeneous. Individual workers are
ally distinct, but may be almost ident
their ability to work and may therefo
 treated as a homogeneous group by fi

homogeneous functions. A function
be homogeneous of degree $n$ if the m
lication of all of the INDEPENDENT VARI
by the same constant, say X, results in
ultiplication of the DEPENDENT VARI
X". Thus the function

$$Y = X^n + Z^n$$

is homogeneous of degree 2 since

$$(\lambda X)^2 + (\lambda Z)^2 = \lambda^2 (X^2 + Z^2) = \lambda Y$$

A function which is homogeneous of de
1 is said to be linearly homogeneous, di
linear homogeneity. A PRODU
FUNCTION which is homogeneous of dep
homogeneous product. When the commodities or services supplied by economic agents in a given market have attribute combinations which are identical in the eyes of buyers, the product is said to be homogeneous.

homogeneous production functions. See PRODUCTION FUNCTIONS.

homoscedasticity. A property of the VARIANCE of the DISTURBANCE TERM of REGRESSION equations whereby it remains constant overall observations. This is one of the required properties for the ordinary least squares estimator to be the BEST LINEAR SQUARES ESTIMATE.

horizontal equity. Fairness or justice in the treatment of individuals in similar circumstances. In general, the principle that like-individuals should be treated in a like manner where economic arrangements are concerned. The concept is most frequently used with regard to tax and income, thus horizontal equity is held to be attained if individuals with the same income face the same TAX BURDEN. However, it may be applied in other areas, for example with regard to the benefits of public expenditure horizontal equity may be said to require that individuals with similar income or NEED should receive the same benefit. In using the concept we must be clear which characteristics are employed in defining 'similar', generally income is the relevant variable but other characteristics might be thought relevant - such as health. (See also EQUITY, VERTICAL EQUITY.)

horizontal integration. Horizontal integration is said to take place when two FIRMS at the same stage of the production process merge to form a single business organization. (See MERGER.)

hot money. If a country has a favourable RATE OF INTEREST, it will attract money from abroad which would however be moved out again if interest rates subsequently became more favourable elsewhere. Governments are generally wary of the relative improvement of the BALANCE OF PAYMENTS and strengthening of the EXCHANGE RATE due to inflows of hot money as the inflow can be very transient. (See FOREIGN EXCHANGE MARKET, ARBITRAGE SPECULATION.)

Hotelling’s Rule. A rule for the optimal use of non-renewable natural resources established by H. Hotelling in 1931 ('The Economics of Exhaustible Resources', Journal of Political Economy, Vol. 39, pp. 137-175). The rule, which still has a central place in the economics of natural resources, states that for the time path of extraction to be optimal net price (selling price minus extraction cost) of a unit of resource left in the ground must rise at a rate equal to the interest rate. The reasoning is as follows. A resource owner has the choice of either extracting a unit of resource and investing the receipts at the going rate of interest or of leaving the unit in the ground. He will only be content with the latter course of action, if the net price rises by as much as the rate of interest, so that both courses of action yield the same return. The rule may be alternatively stated as the condition that the PRESENT VALUE of a unit of the resource must be the same irrespective of when it is extracted. The rule holds for producers in a competitive situations and for society, but not for situations of Imperfect Competition. (See NON-RENEWABLE RESOURCE.)

housing benefit. See BEVERIDGE REPORT.

human capital. The essence of human capital is that investments are made in human resources so as to improve their productivity. Costs are incurred in the expectation of future benefits; hence, the term investment in human resources. Like all investments, the key question becomes: are they economically worthwhile? The answer to this question depends on whether or not benefits exceed costs by a sufficient amount, and the standard INVESTMENT CRITERIA apply. There is thus a direct analogy between investment in human capital and investment in physical capital, although there are differences. In particular, human capital is not collateral because it cannot be sold. Moreover, an individual cannot spread or diversify his risk in the manner that owners...
The parallel between human and physical capital is a close one; for example, human capital like physical capital is subject to depreciation. The concept of man investing in himself has a very wide application. It covers not only investments in formal schooling and post-school training (see on-the-job training), but also home investments in the form of family care in the pre-school years, the acquisition of improved health, and investments in labour market information via job search.

Human capital theory underpins many of the important developments in modern economics and provides one of the main explanations for wage and salary differentials by age and occupation, the uneven incidence of unemployment by skill, the job regulatory practices of trade unions and so on, as well as contributing to policy decisions on, say, the allocation of resources to schooling and training vis-à-vis other claims on resources. See Becker, G., Human Capital, National Bureau of Economic Research (1964).

Hume, David (1711–76). A major Scottish philosopher. Hume’s contributions to political economy are largely contained in chapters of his Political Discourses (1752). He emphasized (following Locke) that the quantity of money in a country has no effect on the real wealth of that country, and held a quantity theory of money. He improved on Locke in as much as he denied that a country could have a permanent trade surplus or deficit. The price-specie mechanism ensured that international trade was always balanced. His theory of interest is one of supply and demand. The demand for loans is partly influenced by business expectations, and thus the rate of profit and rate of interest are closely related.

He saw social science methodology as largely a branch of applied psychology. This philosophy and his views on self-interest and the desire for accumulation as the motivating forces of economic activity had a major influence on A. Smith and later economists.

Hunt Commission. The President’s Commission on Financial Structure and Regulation issued its report in 1972, calling for sweeping reform of the American services industry with extensive deregulation. Among its proposals were,

1. Removal of upper limits on interest rates
2. Provision for the payment of interest on demand deposits
3. Elimination of distinctions between commercial banks and savings and loan institutions
4. Provision for multiple brands of bank both intrastate and interstate
5. Combination of all regulatory supervisory Federal functions with a central agency.

The proposals of the Hunt Commission were not adopted at the time of lease, but they served as the basis for extensive banking reforms which culminated in the Deregulation and Monetary Act of 1980 and the Garn-St. Deposit Institutions Act of 1982. See the Hunt Report.

Royal Commission. The findings of the Royal Commission on the Intermediate Areas, Britain said to be intermediate between the most prosperous areas of the country and the depressed areas which were beneficiaries of government aid found that these intermediate areas were disadvantaged compared both to the prosperous areas and the depressed areas, and recommended that substantial government support should be made available for such areas. Although the report led to the establishment, in 1971, of intermediate areas which received additional support, levels of support were not as high as which the commission had proposed.

Hunt Report. The findings of the Royal Commission set up to investigate the problems of those geographical regions of Britain said to be intermediate between the most prosperous areas of the country and the depressed areas which were beneficiaries of government aid found that these intermediate areas were disadvantaged compared to both the prosperous areas and the depressed areas, and recommended that substantial government support should be made available for such areas. Although the report led to the establishment, in 1971, of intermediate areas which received additional support, levels of support were not as high as which the commission had proposed.

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Hyperbola. The graph of a function

$$y = a + bX^{-c}$$

where $c$ is a positive constant. Such are often used to represent demand because of compatible theoretical
ties. In particular, the special case of the rectangular hyperbola whose equation is

\[ Y = bX^{-1} = \frac{b}{X} \]

will, if \( Y \) is quantity and \( X \) is price, yield a demand curve having a constant price elasticity of demand equal to minus one.

hyperinflation. A position of rapidly accelerating INFLATION. Under conditions of hyperinflation prices rise ten or even a hundred-fold in a single month. Examples of such inflations are rare but have been experienced in Germany in the early 1920s and in China around the period of the Second World War. The exact boundary between inflation and hyperinflation is difficult to define.

hypothesis testing. A general term descriptive of procedures for the statistical determination of the validity of an hypothesis. The tests normally involve the calculation of TEST STATISTICS to discriminate between competing hypotheses. Under one of the hypotheses (the NULL HYPOTHESIS) this statistic will follow a certain distribution, so that if the value of the test statistic lies outside certain CRITICAL VALUES of the distribution (determined by the LEVEL OF SIGNIFICANCE of the test), the Null Hypothesis is rejected in favour of the alternative hypothesis.

Normally, in economics, the tests are concerned with determining whether an EXPLANATORY VARIABLE (or set of explanatory variables), has any causal influence on the DEPENDENT VARIABLE in a REGRESSION equation. The Null Hypothesis is that there is no influence. The test statistic calculated is normally the \( t \)-STATISTIC, which, if greater than the critical value from the \( t \)-DISTRIBUTION, allows the rejection of the hypothesis of no influence, in favour of the hypothesis that there is some causal effect. (See STATISTICAL INference, one tail tests.)

hysteresis. A term used by scientists to describe the circumstance in which the EQUILIBRIUM of a system depends on the history of that system. In economics it is most commonly used in considering the NATURAL RATE OF UNEMPLOYMENT, where the equilibrium is said to be path-dependent, i.e. it depends on the actual history or path of unemployment. Hysteresis may result from INSIDER-OUTSIDER effects or from a rise in the proportion of long term unemployment in total employment, where the long term unemployed are regarded as having withdrawn from the labour force, either for psychological reasons or for the lack of relevant skills. Under such circumstances unemployment will fail to exert downward pressure on wages, and any rise in wages can result in a further rise in unemployment. See Cross, R., Unemployment, Hysteresis and the Natural Rate Hypothesis, Blackwell, Oxford (1988).
IBRD-
See INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT.

ICFC. Industrial and Commercial Finance Corporation. (See FINANCE FOR INDUSTRY.)

IDA.
See INTERNATIONAL DEVELOPMENT ASSOCIATION.

Identification problem. An econometric problem which arises in the estimation of the parameters of SIMULTANEOUS EQUATIONS. The difficulty occurs when it is impossible to distinguish from the data which equation is being estimated. For instance, both supply curves and demand curves may be specified with quantity as the DEPENDENT VARIABLE, and price as the EXPLANATORY VARIABLE. The data may be the result of a series of supply/demand equilibria, so that simply estimating an equation involving quantity and price will not necessarily result in the determination of either a supply curve or a demand curve. In order to distinguish between equations, their specifications must include factors which will identify which is which. If there are just sufficient of these factors then the equation is said to be just identified. If there are too few it is underidentified (or unidentified), and if too many, then it is overidentified.

Identity. An equation which is true by definition, or which serves to define a variable. Thus, for instance, NATIONAL INCOME is defined as the sum of CONSUMPTION and INVESTMENT expenditures by the relation

\[ Y = C + I \]

where the triple bar sign conventionally denotes an identity.

Identity matrix. Commonly denoted I. A matrix whose diagonal elements are all unity, and whose off-diagonal elements are all zero.

Idiosyncratic exchange. The unique tasks of the worker provides workers and employers with some degree of discretion in the determination of wages. Almost every job is idiosyncratic, involving some firm-specific skill; (See SPECIFIC TRAINING.) Because of the notion of a competitive labour market on demand and supply for each job, it is advantageous for employers to possess a degree of MONOPOLY power over their jobs. At the same time, the employer has advantage over outsiders and in an external market. As a result of on-the-job training, workers already in a job have an advantage over outsiders and in an external market. Because of the resources of the firm and the fact that the worker's specific training is unique to his current employment, advantage is possessed over outsiders and in an internal market. As a result of this, wage rates are determined by the employer or the collective agreement. These wages are determined by the employer or the collective agreement, and are not tied to the individual worker's skills or the skills of his current employer. At the same time, the worker's specific training is most worthwhile to his current employer. There results a situation akin to BILATERAL MONOPOLY, coupled with BOUNDED MONOPOLY, since workers are in a position to affect their monopoly over the knowledge they possess. Knowledge technology because that technology is a part of the workforce itself derived from improvements that the workforce itself produces.

An important purpose of the internal labour market is to neutralize the internal monopoly problem so that workers do not absorb the resources of the firm on their detriment of both workers and management. The rules of the internal labour market are such that the employer is designed to suppress the opportunities for individual parties to long-run optimize by regularizing the idiosyncratic exchange relation. In particular, the individual contact is replaced by the collective contract that is written in non-precise terms which wage rates attach mainly to the firm rather than to the worker. Promotions and training that are rewarded by the internal wage structure mean that the TR EARNINGS of incumbent workers are their current wage. The firm is reluctant to capture the discrepancy in case this <
ages labour mobility and also discourages workers from acquiring the knowledge that is required to advance along the promotion ladder.

The model of idiosyncratic exchange provides a variant of contract theory (see 'NEW-NEW' MICROECONOMICS and IMPLICIT CONTRACTS.) The parties to idiosyncratic, or non-standardized, exchange have as we have seen an incentive to regularize the trading relation. This requires the setting up of a governance or regulatory structure to harmonize that relation. The more elaborate that governance structure (i.e. the greater the degree of idiosyncracy) the slower will be the labour market to respond to underlying changes in aggregate demand because of the longer-run nature of institutional commitments. Long and variable price lags will arise and an apparent non-responsiveness of wages, with quantity rather than price bearing the brunt of interim adjustments. Idiosyncratic exchange thus alters the mechanics of inflation: the effects of an inflationary disturbance are more spread out.

Contractual arrangements do, however, adjust in response to higher and more variable rates of inflation. In other words, the model is still rational but only after recontracting occurs. Firms and workers do not have all of the necessary information on future states of the world available to them when they establish their contractual and institutional arrangements but they will adapt those arrangements, after a lag, in response to a changing market environment.

**idle balances.** Money that is withdrawn from circulation and held as a store of wealth. KEYNES identified a speculative demand for money and argued that money would be held in idle balances because of uncertainty as to the future price of financial ASSETS which represented the principal alternative form of holding WEALTH. (See MONEY, DEMAND FOR.)

**illiquidity.** Lack of LIQUIDITY in a specific ASSET, or in a PORTFOLIO of assets held by a transactor. Being the obverse of liquidity the condition is always a relative one, since almost all assets vary in degree of liquidity.

**ILO.** See INTERNATIONAL LABOUR OFFICE.

**imaginary number.** A number involving the square-root of minus one, conventionally denoted i. (See also COMPLEX NUMBER.)

**IMF.**
See INTERNATIONAL MONETARY FUND.

**imitative growth.** An aspect of FIRM growth by DIVERSIFICATION, referring to that growth stimulated by the introduction of products whose ATTRIBUTES are such that consumers do not perceive the product to be new; that is they do not arouse and satisfy some LATENT NEED. The impact of imitative growth will be felt on a small number of PRODUCERS. (See DIFFERENTIATED GROWTH.)

**immiserizing growth.** The possible but improbable case where an increase in economic output within a country leads via repercussions through trade to a situation where its ECONOMIC WELFARE is diminished. The circumstances which could bring this about are growth biased towards the export commodity, for which foreign demand is price INELASTIC, and a high MARGINAL PROPENSITY TO IMPORT. The growth in real output induces a demand for more imports. To earn the extra FOREIGN EXCHANGE to pay for them the export commodity in the face of a price inelastic demand has to be sold at so low a price that the TERMS OF TRADE deteriorate to such an extent that this wipes out the gain from the extra output.

**impact analysis.** A general name given to techniques which attempt to measure the effect on a regional or local economy of a given change in economic activity. For example, one might undertake an impact analysis of the effect of the location of a new industry in a region. Generally, impact analysis is based on some form of the REGIONAL MULTIPLIER - either of the conventional Keynesian type or the ECONOMIC BASE MULTIPLIER. In its more sophisticated forms, impact analysis may employ INPUT-OUTPUT techniques or a full ECONOMETRIC MODEL of the regional economy.

**impact multiplier.** The immediate effect on an ENDOGENOUS variable of a change in an EXOGENOUS variable, as opposed to the total or long-run effect of such a change. In MACROECONOMICS it is the MULTIPLIER effect
of a change in one of the components of AGGREGATE DEMAND in the period immediately following the change. In ECONOMETRIC MODELS impact multipliers are the estimated PARAMETERS on exogenous variables in the REDUCED FORM.

impact of taxation. This simply refers to the person, company or transaction on which a TAX is levied. Someone is responsible for handing the levy over to the tax authorities. This is thus referring essentially to the legal situation. The eventual incidence of the tax could be quite different. An individual or organization will attempt to pass on the burden to someone else. Whether he will be able to do so depends on a complex set of factors. (See INCIDENCE OF TAXATION.)

imperfect competition. A generic term which may be used in two ways. The first refers to any form of market structure other than PERFECT COMPETITION and would thus include MONOPOLISTIC COMPETITION, OLIGOPOLY, and MONOPOLY. On the second definition the term would refer to any market structure other than PERFECT COMPETITION and MONOPOLY.

imperfect information. See PERFECT INFORMATION.

imperfect market. One in which the following conditions, necessary for a perfect market, do not hold. (1) A HOMOGENEOUS PRODUCT; (2) a large number of buyers and sellers; (3) there is FREEDOM OF ENTRY and exit for buyers and sellers; (4) all buyers and sellers have PERFECT INFORMATION and foresight with respect to the current and future array of prices; (5) in relation to the aggregate volume of transactions the sales or purchases of each market agent are insignificant; (6) there is no COLLUSION amongst buyers and sellers; (7) consumers maximize total UTILITY and sellers maximize total PROFITS; (8) the commodity is transferable. If any one of conditions (1) to (8) are not fulfilled a market is to some degree imperfect. Markets tend to vary considerably with respect to the satisfaction of these conditions. The STOCK EXCHANGE and the wheat market are often quoted examples of markets which come near to perfection. On the other hand, the heterogeneous and imperfect nature of housing as a commodity, conditions (1) and (4), while thought ship rights can be transferred the con itself cannot be moved thus breaking

imperialism. According to Marxist socialist thought, a foreign policy seeks political and economic control backward areas to guarantee the country an outlet for idle savings and manufactured goods in exchange for strategic raw materials. Most Marxist or thought holds that a closed capitalism must suffer from a chronic deficiency EFFECTIVE DEMAND, which can only be rectified by the opening of foreign markets.

implementation lag. The time it takes to implement MONETARY POLICY, also known as the INSIDE LAG. This is subdivided into a RECOGNITION LAG, and an ADMINISTRATIVE LAG.

implicit contracts. The notion of implicit contracts seeks to provide a rational* existence of sticky wages (and prices based upon the differential RISK AVERSION characteristics of employees and entrepreneurs). Employees are assumed to be relatively more averse to risk than employers, partly because owners of CAPITAL (employees) cannot diversify in the way that owners of physical CAPITAL (entrepreneurs) can and partly because employers are composed to be self-selected individuals who are indifferent toward (or actually indifferent toward) risk. As a result, it becomes (long-run cost minimizing) for employers to offer employees a joint product consisting of employment and insurance against instability. Implicit contracts emerge because FIRMS, and in some models, workers act as if they are legally constrained to contract that fix the employees’ incomes at least wage rates, and transfer risk to employers. With such contracts in wages do not move to clear the labor market in response to changes in AGGREGATE DEMAND; rather employment changes, reduced working time, or, more importantly, via layoffs.

The above is only one variant of the theory; the major alternative is do...
The above theory has come under fire from a variety of directions. Principally, it supports the specification of fixed income contracts (or tenure) rather than wage rigidity coupled with variability in man hours.

**implicit cost.** The OPPORTUNITY COST of the use of factors which a producer does not buy or hire but already owns. A common example of implicit costs concerns an owner-managed firm; besides hiring FACTORS OF PRODUCTION, the producer’s time, organizational and managerial abilities (collectively known as ENTREPRENEURSHIP) are employed. This labour could be sold to other producers and the salary which could be earned elsewhere is the implicit cost of the use of these abilities in the producer’s own firm. These costs must be allowed for in calculating PROFIT. The term imputed costs is also used.

**implicit function.** A function which is expressed so that there is no DEPENDENT VARIABLE, usually having a function of its variables on the left-hand side of the equality sign, and a constant (usually zero) on the right. Thus

\[ f(X_1, \ldots, X_n) = 0 \]

is an implicit function of the variables \( X_1, \ldots, X_n \). This way of writing a function is normally indicative of an interdependence between the variables in which there is no unique causal direction, and is a conventional form of expressing a CONSTRAINT. (See EXPLICIT FUNCTION.)

**implicit price deflator.** A PRICE INDEX used to deflate one or more components of national income accounts. An implicit price deflator is a PAASCHE PRICE INDEX and hence rises more slowly than a LASPEYRES PRICE INDEX, such as the RETAIL PRICE INDEX or wholesale price index.

**implicit rental value.** The price the owner of a physical factor of production such as CAPITAL should charge the FIRM for the use of that factor. (See USER COST OF CAPITAL.)

**import.** A good or service consumed in one country which has been bought from another country. A visible import is a GOOD, while an invisible import is a SERVICE.

**import duty.** See TARIFFS.

**import quota.** See QUOTA.

**import restrictions.** Restrictions on the quantity or types of goods imported into a country, through the use of TARIFFS or QUOTAS.

**import substitution.** One of the main development strategies chosen by DEVELOPING COUNTRIES. In the early post-war years it was thought by many economists, and governments of developing countries, that a policy of INDUSTRIALIZATION was the best strategy by which to attain economic progress. The most obvious route was through IMPORT substitution. This entailed establishing domestic industries behind TARIFF and QUOTA barriers. Manufacturing consumer goods industries were considered the most appropriate type with which to start this process. Later the manufacture of CAPITAL goods is envisaged. It was hoped that imports would be replaced and internal growth fostered. It was hoped that the costs of the strategy would be mostly borne by the advanced countries supplying the manufactured consumer goods. Experience with the strategy has turned out to be disappointing for most developing countries. Thus the BALANCE OF PAYMENTS position of many countries has not been improved and dependency not reduced. There has been a change in the structure of imports: final consumer goods often become relatively less important, but the significance of plant, machinery, spare parts and raw materials has escalated. The strategy has had other adverse effects. EXPORTS tend to be discouraged as firms producing for export may have to purchase INPUTS at costs above world market levels from indigenous firms operating under PROTECTION. The policy permits the EXCHANGE RATE to remain comparatively overvalued which can discourage all exports. The distribution of income may become more unequal as a result of the policy. Wage levels in the urban areas where manufacturing plants are located may be considerably above free market levels. Protection of industry helps to bring this about. One consequence of this is that rural-urban migration may be accelerated and the result could be more urban...
income consumption. The policy may achieve significant increases in industrial output for a few years but after that the rate of growth is limited to the growth in internal demand for industrial products which can be imported. Protection has often been found to be excessive with a protected industry occasionally producing a negative VALUE-ADDED at world prices. There is political pressure on the governments of developing countries to maintain production at high levels even if it is not strictly necessary. This can happen if productivity increases in the years after an infant industry has been established through 'LEARNING BY DOING'.

import tariff. See TARIFFS.

Impossibility Theorem. See SOCIAL WELFARE FUNCTION.

impure public good. See MIXED GOOD.

imputed rent. The rent notionally paid by the firm to itself for the use of the land it occupies. (See IMPLICIT COST.)

inactive money. See IDLE BALANCES.

incentive payment systems. See PAYMENT-BY-RESULTS.

incidence of taxation. This refers to the eventual distribution of the burden of a TAX. It refers to those who suffer a reduction in their real income resulting from the imposition of a tax. The incidence of a tax may be quite different from the IMPACT OF TAXATION. Thus a SALES TAX may actually be levied on a wholesaler or retailer but he is able to pass on the burden of the tax in part to his customers. In the case of a specific sales tax the incidence will depend on the ELASTICITY of the SUPPLY and DEMAND CURVES. The more inelastic is demand and the more elastic is supply the greater the burden on the consumer. At first sight it may appear that the incidence of a personal INCOME TAX is on the individual income earner. If the effect of the tax is to reduce the supply of work effort and wage rates are pushed up the eventual incidence might be on profit earners or, if they pass on the increased burden to prices, on final consumers. In the EQUILIBRIUM analysis of the effect of an income tax it can be shown that if of labour is reduced as a result of it if as a consequence the output of the economy is reduced then part of will be on the owners of CAPITAL a question of the incidence of a PROFIT. The locus of all such equilibria is a particularly controversial concept. Economic theory is not conclusively on the likely outcome. Extensive empirical evidence has provided convincing evidence to support the view that it is mostly borne by the owners of capital or is passed on to final consumers or suppliers of INPUTS.

income. The amount of funds and services received by an individual or economy in a given time. (See EARNINGS, NATIONAL INCOME)

income, circular flow of. See CIRCULAR FLOW OF INCOME.

income consumption curve. The indifference of the consumer's INDIFFERENCE бюджетная линия defines the EQUILIBRIUM. If income is varied the budget line moves outwards in fashion, new equilibria will be reached. The locus of all such equilibria is the income consumption curve. If the curve

![income consumption curves](image-url)
wards in COMMODITY SPACE it indicates that both goods (measured on the axes) are NORMAL GOODS. If it slopes backwards or downwards one of the goods is an INFERIOR GOOD. (See diagram.) The income consumption curve is widely referred to as an ENGEL CURVE, although some writers distinguish the two.

income determination.
See INCOME-EXPENDITURE MODEL.

income differentials. The difference in income levels between different people; these can be due to types of job, i.e. skill differentials or geographical location in that some areas have higher wage levels than others, or there may be differences between urban and rural wage levels. This is a particularly marked phenomenon in less developed countries, because in general, development plans, introduction of new techniques and high-wage type occupations are situated in urban areas, while the agricultural sector is often left behind, using primitive methods for subsistence farming; in addition payment may be made in kind, in foodstuffs, seeds, clothing which is difficult to quantify in money terms and will give the rural sector an appearance of 'earning' less than it actually does. (See DISTRIBUTION.)

income effect. A change in the price of a good will reduce or increase the consumer's real income. In response to this change in real income we can expect the consumer to buy less (more) of all goods including the one which has changed in price. This is the income effect of a price change. (See SUBSTITUTION EFFECT, PRICE EFFECT, SLUTSKY EQUATION.)

income elasticity of demand. A measure of the responsiveness of the quantity demanded of any GOOD to a change in the level of income of the persons demanding the good. To avoid the measure being sensitive to the units used, the measure is expressed as:

\[
\text{Income Elasticity of Demand} = \left( \frac{\Delta Q_i}{Q_i} \right) \div \left( \frac{\Delta Y}{Y} \right) = \frac{\Delta Q_i \cdot Y}{\Delta Y \cdot Q_i}
\]

where \( Q_i \) is the quantity demanded of good \( i \), \( Y \) is income and the symbol \( \Delta \) refers to a change in the variable in question. (See ENGEL CURVE.)

income-expenditure model. A simple KEYNESSIAN one sector model which shows the determination of the EQUILIBRIUM LEVEL OF NATIONAL INCOME. Under the assumptions of a fixed CAPITAL Stock, LABOUR FORCE and technology and rigid wages and prices and, therefore, expectations, it details the static equilibrium in which the supply of REAL NATIONAL OUTPUT equals the quantity of national output people wish to buy. In the model the volume of AGGREGATE EXPENDITURE determines the volume of output and the associated level of employment: the model concentrates exclusively on the demand side of the macro-economy. There is no reason why the equilibrium that is eventually established will be associated with full employment, on the contrary this simple representation of the Keynesian system seeks to demonstrate the possibility of an UNEMPLOYMENT EQUILIBRIUM. The equilibrium level of national income is established where WITHDRAWALS equal INJECTIONS and this may occur at less than full employment. Under these circumstances the Keynesian prescription is for a rise in GOVERNMENT EXPENDITURE which when magnified by the actions of the MULTIPLIER will result in a level of national income and output just sufficient to ensure full-employment. Graphically equilibrium is shown as the point at which the AGGREGATE EXPENDITURE function CUTS the 45° line as below. This diagram is also known as the Samuelson Cross after SAMUELSON who first suggested the diagrammatic approach.

This simple approach can however, be criticized on a number of counts. First, it concentrates on the demand side of the economy assuming that the appropriate supply will be forthcoming at any level of expenditure. Second, money plays no role in the model; prices are determined exogenously. The model in fact concentrates exclusively on the goods market and it is the IS-LM DIAGRAM which integrates this with the money market.

income maintenance. Policies designed to raise the income levels of specific groups or
incomes policy

Expenditure = National Income

income-expenditure model

individuals. Policies of this type include Social Security benefits such as those paid to the sick or unemployed but also programmes designed to support the incomes of particular producers such as farmers. Controversy over income maintenance generally focuses on its effectiveness and on potential disincentive effects of such policies on individuals’ willingness to work. (See BEVERIDGE REPORT, NEGATIVE INCOME TAX.)

income-sales ratio. The ratio of a firm’s or industry’s value-added to total sales revenue. This ratio can be used as a measure of the extent of VERTICAL INTEGRATION; the greater the integration the higher the index.

incomes policy. Government attempts to control wage inflation by some form of intervention in the pay bargaining process. Governments seeking to restrain WAGE-PUSH INFLATION may do so either indirectly by the use of MONETARY POLICY or by acting directly in the level of pay settlements via incomes Policies. In fact modern governments can hardly avoid some form of incomes policy for they will be concerned to place some limits to the rate of growth of the pay of their own employees. In the UK these employees constituted around one-fifth of all employees by the end of the 1980s.

In the UK incomes policies were in operation almost continuously from 1961 to 1978. Broadly speaking they have taken three main forms: freezes, and voluntary and statutory norms. Wage freezes have been in force for short periods on a number of occasions since the war. They prohibit implementation of all pay settlements (prior to the period of the freeze and thus may disrupt established patterns of differentials or relativities between those who implemented a settlement immediately before the freeze and those who would have implemented during the freeze. A freeze traditionally been followed by a period during which a statutory norm is in operation during which this further defers the re-establishment of traditional differentials and relativities as well as perhaps contributing its own distortions to the wage structure. Statutory norms impose a zero or small positive ceiling on wage settlements. Settlements in excess of the norm are frequently only permitted one of a number of criteria for exception treatment are satisfied.

Statutory norms are usually accompanied by a restriction on the number of pay settlements that any one group can implement in a single year. Usually any single negotiating group is restricted to one major pay settlement every 12 months, a policy which became known as the ’twelve month rule’.

The norm may either be specified in terms of some percentage or some absolute money sum to be added to existing levels of pay. Increasingly the tendency evolved in the 1970s for the norm to be regarded as the target rate of increase for most negotiating groups with the result that specification of a norm resulted in the award of increases of just that amount to large numbers of workers. Where the norm was specified as some absolute money sum, say £1 per week, this resulted in a narrowing of percentage differentials. Specification of the norm in absolute terms resulted in a series of incomes policies in the UK in the early 1970s was one reason for the substantial erosion of occupational wage differentials at this time.

Voluntary norms usually involve specification of a maximum permissible level of wage settlements but unlike the statutory norm do not enjoy the force of the law. For this reason there is less compliance and it has frequently been argued such policies are effective only in those areas in which
government can exert direct control over wage levels. It is suggested they fall unduly on public employees.

Incomes policies have suffered from a number of other shortcomings. It is argued that they merely defer rather than cancel large wage increases, because once the policy is 'off' employees attempt to catch up lost ground. Moreover where the norm relates to basic wage rates, earnings drift has risen to compensate for this in some sectors. This causes feelings of resentment on the part of those who remain restrained. Incomes policies tend to ossify the wage structure and prevent differential rates of change of money wages from allocating labour between sectors. For all these reasons incomes policies have been the subject of severe criticism.

The administration of incomes policies in the UK has usually been undertaken by the government although on the occasion of the voluntary norm known as the social contract the policy was administered by the TUC and government. In Sweden both unions and management have policed the policy without active government participation, while in the USA administration has largely been by government. In the USA voluntary norms known as guidelines or guideposts operated in the 1960s while more recently informal government pressure to moderate pay has been employed. See Elliott, R.F. and Fallick, J.L., Incomes Policies, Inflation and Relative Pay, George Allen and Unwin (1981).

income support.
See BEVERIDGE REPORT.

income tax. This is the most important single tax in the UK and plays an important role in the fiscal regimes of all Western countries. In the UK it is levied on taxable income of individuals at progressive rates. These have undergone many changes in recent years as have the allowances which determine taxable income. Income is widely recognized as being a suitable base for taxation on equity grounds though there are many problems with the definition of taxable income and some economists suggest that an expenditure tax is superior. Critics of income tax argue that it can have significant disincentive effects. Thus it has been suggested that it 'double taxes' savings. Income which is saved will have tax paid on it. If that income is invested tax will also be payable on the interest or dividend. An income tax does in fact discriminate against saving and in favour of consumption. The argument that an income tax discourages work effort is not clear-cut. There is a substitution effect adverse to work effort and an income effect encouraging extra work. The net result depends on the relative strengths of these opposing forces. Empirical work has not given convincing evidence that the net effect is significantly adverse, though it may be for certain groups such as married women and people paying the very top marginal rates. The argument that income tax reduces the volume of investment is not foolproof either. Income taxation may well reduce the total return on investment but the effect on incremental projects is not so clear-cut. The existence of loss-offsetting arrangements means that the government shares in the losses as well as in the gains from new projects. The net effect on risk-taking is uncertain, depending on the attitude of investors to risk and on the range of assets available to them. (See ALLOWANCES AND EXPENSES FOR INCOME TAX, CORPORATION TAX.)

income terms of trade.
See TERMS OF TRADE.

income velocity of circulation. The measure of the velocity of circulation of money which stems from the Cambridge analysis (see QUANTITY THEORY OF MONEY), in which average cash balances are related to the level of income in a given period. The equation is

\[ M = kPY \]

where \( M \) is the quantity of money, \( P \) represents the price level, \( Y \) stands for real income and \( k \) for the fraction of nominal income held as cash balances. If the terms are rearranged,

\[ K = \frac{M}{PY} \]

and refers therefore to the proportional relationship between balances and national income. This differs from the transactions velocity in the equation of exchange

\[ MV = PT, \]
which on rearrangement becomes

\[ M \]

will be inclusive of intermediate transactions and therefore differs from final income. (See QUANTITY THEORY OF MONEY, VELOCITY OF CIRCULATION.)

increasing returns to scale.  
See ECONOMIES OF SCALE, RETURNS TO SCALE.

incremental capital-output ratio (ICOR). The number of additional units of CAPITAL that are required to produce an additional unit of output:

\[ \frac{\Delta K}{\Delta Y} \]

where \( K \) is the change in the capital stock and \( Y \) the change in output. Since in the NAIVE ACCELERATOR \( AK = \alpha \Delta Y \), it is clear that \( \alpha \) the ACCELERATOR COEFFICIENT is also the incremental capital-output ratio.

Clearly similar units of capital may produce substantially different levels of output according to the efficiency with which they are employed. The productivity of a particular unit of capital may be reduced if management deploys the workforce inefficiently or fails to ensure an uninterrupted flow of materials to the workplace while restrictive practices on the part of the workforce may also lower output. For these reasons the level of output obtained from identical pieces of capital differs widely between different countries. International comparisons of the incremental capital-output ratio are notoriously difficult due to problems of measuring the changes in the capital stock. (See CAPITAL CONTROVERSY.) Nonetheless, it continues to be employed as one measure of the efficiency of INVESTMENT in different countries.

independent variable. A variable appearing on the right hand side of the equality sign in an equation, so called because its value is determined 'independently' of, or outside the equation. (See EXOGENOUS VARIABLE, REGRESSOR.)

Indexation. A mechanism for periodic adjustments in the nominal value of contracts in line with movements in a specified PRICE INDEX. ESCALATOR clauses in wage contracts provide one example of these. The concerned indexation of all contracts is frequently advocated as a policy to prevent the arbitrary redistribution of income caused by INFLATION. If all contracts, both explicit and implicit, were escalated by the known rate of inflation, inflation would have small effects. (See THRESHOLDS, COLA.)

indexation of tax allowances and taxes. Indexation of allowances refers to the practice of keeping allowances for tax purposes in real terms. The presence of inflation erodes the real value of INCOME TAX allowances and under a progressive income tax system pushes tax-payers into higher EFFECTIVE RATES OF TAX situations. The UK Government now obliged to index these allowances € year at budget time, though, of course, discretionary changes can be made as and when necessary. Some taxes are specific and thus are less affected in real terms when inflation takes place. In the UK the EXCISE DUTIES on alcohol, tobacco and oil products are the most obvious examples. Some economists have argued that these payments should be indexed as well.

index number. A number expressing the value of some entity, say price or output of national product, at a given period of time in absolute number form but related to a base period which is arbitrarily set equal to 100. Thus, if the index is 100 in 1980 and 112 in 1981, this is equivalent to saying that the magnitude in question has risen by 12 cent in one year.

\[ \frac{112}{100} \times \]

(See PRICE INDEX, PAASCHE PRICE INDEX, LASPEYRES PRICE INDEX, RETAIL PRICE INDEX)

index number problem. The index number problem can arise when an attempt is made to compare two sets of variables at points in time using a single number : there are many different ways of aggregating variables into a single measure. It can be illustrated with respect to the problem of determining whether or not the national product has increased between two years is possible for the value of the base
indicative planning. The use of centrally determined targets to co-ordinate private and public sector investment and output plans. Decision-making remains decentralized but sectors of the economy are encouraged to meet agreed targets. There are two approaches to indicative planning. The first is to ask firms in all sectors of the economy to submit output and investment intentions for the forthcoming planning period; these plans are scrutinized for possible bottlenecks and if identified, attempts to resolve the inconsistencies are made by persuading the relevant sectors to raise targets. The second takes as its starting point a target national growth rate which is then used as the basis for detailed sector targets which are compatible with this growth rate. If the resources are available and the sector targets are believed then the plan can be expected to induce the investment necessary to satisfy the plan. A major rationale of indicative planning is improvement in the flow of information within a market economy, and reduction in the uncertainty surrounding decision-making. By doing so business confidence is improved and stability and cohesion within the national economy promoted. The French have been major proponents of indicative planning, while Britain experimented during the 1960s with the Labour government's National Plan. A poor balance of payments performance and pressure on the sterling exchange rate were major factors in its downfall. (See economic planning.)

indifference. A statement that one good, event or project is neither preferred nor not preferred to any other good, etc. If an individual is indifferent between goods $X$ and $Y$ then his utility from $X$ is the same as his utility from $Y$.

indifference curve. A curve showing the locus of combinations of the amounts of two goods, say $X$ and $Y$, such that the individual is indifferent between any combination on that curve. An indifference curve is usually assumed to be convex (see diagram). (See indifference map.)

an indifference curve

indifference map. A set of indifference curves with each successive curve lying outside the previous one and in a north-east direction. 'Higher' indifference curves indicate higher levels of utility. Indifference curves cannot cross: if they do they violate the axiom of transitivity of preferences. They can touch the axes (see diagram) but are usually drawn such that this is not the case. Note that the distance between indifference curves does not indicate absolute differences in utility since indifference curve theory is based on ordinal utility.

indirect least squares (ILS). A procedure for estimating the parameters of simultaneous equations, which avoids simultaneous equation bias. ILS involves the ordinary least squares estimation of the parameters of the reduced form of the equations, and the calculation of the values of the structural form parameters from these. The procedure can only be used if the equations are just identified (see identification).
industrial democ

Indifference curves may coincide with the X or Y axis, but do not usually do so.

an indifference map

CATION PROBLEM) since, otherwise, there will be no unique values of the structural form parameters which are consistent with (or can be calculated from) the reduced form.

indirect taxes. Traditionally these were defined as taxes levied on goods and services and thus payment was only indirect EXCISE and CUSTOMS DUTIES, VALUE-ADDED TAX and RATES are examples of indirect taxes. The distinction between DIRECT TAXES and indirect ones is traditional in public finance. The distinction is not, however, a particularly watertight one, nor is it especially useful from an analytical point of view. There are several examples of taxes whose classification is not obvious and the distinction is not very helpful from the viewpoint of INCIDENCE.

indirect utility function. A UTILITY FUNCTION that expresses the utility obtained from a set of goods as being determined by the prices of the goods and the level of income. Reference to the CONSUMER'S EQUILIBRIUM will show that the equilibrium is given when maximum utility is achieved for a given income and set of relative prices. However, instead of expressing utility as a simple function of the goods consumed, the indirect utility function indicates the fact that income level and price levels themselves determine the utility level.

indivisibilities. The characteristic of a FACTOR OF PRODUCTION or commodity which prevents its use below a certain minimum level.

This may arise out of the specialization of many commodities and cause a distortion in the PRODUCTION FUNCTION or UTILITY. If for example a machine is to be reduced in proportion to output MARGINS OF SCALE may arise and MARGINS OF PRODUCTION may fall as the scale of operations increases. In general where an indivisible unit of production is sensitive to output, plants or FIRMS will be large.

industrial action. Sanctions employed by individuals or groups of individuals to attempt to resolve an INDUSTRIAL dispute within their firm. The sanctions may take the form of either a complete or partial withdrawal of labour, that is STRIKES, or at the other extreme complete adherence to industrial relations, that is WORK TO RULE.

Industrial and Commercial Finance Corporation. See INVESTORS IN INDUSTRY.

industrial bank. An alternative to the FINANCE HOUSE, for example an organization which gives HIRE PURCHASE credit. It is usually given to the smaller organizations of this nature and not the big final houses in London.

industrial complex analysis. A technique for use in regional planning which sizes interrelationships between industrial activities located in the geographical area. An industrial complex can be defined as a group of economic activities which when located together benefit from mutually advantageous EXTERNALITIES, also known as AGGLOMERATION EFFECTS. The analysis involves estimating flows of inputs and outputs which exist between the component industries and estimating costs of production in the complex as a whole (rather than individual industries). At various localities the technique implies that policies to support regional economy should conceivably support regional "complexes" rather than individual industries. (See GROWTH POLE.)

industrial democracy. An extension of the decision-making process within a firm, to preclude away from a single body an
the whole workforce. It represents a recognition of the 'rights' of workers, as suppliers of labour, to participate in decisions, and take part of the responsibility that these necessarily imply, alongside the nominated management derived from the body of shareholders as owners of capital. One may distinguish between direct and indirect forms of industrial democracy. Direct, or participative, democracy is said to be that in which the worker has an immediate effect on decisions. Indirect, or representative, democracy refers to situations in which workers are given decision-making power through the placing of representatives on high-level boards within companies. Included in the latter category are the Yugoslav workers’ councils, which consist almost entirely of worker members and have full power; boards of directors in state-owned companies in various countries; the German Mitbestimmung or CO-DETERMINATION system; and the relatively few private companies that have voluntarily given workers seats. The aim of both direct and indirect forms of industrial democracy is to diffuse decision-making power throughout the organization.

**Industrial Development Certificate.** A former control on industrial building established by the Town and Country Planning Act 1947 which required a certificate (an IDC) to be obtained before the construction or extension of any manufacturing establishment beyond a certain size. The limit below which a certificate was not required was originally set at 5000 square feet but was frequently varied. The object of this control was to enable the government to influence the pattern of location of industry; it was thus an element of REGIONAL POLICY. After the passing of the Industry Act 1972, IDCs were not required for developments in DEVELOPMENT AREAS or SPECIAL DEVELOPMENT AREAS and IDCs were eventually abolished in 1982.

**Industrial dispute.** A dispute or difference either between employers and employees or amongst employees concerning the terms and conditions of employment of any person or group of people or indeed the non-employment of any person. An industrial dispute may result in INDUSTRIAL ACTION.

**Industrial inertia.** A term used to describe the observed phenomenon whereby firms fail to change location when the existing location ceases to be the most profitable location. Industrial inertia, or 'inertia in location', appears to be inconsistent with standard location theory which assumes firms seek the most profitable location. Such inertia may be explained by costs of relocation which outweigh the extra profits to be obtained in a new location. Alternatively, we may reject the maximization analysis and argue that firms aim at 'satisfactory' rather than maximum profits, that is their behaviour is ‘SATISFYING’.

**Industrialization (in DEVELOPING COUNTRIES).** The development of industries as a general development strategy. In the early postwar period and indeed up to the early 1960s many economists considered that industrialization constituted by far the most promising means by which a poor country could develop. Governments of many developed countries accepted this judgement and proceeded to draw up strategies and plans giving priority to industrial development. The IMPORT SUBSTITUTION approach was adopted by most countries but some did favour EXPORT PROMOTION. While the results of adopting this strategy have been encouraging for a few countries (especially those favouring export promotion) the majority of countries have experienced mixed and disappointing results. In fact many have in recent years reversed their policies and given priority to developing agriculture. In some cases the difficulties experienced were the result of devoting too many investible resources into industry and neglecting agriculture which is, of course, the dominant sector in developing countries. Other countries found that the costs of industrializing were very high in the sense that EFFECTIVE RATES OF PROTECTION had to be very large before new domestic industry became competitive with imports. Small, very poor countries found that they had great difficulty in establishing viable industries because their markets were so small in relation to the minimum efficient
size of plant. Some countries found that their balance of payments situation was not significantly improved. The structure of their imports was changed from final consumer goods to machinery, raw materials and spare parts but dependency was still very 'high'. The distribution of income within some countries actually became more unequal with consequential rapid rural-urban migration, growing urban unemployment and political difficulties. In recent years both economists and governments of developing countries have become more circumspect in their attitude to the apparent benefits of an industrialization strategy. Many DEVELOPMENT STRATEGIES now give priority to agricultural and rural development.

industrial organization. Traditionally, the field of applied PRICE THEORY. It is concerned with the working of the MARKET ECONOMY and generally organizes its approach in terms of market structure, conduct and performance. Market structure encompasses the questions of seller and buyer CONCENTRATION in the market, PRODUCT DIFFERENTIATION, BARRIERS TO ENTRY, COST Structures, VERTICAL INTEGRATION and MERGER. Market conduct treats firms' pricing behaviour, product strategy, advertising, research, innovation, plant investment and legal strategy. Market performance is the evaluation of the results of firms' conduct in their markets in terms of production and allocative efficiency, economic growth and progress and equity. With the advent of concepts such as SATISFICING BEHAVIOUR and BOUNDED RATIONALITY and with advanced applications of GAME THEORY, the field has broadened to deal with non-profit maximizing and strategic behaviours and their roles in market structure, conduct and performance. (See also FIRM, THEORY OF THE.) See Schmalensee, R. and Willig, R.D. (eds), Handbook of Industrial Organization, North Holland (1988).

industrial relations. The study and practice of the rules that govern employment. These rules are of three main kinds. Substantive rules that regulate pay and employment, procedural rules that govern the making and challenging of substantive rules and finally disciplinary rules that deal with a breach of both the above sets of rules.

Industrial Reorganization Corp. independent body, created in British government and dissolving another, which attempted to efficiency of the industrial secto by encouraging the rati merging of 'small' firms into presumably more efficient units. Paper which introduced the gave it wide powers regard industrial intervention, consid- omy vis-à-vis other governmen and £150 million of revol finance its operations. Its price included ad hoc encouragement of mergers, buying market shares, bid situations arising from prop and loaning funds both to n firms and to individual firms fe tion or conversion schemes. In Corporation represented the interest in situations involving foreign multinational firms in Corporation helped to bring a tration in the electrical industr the merger of GEC, / Electric and Elliot Automation activities in the automobile in the merger of British Motor Leyland Motors. (See FINANCE FOR INDUSTRY, NATIONAL ENTER)

industrial unions. Trade Un organize all workers within a g regardless of the jobs they p GENERAL UNIONS and CRAFT UNI

industrial wage differentials. in the average levels of pay workers classified according to in which they are employed. It in which workers are free to n different employments the lev any single occupation within di tries should differ only to th industries provide more or l working conditions, differing wards, which are not include under analysis, or exhibit di bility in the pattern of employ industries exhibit differing depetition in product markets this some division of monopoly pr entrepreneurs and workers res ult in substantial differences
industrial wage structure. The ranking of the average pay levels of different groups of workers classified according to the industry in which they are employed. (See WAGE STRUCTURE, INDUSTRIAL WAGE DIFFERENTIALS.)

industry. An industry within the framework of a PERFECTLY COMPETITIVE MARKET STRUCTURE can be defined as a large number of firms competing with each other in the production of a HOMOGENEOUS PRODUCT. Under such conditions the individual firm demand and supply schedules can be summed to form the industry demand and supply schedules. In contrast, with MONOPOLY the firm and the industry are one and the same.

Conceptual and operational difficulties arise in the analytical treatment of the industry when the assumption of product homogeneity is relaxed. The MONOPOLISTIC COMPETITION model defines the concept of an industry using 'product groups' as the criteria for identification. Product groups are a category of closely related products in the sense that they are close technological and economic SUBSTITUTES. It is then theoretically plausible to use 'product groups' as a basis for the demarcation of industries. There are a number of difficulties with this definition. Firstly, there is the operational one of how closely related products should be before they constitute a 'product group'; for instance, are motor cars and motorcycles part of the same 'product group'? Secondly, HETEROGENEOUS goods cannot be summed to form industry demand and supply schedules unless some common denominator is used. Price would be appropriate here but unless highly restrictive assumptions are utilized, there will be no one UNIQUE EQUILIBRIUM PRICE in monopolistic competition, but rather a cluster of prices reflecting consumer preferences for the products of the various firms within 'the group'. Lastly, MULTI-PRODUCT FIRMS raise the problem of overlap across product groups and the use of some criterion for establishing when a firm should or should not be included in 'the group'.

industry-wide bargaining. See NATIONAL BARGAINING.

inelastic. See ELASTICITY.

inequality. A relationship whereby a function of a variable (or set of variables) is represented as being greater than, or less than, some quantity, and denoted by the symbols

\[ \geq \text{ greater than or equal to,} \]
\[ \leq \text{ less than or equal to,} \]

The 'greater than or equal to', and 'less than or equal to' relations are called weak inequalities, since they do permit of equality. The strictly 'greater than', or 'less than' relations, with no equality components are referred to as strong, or strict inequalities. The normal application of inequalities in economics is in the formulation of CONSTRAINTS. For instance

\[ rK + wL \leq TR \]

where \( r \) is the per unit cost of CAPITAL, \( w \) is the per unit cost of LABOUR, \( K \) is the amount of capital, \( L \) is the amount of labour, and \( TR \) is TOTAL REVENUE

would be interpreted to mean that factor payments must be less than or equal to total revenue. (See LINEAR PROGRAMMING.)

infant industry. An industry in its early stages of development whose share of its domestic market is currently small due to competition from overseas competitors. This can therefore mean that the domestic firms are producing at output levels considerably below their MINIMUM EFFICIENT SCALE. It can be argued that for such an industry TARIFFS will be beneficial, in that they provide protection from international competition while they grow up and achieve cost competitiveness through the acquisition of ECONOMIES OF SCALE. (See INFANT INDUSTRY ARGUMENT FOR PROTECTION.)

infant industry argument for protection. One of the oldest arguments for protection, it is justified on the grounds that an industry new to a country and of below optimum size...
inflationary gap. Aggregate expenditure exceeds the maximum attainable level and output with the result that there is upward pressure on prices. In the simple INC EXPENDITURE MODEL this is shown by an aggregate expenditure function which is a 45° line where $E = Y$, beyond the employment level, $Y_f$. At $Y_f$, the resources capital and labour are fully employed, with the result that this represents the maximum attainable level of output. As a result, there exists an inflationary gap of magnitude...
with the associated upward pressure on prices.

This was initially advanced to explain the inflation of the 1940s and 1950s; the first real inflation since the publication of the General Theory of Employment, Interest and Money. However the treatment neglects the role of money either in bringing inflation under control or in exacerbating an upward spiral of wages and prices. The model may be considered a DEMAND-PULL explanation of inflation. (See COST-PUSH INFLATION.)

**inflationary gap**

considered a DEMAND-PULL explanation of inflation. (See COST-PUSH INFLATION.)

**inflationary spiral.**

*See* HYPERINFLATION, INFLATION.

**inflation subsidy.** Due to institutional inflexibilities interest rates and debt repayments may fail to rise in line with inflation and as a result real INTEREST RATES and the real value of debt will fall; indeed real interest rates may even become zero. In this case there is an inflation subsidy to those borrowing although of course there is a corresponding tax on those who made the loans. (See INFLATION TAX.)

**inflation tax.** The situation where a government adopts a policy of promoting inflation in place of an increase in taxation to pay for its expenditures. If the government finances its purchases by means of an increase in the money supply when the AGGREGATE SUPPLY CURVE in the economy is INELASTIC, prices will rise so that all holders of money balances will find their real purchasing power diminished in a manner analogous to an increase in, for example, income taxes. (See INFLATION SUBSIDY, FISCAL DRAG, SEIGNORAGE.)

**informal sector.** This refers to the large volume of self-employed in a developing country who are engaged in small-scale labour-intensive work such as tailoring, food preparation, trading, shoe-repairing, etc. These people are often regarded as unemployed or underemployed as they cannot be included in national employment statistics, but they are often highly productive and make a significant contribution to national income. Their work in general is characterized by a low CAPITAL-OUTPUT RATIO, that is the ratio of the level of equipment, or capital relative to output, and a low capital-labour ratio; that is the ratio of the levels of factor inputs of capital equipment to labour. (See UNDEREMPLOYMENT.)

**information.**

*See* PERFECT INFORMATION.

**information matrix.** A matrix containing the second derivatives of the LIKELIHOOD FUNCTION in maximum likelihood estimation of an econometric model. Inspection of these second derivatives can show whether the PARAMETER values estimated do in fact maximise the likelihood function. See Harvey, A.C., *The Econometric Analysis of Time Series*, 2nd edition, Philip Allen (1990).

**infra-marginal externality.**

*See* EXTERNALITIES.

**infrastructure.** Those structural elements of an economy which facilitate the flow of goods and services between buyers and sellers. Examples of these structural elements are communications and transport (roads, railways, harbours, airports, telephones etc.), housing, sewerage, power systems etc. These facilities are usually, though not necessarily, provided by public authorities and may be regarded as a prerequisite for economic growth in an economy.

**inheritance tax.** This is a tax on wealth in the UK which was known until 1986 as CAPITAL TRANSFER TAX which had itself in 1974
ESTATE DUTY. The inheritance tax applies both to estates at the time of death and to gifts made in the seven years prior to death, though there is a tapered reduction in tax payable on gifts made more than three years before death. Since 1988 inheritance tax has been levied at a flat rate of 40 per cent on estates over a certain size at time of death. The threshold for 1991-2 is £140,000. See ACCESSIONS TAX.

initial claims series. A statistical report of the number of persons currently applying to begin to receive unemployment compensation. Data are gathered and published by the US Department of Labour. This series is used in several composite 'leading indicator' indices to predict future trends in employment and unemployment.

injections. An EXOGENOUS addition to the income of firms or households. An addition to the income of domestic households or firms that does not result from the immediate expenditure of the private sector. In the simple INCOME-EXPENDITURE MODEL injections are magnified via the actions of the MULTIPLIER and as a result give rise to some multiple rise in NATIONAL INCOME. Injections exert an expansive pressure on national income. The three broad categories of injections usually considered are INVESTMENT, GOVERNMENT EXPENDITURE and EXPORTS. (See WITHDRAWALS.)

in-kind redistribution. This covers all forms of redistribution that do not involve purely a transfer of cash or income where the individual is completely free to spend the transfer as he wishes. In-kind redistribution thus includes not only the case where goods are transferred directly but also voucher schemes, price SUBSIDIES and any other form of transfer which does not permit the individual to spend the transfer solely as he chooses.

inland bill. A BILL drawn for the finance of domestic production or trade. Although such bills are still significant (and have increased in volume in recent years) the term is now little used. Traditionally, it distinguished such bills from BILLS OF EXCHANGE, which are bills drawn in connection with foreign trade.

innovations. Often used as an alternative to 'inventions' and is used to technological advances in processes as well as the introduction of new ATTRIBUTES and attribute COMMODITIES. In the latter case innovation is a source of PRODUCTION and is used by produce DEMAND and enhance MARKET SH
where \( A \) is the matrix of input-output coefficients, \( a_{ij} \), commonly termed the Technology Matrix,
\( X \) is the vector of outputs of commodities, and
\( F \) is the vector of final demands.

It is thus possible to discover the necessary amount of output in each sector to meet a given final demand vector as
\[
X = [I - A]^{-1}F
\]
where \( I \) is the identity matrix.

This technique of analysis is often used in planning contexts. See Miller, R.E. and Blair, P.D., Input-Output Analysis: Foundations and Extensions, Prentice Hall (1985).

**Inside lag.** The delay between recognition of the need for policy action and its implementation. The inside lag may be subdivided into three components, recognition, decision and action lags. (See outside lag.)

**Inside money.** Forms of money which are based on private sector debt, the prime modern example being commercial bank deposits to the extent that they are matched by bank lending to private sector borrowers. By contrast, ‘outside money’ is money which is a direct debt of the public sector, e.g. circulating currency, or is based on such debt, e.g. commercial bank deposits matched by bank holdings of public sector debt. The terms were coined by John Gurley and Edward S. Shaw in Money in a Theory of Finance (1960) and a prime significance of the distinction is the contention that changes in the real amounts of the two types of money held by the private sector will have differing wealth effects with further implications for the neutrality or otherwise of the money stock. It is argued that a fall in the real value of the inside money stock, caused by a rise in prices, will leave the net real wealth of the private sector unchanged, since the matching debts will be equally devalued and the net real wealth of the debtors increased. A similar change in the value of outside money will decrease the private sector’s net real wealth, while the balancing change in the public sector’s real wealth may be ignored if we assume that its economic behaviour will be unaffected by the change. Some argue that in this case also the public, perceiving that its future real tax liability for debt interest and repayment has fallen, will regard its net wealth as unaffected. But this is generally disputed as assuming unrealistic attitudes in individual members of the private sector. (See neutrality of money.)

**Insider-outsider models.** Models which distinguish between those currently employed, insiders, who are assumed to possess some degree of market power, and those without jobs but wishing to work, outsiders. Insiders’ market power results from their possession of specific skills consequent upon specific training. Insiders are presumed to be interested in maintaining their own employment and increasing their real wages and to attach little weight to the creation of jobs for those who are currently unemployed. Accordingly unemployment exerts little input on the wage bargaining process and the inverse relationship between wage rates and the unemployment rate posited by the Phillips curve may fail to materialise.

**Insolvency.** The state of being unable to pay one’s debts. An insolvent person or company may, after various legal processes, be declared bankrupt, or they may agree an arrangement with the creditors to discharge the debts.

**Instalment credit.** The general term for finance lent on conditions which provide for repayment of the principal, together with the interest, by regular instalments. The greater part of instalment credit is advanced to finance the purchase of consumer goods under hire purchase contracts, where the finance is linked to a particular transaction with the lender and purchaser having certain legal rights in the object purchased. Such credit may be financed by the retailer concerned, although in the case of hire purchase the contract may be between the buyer and a finance company. Other forms of instalment credit include personal loans by banks, and credit extended through credit card and budget account facilities. As normally used the term does not embrace mortgage finance for house purchase. It should be noted that, increasingly, producer goods are purchased under various instalment credit arrangements.
Institutional economics. A type of economic analysis which emphasizes the role of social, political and economic organizations in determining economic events. This movement flourished in the early twentieth century particularly in the US under the influence of T.B. VEBLEN and W.C. Mitchell (1874–1948). The emphasis on the role of institutions in economic affairs is a criticism of conventional economics which may be said to ignore the non-economic environment in which individuals make decisions. Many economists such as G.K. MYRDAL have emphasized the importance of the social and political structure within which the economy operates and attempted to use a broader method of economic analysis encompassing the disciplines of politics and sociology.

Institutional training. Usually used to describe job training that is provided directly by the government. Its rationale, at a micro-level, is that the private market does not provide a socially optimal amount of training. Thus, trainees may be unable to "purchase" training by accepting a lower wage during training or otherwise be unable to borrow because of an inability to use their HUMAN CAPITAL (future earnings) as collateral for a loan. Also, to the extent that training generates external (third party) benefits that are not paid for in the market, there will be a socially suboptimal amount of training. Note that shortages of skilled workers may result from the actions of unions and/or government in restricting the supply of and demand for training places.

Institutional training also may fulfill important macroeconomic objectives. (See MANPOWER POLICY.)

Instrumental variables (IV). Variables which are used to replace actual EXPLANATORY VARIABLES as weights in REGRESSION ANALYSIS. The IV technique is often used where one or more of the explanatory variables are correlated with the error term of the equation. Under these circumstances, the use of the explanatory variables themselves will result in BIASED ORDINARY LEAST SQUARES estimates. The ideal instrumental variable is one which is highly correlated with that explanatory variable it is to replace, but which is uncorrelated with the error term. The technique results ENT estimates.

Instruments (also known as POL MENTS). The term comes from cation of variables in econORIZATION into policy instruments. TARGETS and EXOGENOUS Instruments are those variables assumed to be under the control of the policy making agent (i.e. the government) to attain certain values of the policy or to OPTIMIZE the WELFARE FUNCTION.

If the classification of variables instruments and targets is used, then policy may be seen as the solution of equations to achieve values, provided the number of instruments is at least as great as the number of targets. If the number of instruments is greater than the number of targets then some targets are unattainable.

Insurance. Insurance permits the exchange of the risk of a large loss for the certainty of a small loss. The loss commonly insured against are life, property, and income. The purchase of an insurance policy is a means of spreading the risk associated with an contingency over a large number of individuals. Insurance is said to be fair, although this is frequently biased by the tax treatment of insurance premiums. The mathematical expectation of gain from perfect competition in the insurance market tend to make insurance fair, although this is frequently biased by the tax treatment of insurance premiums. (See ADVERSE SELECTION, HAZARD.)

Insurance premium. See INSURANCE.

Intangible assets. See TANGIBLE ASSETS, GOODWILL.

Integer. A whole number, containing no fractional or decimal components.

Integrated economy. A term reflecting a situation when different sectors of
omy, usually the agricultural and industrial sectors, work together efficiently, and are mutually interdependent. As part of the development process, this situation is usually coincident with the achievement of sustained growth.

integrated time series. A TIME SERIES, which needs to be differenced 'd' times (see DIFFERENCING) before the resultant series is stationary, is said to be an integrated time series of order \(d\) and is written \(I(d)\). If \(d = 1\) the series is said to have a unit root and the undifferenced series is called a RANDOM WALK. See Harvey, A.C., *The Econometric Analysis of Time Series*, 2nd edition, Philip Allen (1990).

integration. Denoted by the symbol \(\int\). The reverse process to differentiation (see DERIVATIVE.) By integrating a MARGINAL function we can obtain the corresponding total function. Thus for instance,

\[ TC = \int MC \cdot dQ \]

where \(TC\) is total cost (the integral)

\(MC\) is marginal cost (the integrand), and

\(Q\) is quantity, i.e. the variable we are integrating with respect to.

intended inventory investment. The deliberate build-up of stocks. The deliberate rundown of stocks is intended inventory disinvestment. (See INVENTORIES.)

intensive margin. The case of decreasing physical returns to capital or labour applied to a fixed quantity of land. Often accredited to David RICARDO, this theory states that if to a given piece of land equal increments of labour (or capital) are applied the increments in the output \(\Delta\) of the crop produced will at some point reach a maximum and thereafter continuously decline. (See DIMINISHING RETURNS)

Inter-Bank Market. One of a group of interrelated MONEY MARKETS in London. It developed in the 1960s actually as a market in which the 100-CLEARING BANKS lent to one another, but it has since become a general money market used by the whole range of financial institutions both for lending and borrowing. The funds dealt in are in large sums - generally not less than a quarter million pounds - and they are lent, unsecured, at terms which may be 'overnight' or 'at call', or for fixed periods. The market, which is served by a number of firms of money BROKERS, is used by the banks and other institutions to adjust their short-run LIQUIDITY positions, or to obtain funds for on-lending.

intercept. In a LINEAR FUNCTION, the constant term, i.e. that term which does not contain any INDEPENDENT VARIABLES. For instance, in the function

\[ Y = a + bX \]

\(a\) is the intercept, so called because the graph of the function crosses (or intercepts) the \(Y\) axis when \(Y\) is equal to \(a\) (i.e. when \(X = 0\)). In a simple linear CONSUMPTION FUNCTION, the intercept can be interpreted as autonomous consumption, i.e. consumption which would take place even if income were zero.

interdependent utility. If one individual's UTILITY is affected by the quantities of goods and services consumed by other individuals we have the case of interdependent utility. Such effects arise from envy or altruism. Traditionally, WELFARE ECONOMICS is based on an assumption of independent UTILITY FUNCTIONS; under this assumption the utility of individuals depends only upon their own consumption of goods and services. (See EXTERNALITIES.)

Interdistrict Settlement Account (or Fund). A special clearinghouse account used to accommodate transfers of funds among the 12 District Banks of the FEDERAL RESERVE SYSTEM. The Fund offices are located in Washington, DC. For example, if a Cleveland bank (A) receives a cheque drawn on a New York Bank (B), bank A sends it to the Cleveland Federal Reserve Bank which credits the account of Bank A and then sends the cheque on to the New York Federal Reserve Bank. The Cleveland Federal Reserve Bank receives a credit in its account with the interdistrict Settlement Fund. The New York Federal Reserve Bank debits the Federal Reserve account of Bank B and
receives a debit in its own interdistrict Settlement Fund account.

interest.
*See* RATE OF INTEREST.

**interest equalization tax.** In the early 1960s, the US was experiencing continuing balance of payments deficits in large measure because of significant net capital outflows. The interest equalization tax was an attempt to stem that outflow by placing a tax on acquisition of foreign bonds and equities by American residents. The tax was designed to make the after-tax yields on foreign securities equal to yields on comparable American issues. However, the tax was only on securities from Western Europe, Japan, Australia, South Africa, and New Zealand. Canada and the rest of the world were exempt. The tax was very effective in reducing capital outflows directly to the countries included in the tax, but total capital outflows were not decreased dramatically. Furthermore, Canada, Mexico and Latin America in general, soon began to serve as centres for borrowing and relending, making them conduits for the flow of US capital to those nations affected by the tax. The tax was repealed in 1974.

**intergenerational equity.** Fairness in the use of natural resources over time by different generations. The use of a finite resource (unless it can be recycled) or of a RENEWABLE RESOURCE, including the environment, at a rate greater than its regenerative capacity denies the benefits of the use of the resource to a future generation, so that there is an OPPORTUNITY COST, which is not usually considered, in the costs of the current use of the resource. Since in investment appraisal a positive RATE OF INTEREST is used to discount future benefits, this implicitly reduces the importance of future generations. To overcome this, suggestions have been made that Rawlsian procedures be used to decide on the correct rate of use of natural resources. *(See HOTELLING'S RULE.)*

**intergovernmental grants.** Funds provided by one level of government in a country (e.g. the national government) to another level of government (e.g. a local authority in the UK or a state government in the USA). While most western governments involve both local and national tax systems (FISCAL FEDERALISM), intergovernmental grants or ‘grants-in-aid’ from national to local governments have grown in importance. Indeed, in the UK most of the income of local governments is provided by the national government through the RATE SUPPORT GRANT. *(See Grant.)*

**interlocking directorates.** Refers to a situation in which one or more person(s) sit on the board of directors of two or more companies. Where these firms have similar product lines, such conditions can be conducive to collusive activities.

**intermediate areas.** *(See* HUNT REPORT, ASSISTED AREAS.)*

**intermediate good.** A good which is used at some point in the production process of other goods, rather than final consumption. Common examples are steel and wood. It is quite possible for some goods to be both intermediate and FINAL GOOD, as is the case with coal for instance which is used both in the purposes of producing electricity and making steel, as well as directly for domestic heating purposes.

**intermediate lag.** This is part of the operational lag associated with MONETARY POLICY. It represents the time taken for the action of the authorities to have an effect on the intermediate target variables: money supply, interest rates and credit availability. *(See* MONETARY POLICY.)*

**intermediate technology.** A set of techniques and technological processes half way between the highly CAPITAL-INTENSIVE technologies of the Western world and primitive, indigenous techniques of underdeveloped countries. The name was coined in the 1960s by Dr E.F. Schumacher who was one of the pioneers of such ideas. *(See* APPROPRIATE TECHNOLOGY, INTERMEDIATE TECHNOLOGY DEVELOPMENT GROUP, TECHNOLOGY, CHOICE OF.)*

**Intermediate Technology Development Group.** A group set up in 1965 in London by Dr E.F. Schumacher. It has the main activities: a scheme for collecting...
cataloguing data on efficient LABOUR-INTENSIVE techniques which would be suitable for small-scale application. Its second activity is publicity, of the ideas of INTERMEDIATE TECHNOLOGY through articles, books, lectures, its own journal and also by trying to influence aid policies of governments and international organizations. Thirdly, it has a programme of providing aid to specific projects in underdeveloped countries which emphasize the process of self-help using APPROPRIATE TECHNOLOGIES for small communities.

**intermediate variables.**

*See* INTERMEDIATE LAG.

**internal convertibility of soft currencies.** The facility available to residents of a country to exchange domestic CURRENCY without limit for foreign currencies at a rate fixed by the central bank, where the use of the foreign currency is restricted to CURRENT ACCOUNT transactions. Restricted convertibility of this nature has been introduced by former Eastern Bloc countries as part of restructuring of their economies. (*See* POLLUTER PAYS PRINCIPLE.)

**internal drain.** A movement of cash, i.e. circulating media, from the banks into domestic circulation. Under the pre-1914 GOLD STANDARD, seasonal movements apart, this might take the form of an increased demand for gold coin by the public, arising from a mistrust of paper money or of the banking system generally. In the present day the term denotes the seasonal peaks in the public’s demand for currency, or, in the theory of CREDIT CREATION, the rise in the demand for currency (part of HIGH-POWERED MONEY) usually assumed to accompany a general increase in the money supply.

**internal finance.** Those funds retained from NET PROFITS for use in financing a firm’s activities. (*See* EXTERNAL FINANCE.)

**internal growth.** That part of a firm’s expansion which is produced by INVESTMENT within the firm rather than investment in acquisition of other firms and MERGER activity, i.e. EXTERNAL GROWTH.

**internalization.** A situation where an EXTERNALITY, usually an external dis-economy, is taken into account and OUTPUT of the offending GOOD reduced to its optimal level, with the optimal amount of the externality still in existence, i.e. where the cost of reducing the externality by a further unit exceeds the benefit from so doing. This result can be attained in three ways. Where PROPERTY RIGHTS are properly defined and TRANSACTIONS costs not excessive, bargaining between the offending and suffering parties can according to COASE’S THEOREM restore output to its optimal level. Secondly, it may be done by the imposition of a PIGOVIAN TAX equal in value to the external cost on the offending party. Thirdly the result can be attained by changes which place both the suffering and offending parties under one ownership, so that the external cost now becomes internal and taken into account by the owner. (*See* POLLUTER PAYS PRINCIPLE.)

‘internal’ labour market. An arrangement whereby labour is supplied and demanded within the firm without direct access to the EXTERNAL LABOUR MARKET. Different treatment is accorded to the ‘ins’ (i.e. those already employed in the firm) and the ‘outs’. Most jobs within the firm are filled by the promotion or transfer of workers who have already gained entry. The internal labour market thus consists of a set of structured employment relationships, embodying a set of formal/informal rules that govern each job and the interrelationships between jobs. This complex employment relationship is said to have developed partly because of the elaboration of tasks that are specific to a job and thus require SPECIFIC TRAINING, often acquired on the job. A further reason for the development of internal labour markets is likely to have been union pressure for the SENIORITY system (i.e. rewarding those who have a long employment service in the industry). In consequence many jobs will be unique and lack an external market. (*See* ON-THE-JOB TRAINING, IDIOSYNCRATIC EXCHANGE.)

**internal rate of return.**

*See* RATE OF RETURN.

**internal wage differentials.**

*See* RELATIVITIES.
International Bank for Reconstruction and Development. An international development bank established in 1945, along with the International Monetary Fund (IMF), Articles of Agreement signed at the United Nations Monetary and Financial Conference held at Bretton Woods, New Hampshire in July 1944. The Bank, commonly referred to as the World Bank, became a specialized agency of the United Nations in 1947. Initially the Bank was concerned with raising and allocating capital resources for postwar reconstruction in Europe. However, following the establishment of the European Recovery Programme in 1948, the main objective of the Bank has been to assist the economic development of member countries by providing loans where private capital is not available on reasonable terms to help finance investment projects. Loans generally have a grace period of five years and are repayable over fifteen years or less. They are made to developing countries at more advanced stages of growth. Loans are given to, or guaranteed by, governments. In the 1980s the Bank devoted more of its resources to support adjustment and policy reform to promote future growth and equilibrium on the balance of payments. The Bank finances its activities by members' contributions (in 1990 there were 153 members), calculated according to their quotas in the IMF, borrowing in world capital markets and selling portions of its loans. The Bank's lending rate is reviewed at quarterly intervals and is based upon the average weighted cost, by amount and maturity, of capital funds borrowed by the Bank in the preceding year. The Bank also provides and coordinates a wide range of technical assistance for member countries. It conducts project feasibility and evaluation studies and acts as executing agency for a number of development projects financed by the United Nations Development Programme. In addition, the Bank collaborates with numerous international and regional development agencies. The Bank also administers the Economic Development Institute, a staff college which provides training for government officials of member countries who are directly involved with the evaluation and implementation of development programmes. The Bank's lending and technical assistance activities are complemented by three affiliated organizations; the International Finance Corporation, the International Development Association and the Multilateral Investment Guarantee Agency established in 1956, 1960 and 1988 respectively.

international cartel. An agreement among producers, when their number is small, to apportion the world market in a particular good among themselves to obtain profits above the competitive level and in times of depression to avoid cut-throat competition. The interwar period was the hey-day of cartels, when they covered machine tools, electrical machinery, dyestuffs, chemicals and other goods. A cartel tends to be inherently unstable, since it is in the interest of any one member to break the rules, provided other members abide by them. OPEC is the outstanding current example of a cartel.

international clearing union. See Keynes Plan.

international commodity agreements. Agreements made between producer and consumer countries, but occasionally only on the part of producers, in an attempt to secure price stability for primary commodities. Consumers and producers may agree to purchase and supply respectively certain quantities at set prices, while in those involving only producers the schemes usually involve quotas, and occasionally buffer stocks, to control the level of supply. There have, for example, been agreements for wheat, sugar, coffee, tin and olive oil.

International Development Association (IDA). A specialized agency of the United Nations, established in 1960 as an affiliate of the International Bank for Reconstruction and Development of World Bank. It provides capital to governments for development projects in member countries on more favourable terms than those offered by private capital markets or the World Bank. Its loans are concentrated on very poor countries, i.e. those with per capita incomes of $480 or less (in 1987 dollars). Forty countries qualify under this criterion. Most of the association's loans are for periods of 40 to 50 years, with a 10 year initial grace repayment period and are interest free, although a small service charge
of 0.75 per cent per annum is levied. The majority of its loans are provided to improve the physical infrastructure (e.g., transportation systems, electrical generation and transmission facilities, flood control schemes) in DEVELOPING COUNTRIES. In 1989 the Association had 137 members.

**International Development Co-operation Agency (IDCA).** An administrative agency established in 1979 to oversee all forms of US assistance to underdeveloped countries, including foreign aid grants, concessionary loans, food aid under Public Law 480, technical assistance, and personnel transfer (e.g., Peace Corps). The most important sub-organization which is part of IDCA is the Agency for International Development (AID) which is responsible for the actual implementation of almost all aid programmes.

**International division of labour.** Specialization in production on a national basis. While division of labour within an economy may include concentration upon a particular part or process in the production of a good, specialization in the international sphere tends to be concentrated more on products. The arguments advanced for the international division of labour rest on different labour productivities (RICARDO) and different factor endowment (HECKSCHER-OHLIN). Such specialization leads to a more efficient allocation of resources in the world economy and to gains from trade. Nevertheless most countries interfere with its free operation. (See FREE TRADE, PROTECTION.)

**International economics.** That part of economics which deals with transactions between countries in the fields of goods and services, financial flows and factor movements. It is conventionally divided into two subject areas, pure theory and monetary theory. In the former, attention is focused on REAL magnitudes such as GAINS FROM TRADE, TERMS OF TRADE, patterns of trade, etc., while the latter is preoccupied with the determination of the EXCHANGE RATE between currencies and with ADJUSTMENT MECHANISMS for attaining equilibrium in the BALANCE OF PAYMENTS. See Grubel, H.C., *International Economics*, revised edn., Irwin, Homewood, Illinois (1981).

**International Finance Corporation.** An international development agency, established in 1956 and later made a specialized agency of the United Nations in 1957. Although affiliated with the INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT, it is a separate legal entity with its own share capital and equity holdings in development projects. It seeks to encourage economic growth and the development of local capital markets in member countries by providing loans and equity capital, without government guarantees, to finance projects where sufficient private capital is not available on reasonable terms. The Corporation also carries out underwriting operations, provides financial support for pre-investment evaluation studies and coordinates industrial, technical and financial aspects of development projects. Its activities are financed by subscriptions from its member countries and periodic sales of its investments.

**International Labour Office.** An intergovernmental organization, established in 1919 by the Treaty of Versailles, which became a specialised agency of the United Nations in 1946. The Organization seeks to promote international co-operation regarding policies designed to achieve full employment, improve working conditions, extend social security and raise general living standards. In addition to adopting conventions and issuing recommendations on a variety of labour issues, the organization supports research conducted at the International Institute for Labour Studies and provides technical assistance in fields such as vocational training, co-operative development and occupational safety.

**International liquidity.** In the final analysis, debts between nationals of different countries are settled by the transfer of some internationally accepted means of payment: i.e. gold, one or other of the major RESERVE CURRENCIES, or - to a more limited extent - SPECIAL DRAWING RIGHTS (SDRs). 'International liquidity' is used to denote either the total stock of these various means of payment, or the stock of them relative to the potential demands on that stock. So far as such demands arise from imbalance in payments between countries, they may be
held to be related to the level and growth of world trade. However the availability of international lending facilities, either through bodies such as the INTERNATIONAL MONETARY FUND (IMF) or through the EURO-CURRENCY markets, greatly affects the international liquidity situation since such facilities are a means of redistributing the available stock of international means of payment. When the demands arise because of a loss of confidence in a particular currency, liquidity may have to be mobilized on an international scale, and provided in a way analogous to that given by a CENTRAL BANK acting as LENDER OF LAST RESORT.

**international monetarism.** A school of thought which holds that changes in the world MONEY SUPPLY are the principal source of inflationary and deflationary pressure in the international economy. Thus rapid monetary expansion by either a large country relative to the rest of the world or simultaneously by a number of small countries will result in inflationary pressure throughout the world under a FIXED EXCHANGE RATE regime. In a world of fixed exchange rates, flows of international reserves add to and reduce the domestic money supply of surplus and deficit countries respectively, and thus there is a tendency for a uniform rate of price inflation to emerge throughout the world. It follows that in a world of fixed exchange rates the rate of price inflation in a small open economy cannot be independent of the world rate of inflation.

In a world of fixed exchange rates the following mechanism is postulated: excess growth in the money supply of a particular country results in excess cash balances and the subsequent attempt to bring this back into the desired ratio within the country's portfolio, leads to the purchase of both domestically and foreign produced commodities and securities. Thus a deficit on either or both current and capital account will emerge which will have to be financed by borrowing abroad and running down foreign exchange reserves. The magnitude of the reserves and the borrowing facilities places a limit on the extent to which the country can continue to increase the money supply and thus the domestic price level. Conversely a country with a BALANCE OF PAYMENTS surplus on either capital or current account will experience a new inflow of foreign exchange and thus an addition to the domestic money supply. It may attempt to neutralize or sterilize the impact of such inflows by the sale of BONDS to the public to reduce their cash balances, but again there are limits to this process. The continued sale of bonds will push down the price and raise the interest rate which in turn will increase the net inflows on capital account. Thus in the deficit country there will tend to be a net outflow of money reducing the inflationary pressure while the surplus country will experience a net inflow and hence inflation. In this manner inflation rates will tend to equality and equilibrium of the balance of payments be restored.

In the case of floating exchange rates, a rapid expansion of the domestic money supply will lead directly to depreciation of the currency. Domestic residents will seek to reduce their holdings of cash and restore the value of cash balances within their portfolios by purchasing foreign commodities and securities. Conversely the countries with a rate of growth of the money supply less than the rate of growth of income will seek to increase their cash balances to enable them to finance their increased volume of transactions. The country will thus experience a net inflow of funds as the residents of this country increase their exports or their sales of foreign securities in an attempt to increase their cash balances. Thus a country with a rapid growth of real income and a slow growth of domestic money supply will experience an appreciation of its currency due to the tendencies toward a surplus on either capital or current account. (See MONETARISM, SPECIE FLOW MECHANISM.)

**International Monetary Fund (IMF).** The International Monetary Fund was established in December 1945 following ratification of the Articles of Agreement of the Fund, formulated at the United Nations Monetary and Financial Conference held at BREITON WOODS, New Hampshire in 1944. The fund became a specialized agency of the United Nations in 1947. The purposes of the fund are to encourage international monetary co-operation, facilitate the expansion and balanced growth of INTERNATIONAL TRADE, assist member countries in correcting BALANCE OF PAYMENTS deficits and promote
FOREIGN EXCHANGE stability. The 'Bretton Woods System', or international monetary system established by the fund, was based upon a policy of FIXED EXCHANGE RATES, the elimination of exchange restrictions, CURRENCY CONVERTIBILITY and the development of a multilateral system of international payments. Exchange rates were based upon a par value system which required member countries to constrain fluctuations in their exchange rates within a margin of plus or minus one per cent round a par value expressed in terms of US dollars, which in turn were directly convertible into gold at a fixed rate. However, following the 1971 decision of the US to suspend the convertibility of dollars into gold, the ministers and CENTRAL BANK governors of the Group of Ten (see below) met in December 1971 at the Smithsonian Institute in Washington DC and ratified the 'Smithsonian Agreement' which resulted in a 10 per cent devaluation of the dollar and a realignment of exchange rates, including wider margins of fluctuation in lieu of par values. This adjusted par value system was largely abandoned when, following another dollar devaluation in 1973, the EUROPEAN COMMUNITY member countries introduced a joint system of floating their currencies against the dollar. In 1972, following the initial collapse of the Bretton Woods System of exchange rates, the fund established a Committee on Reform of the International Monetary System and Related Issues which issued a set of recommendations eventually adopted in 1976 by the Jamaica Agreement (see below).

The fund relies upon members' contributions and borrowing arrangements to finance its operations. Member contributions, payable in SDRs (see below), other members' currencies or its own currency, are determined by a quota system which assigns each member a quota related to its NATIONAL INCOME, MONETARY RESERVES, ratio of EXPORTS to national income and other economic indicators. A member's quota, which is periodically reviewed and revised, also determines its drawing rights on the funds under both regular and special facilities, its allocation of SDRs and its voting power. In 1962 an agreement was concluded whereby the Group of Ten: Belgium, Canada, France, the Federal Republic of Germany, Italy, Japan, the Netherlands, Sweden, the UK and the US along with Switzerland (an associate member of the fund), undertook to provide up to $6900 million in their own currencies if required by the fund. These General Arrangements to Borrow were reformed in 1983 and renewed for 5 further years from 1988. Until 1983 only the Group of Ten plus Switzerland could borrow under the scheme, but this right was extended to other members of the IMF and the funds available were increased to SDR 17 billion. This increase together with the increase in quotas in 1984 was necessary to permit the IMF to come to grips with the debt problems of the developing countries. These countries had borrowed heavily from commercial banks in the 1970s and largely because of the oil price hike of 1975-80 and the collapse of primary product prices in the early 1980s (the result of the world recession) they were unable to service their debts. The Fund working closely with the IBRD has played a crucial role in a series of ad hoc rescue packages, as the two institutions were in a unique position of being able to provide finance in support of adjustment programmes in debtor countries and act as a catalyst for other private and official lenders.

A number of credit regulations, known as tranche policies, control members' access to the fund's general resources. In general, the tranche policies limit purchases of foreign currencies by a member to some multiple of its quota but this figure can be as much as 440 per cent for countries which can avail themselves of all the existing facilities. Access to the various facilities is only granted to countries, which have accepted certain conditions laid down by the fund with respect to appropriate policies towards the balance of payments, growth and employment creation, financial stability, structural reform and restrictions on trade and payments. These terms, which have to be accepted by a borrower, are known as conditionality. In addition to the normal stand-by facilities, the fund has established a compensatory scheme for financing temporary export fluctuations, a BUFFER STOCK financing facility, an extended facility which provides medium term financing for up to 4 years to enable members to overcome structural balance of payments difficulties, a structural adjustment facility and an enhanced structural adjustment facility.
international trade

The latter 2 facilities are designed to help low income countries improve their growth prospects.

Against a background of inadequate growth in gold production in the early 1960s, discussions took place on how to augment international LIQUIDITY. At the IMF meeting at Rio de Janeiro in 1967, a draft outline for a scheme of Special Drawing Rights (SDRs) was produced. In 1969, the members of IMF agreed to an amendment in the fund's articles to permit the fund to operate a Special Drawing Fund in addition to its General Fund and the first allocation of SDRs took place in 1970, with subsequent allocations in 1971, 1972, 1979, 1980 and 1981. The SDR is an accounting creation without any backing, which, subject to a variety of conditions, debtor countries may use to settle debts. Debtors run down their drawing rights, while creditors' balances are increased. The SDR has also been adopted by other international and regional financial institutions. Initially, the value of the SDR was equivalent to that of the US dollar. However, following the emergence of floating exchange rates in 1973, the value of the SDR was based upon a weighted basket of 16 currencies, where the weights reflect the importance of members' currencies according to the relative share of their economy in the volume of world exports. In 1981, the basket of currencies used to determine the value of the SDR was changed to include only the US dollar, the West German Deutschmark, the French franc, the Japanese yen and the UK pound sterling as these were the currencies of the five members having the largest volume of exports between 1975 and 1979. The fund has also distributed SDRs according to the above Quota system in order to supplement the reserve assets of member countries. SDRs have not been as successful as their protagonists had hoped as they play only a very minor role in the total of international settlements. The fund's Articles of Agreement were substantially revised following the 'Jamaica Agreement' concluded at Kingston, Jamaica in May 1976. The agreement reduced the role of gold in the international monetary system, acknowledged the system of 'floating' exchange rates, revised the valuation and Possible uses of the SDR and authorized the sale of the fund's gold reserves for the benefit of developing member countries.

Apart from making loans, the other function of the IMF is the surveillance of exchange rate policies of members i] to attempt to secure consistency in monetary and economic policies at the world level. This is done by engaging in annual or biennial cussions with members.

Executive authority for the Fund's activities is vested in a Board of Governors composed of two representatives from each member country. Daily activities of the Board are conducted by a permanent staff under the supervision of the Managing Director, Board of Executive Directors. See de Vries, M.G., *The International Monetary Fund*, vols., IMF, Washington (1985).

international payments system. A general term referring to the way in which international financial transactions are carried out, that is payments between residents of different countries who hold different national currencies. The term covers the different systems of EXCHANGE RATES, EXCHANGE CONTROL and questions concerned with national LIQUIDITY.

International Standard Industrial Classification (ISIC). An industrial classification of economic activity which is designed to promote international comparability in statistics compiled and published by the United Nations. The classification is essential in compromise between the systems of industrial classification employed by countries throughout the world. (See STANDARD INDUSTRIAL CLASSIFICATION.)

international trade. Trade between national or foreign trade is that which involves the use of different currencies subject to additional regulations such as IFFS, QUOTAS and EXCHANGE CONTROLS. International trade is held to take place because of cost differences between national or because of the absolute non-availability of goods or services in countries. International trade leads to GAINS FROM TRADE. The theory of COMPARATIVE ADVANTAGE shows that the difference required in costs between national is not an absolute advantage but a competitive advantage, based on a difference in structure among countries.
International Trade Organization (ITO). In 1947 the United Nations Economic and Social Council convened in Havana, Cuba, an International Conference on Trade and Development 'for the purpose of promoting the production, exchange and consumption of goods'. The Conference drew up the Havana Charter which proposed both the establishment of an International Trade Organization under the aegis of the United Nations, and a 'code of conduct' for member countries regarding commodity agreements, CUSTOMS UNIONS, export subsidies, FREE TRADE AREAS, QUOTAS, TARIFFS and other topics related to the development of international trade. Although 50 countries signed the charter, it failed to receive the necessary number of ratifications and the idea of a permanent international trade body was temporarily abandoned until 1964 when the UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD) considered the establishment of a universal trade organization. The proposed trade organization would represent all countries, irrespective of United Nations membership, provide a forum for discussing all aspects of international trade, and implement corresponding policy decisions and recommendations. However, once again the proposed International Trade Organization was not set up as the conference established itself as an organ of the United Nations General Assembly which together with the GENERAL AGREEMENT ON TARIFFS AND TRADE has carried out most of the functions outlined for the proposed organization.

International Wheat Council. An international commodity organization, established in 1979 under provision of the First International Wheat Agreement, which administers the Wheat Trade Convention of the 1971 International Wheat Agreement. The Council's activities include encouraging international co-operation regarding wheat problems, promoting international wheat and wheat flour trade and contributing to the stability of the international wheat market. Current members include 9 exporting countries, 39 importing countries and the EUROPEAN COMMUNITY (EC) which is both an exporting and importing member.

interquartile range. A measure of dispersion of sample data or distributions, defined as the difference between the upper and lower QUARTILES, and therefore containing the central 50 per cent of the observations on the variables concerned. (See RANGE, STANDARD DEVIATION)

Interstate Commerce Act. The act which established the Interstate Commerce Commission (ICC) in the US in 1887. The ICC was the first modern federal regulatory agency. The main provision of the Act was related to common carriers 'engaged in the transportation of persons or property wholly by railroad, or partly by railroad and partly by water, when both are used under a common control, management or arrangement for a continuous carriage or shipment' and was designed to correct abuses such as excessive pricing and PRICE DISCRIMINATION. It extended to all traffic that was either interstate, or with foreign countries. Although the Commission's jurisdiction then encompassed pipelines (it does so no longer), inland waterways and several utilities, its major significance has probably been felt in the railroad and trucking industries.

interval estimation. The ESTIMATION of a range in which the value of true PARAMETER is likely to lie. This normally involves the calculation of CONFIDENCE INTERVALS. The name is used to distinguish the procedure from POINT ESTIMATION, which involves the actual estimation of the parameter value (i.e. the calculation of one number). (See STATISTICAL INFERENCE.)

'in the Bank'. The LONDON DISCOUNT MARKET is said to be 'in the Bank' when all or some of the DISCOUNT HOUSES are compelled, by the banks withdrawing their MONEY AT CALL, to borrow or rediscount bills at the BANK OF ENGLAND'S Discount Office. (See LENDER OF LAST RESORT.)

inventories. Stocks; holdings of goods by firms to enable them to meet temporary unexpected fluctuations in production or sales. They are, therefore, a form of INVESTMENT and may be either intended or unintended.
inventory cycle. Fluctuations in the level of output caused by changes in INVENTORY holdings. Demand for output arises from sales of output and from inventory holding by firms. Sales can be (partly) met from a rundown of inventories such that output is depressed; likewise output is boosted if INVENTORY INVESTMENT is in progress. Many firms try to maintain a constant inventory to sales ratio which implies that changes in sales lead to greater changes in output as the constant ratio is maintained.

inventory investment. The accumulation of inventories when production exceeds actual sales. If production is less than sales, inventory DISINVESTMENT takes place. Often such investment is unanticipated and acts as a buffer between output and uncertain sales.

inverse function rule. A rule for the determination of the DERIVATIVE of a function where the variable with respect to which we wish to differentiate is expressed as the dependent variable. It states that

$$\frac{dY}{dX} = \frac{1}{dX/dY},$$

so that if we have the function

$$X = a + bY,$$

we can determine that

$$\frac{dX}{dY} = b, \text{ so that}$$

$$\frac{dY}{dX} = \frac{1}{b}.$$

investment. The term is most commonly used to describe the flow of expenditures devoted to increasing or maintaining the real CAPITAL STOCK. In fact a more accurate definition, which clearly encompasses the above, is that investment is the flow of expenditures devoted to projects producing goods which are not intended for immediate consumption. These investment projects take the form of adding to both physical and HUMAN CAPITAL as well as INVENTORIES. Investment is a flow, the volume of which is determined by all those projects which yield a Positive NET PRESENT VALUE, or an INTERNAL RATE OF RETURN greater than the interest rate. The former is known as the ENT VALUE criterion and the latter the MARGINAL EFFICIENCY OF INVESTMENT.

investment criteria (for DEVELOPING COUNTRIES). Criteria proposed to base the allocation of investible capital in very scarce supply in these countries and so it is important that available supply be allocated in an efficient manner to obtain developmental objectives. Many criteria have been proposed by economists. These are often contradictory. Sometimes the contradiction may cause different development projects to be assumed by different authors. Often assumptions are made about which should be reflected in the investment undertaken. Thus one may be to maximize the total output head at the end of a specified time (say 10 years). This objective would lead to a different ordering of investment projects in a situation where the goals were to maintain output and consumption over a shorter period. The first objective requires an allocation of investible capital which have a low priority to consume the short term compared to the longer run.

Special consideration of investment in developing countries is also needed because markets are so imperfect that market prices (both goods and labor) greatly out of line with SOCIAL OP COSTS or SHADOW PRICES. Use of market values may give wrong indications of relative social values of goods and services produced and lead to a misallocation of resources. In developing countries the distribution of income could be significantly altered by a set of new projects. It may be so pronounced that it is suggested by some economists that distributional considerations require to be explicitly taken into account when proposed projects are examined for acceptance. The SOCIAL MARGINAL PRODUCTIVITY criterion (LITTLE-MIRRLEES METHOD, UNID, LINES.)

investment grants. Funds made available by government or other agencies for the purpose of encouraging FIRMS to make new investments on the acquisition of physical assets. These grants are generally provided in the form of a fixed percentage of the cost of the project.
expenditures. Governments provide investment grants as a policy to encourage economic growth in general, in order to support particular industries and to promote the economic development of particular geographical areas. (See Regional Development Grant.)

**investment trust.** A company whose function is to invest in other organizations. It raises capital in a manner similar to other companies and usually invests the proceeds in a wide range of other organizations to spread risk. An investment trust frequently raises part of its capital in the form of debentures or loan stock as well as ordinary shares and can thus obtain the benefits of gearing. Investment trusts put their capital into both equities and gilt-edged securities. The stock exchange price of an investment trust share, unlike that of a unit trust share, is usually less than the sum of the prices of the shares owned by the trust in other companies. Its shares usually trade at a discount to its net asset value. They now constitute a leading example of an institutional investor in the UK along with others such as pension funds and insurance companies. There are around 300 investment trusts in the UK and their invested funds greatly exceed those managed by unit trusts despite the greater public knowledge of the latter.

**Investors in Industry.** A development finance company formed in 1946 as the Industrial and Commercial Finance Corporation (ICFC) by the Bank of England and the London and Scottish Clearing Banks, at the instance of the government, to fill one of the 'gaps' in the UK capital market identified by the Macmillan Committee. The company advances capital on equity and debt terms to small companies, in amounts too large or too long-term for bank lending but too small to be raised by a public issue of securities, and it also assists with management advice. It was announced late in 1991 that the company is to be floated on the stock market in 1992 as an investment trust, expected to be worth about £1 billion.

**invisible hand, the.** A term for the unseen process of co-ordination which ensures consistency of individual plans in a decentralized market economy. The phrase was introduced by Smith (Wealth of Nations, Book IV, Ch. II), who stressed the role which the invisible hand played in attaining a harmony of interests. Smith argued that an individual 'who intends only his own gain' is 'led by an invisible hand to promote an end which was no part of his intention'. The end referred to is the interests of society. The modern view is that while the hand undoubtedly operates, it is arthritic.

The problem of co-ordination in a general equilibrium system was analysed by Walras in the nineteenth century and by Arrow and Debreu in this century. (See Economic Liberalism, Laissez-Faire.)

**invisibles.** See balance of payments, balance of trade, current account, exports.

**involuntary unemployment.** That unemployment which would be eliminated by a rise in aggregate demand which resulted in higher prices and a lower real wage. While resisting money wage cuts because there is no mechanism which can secure these without disturbing the existing structure of wage differentials, Keynes suggested workers would accept a cut in the real wage brought about by higher prices. The alternative interpretation of the General Theory as summarized in the neo-classical synthesis suggests that involuntary unemployment is that unemployment which is eliminated by an increase in aggregate demand, the price level remaining unchanged.

**iron law of wages.** The hypothesis that, regardless of the possibility of upward movements in wages in the short run, wages would inevitably return to the subsistence level in the long run. This 'law' is a combination of the wages fund doctrine and Malthus' law of population. The former states that the wages fund for the current period comprises the entire output of the previous period less that which is removed by entrepreneurs for their consumption. This magnitude determines the total amount available for wages in the current period. The wages fund can expand with technological advance, at which point the Malthusian argument enters: any increase in the wage rate will encourage a growth of population
and ultimately an increase in the labour force. Consequently the wage rate falls to its subsistence level - death constraining further falls in wages. The relevance of the above argument is today restricted to primitive agricultural economies.

irredeemable loan stock.
See FINANCIAL CAPITAL.

irredeemable preference shares.
See FINANCIAL CAPITAL.

irreversibility. In the context of NATURAL RESOURCES or the environment an action whose effects cannot be reversed either absolutely or because the costs of doing so would be extremely high. If economic development leads to the extinction of a species, this cannot be reversed. If a hydro-electric scheme requires the flooding of a village, this can only be reversed at great cost. (See OPTION VALUE.)

IS curve.
See IS-LM DIAGRAM.

ISIC.
See INTERNATIONAL STANDARD INDUSTRIAL CLASSIFICATION.

Islamic Development Bank. A regional development bank, created in 1974 by the Organization of the Islamic Conference to encourage economic growth in Muslim countries and communities. The Bank, adhering to the Koranic principle forbidding usury, does not grant loans or credits for INTEREST. Rather, it finances industrial development projects by holding equity capital or granting loans at a nominal 'commission' rate. In addition, the Bank extends loans which assist member countries in financing essential IMPORTS.

IS-LM diagram. The diagram detailing the simultaneous determination of equilibrium values of the interest rate and the level of national income as a result of conditions in the goods and money markets: the integration of the real and monetary sectors of the economy by HICKS and Hansen to reveal the determination of macroeconomic equilibrium. (See diagram.).

The IS curve is the schedule detailing the combination of interest rates (of national income (Y) which ensure equilibrium in the goods market. Along this schedule total WITHDRAWINGS and taxation in the CLOSING case, equal total INJECTIONS, in government expenditure. The IS curve reflects the simple case dealt with initial exposition when only investment were considered. It is the schedule detailing the coexistence of interest rates and levels of national income which ensure equilibrium in the market. At all points along this curve demand for money for transactions, precautionary motives if we sum into transactions demand) and purposes is equal to the EXOGENOUSLY supplied supply of money. Initial IS curve was titled the L curve by Hansen christening it the LM curve realizing that it represented a curve L, the demand for money = M, in money.

The model represents an integral part of the GENERAL THEORY but in direction to the equilibrium conditions the attention from the underlying structure and one of the central themes in GENERAL THEORY; the uncertainty characterizes a monetary economy's

NEOCLASSICAL SYNTHESIS.)
iso-cost curve. A curve or line showing the combinations of any two inputs that can be bought with a fixed sum of money. It is analogous with the consumer's BUDGET LINE, but relates to the firm's purchase of inputs. The tangency of the iso-cost curve with the ISO-PRODUCT CURVE defines the least-cost combination of inputs for the production of a given level of output. The iso-cost curve is also known as the iso-outlay line (curve). (See COST MINIMIZATION.)

iso-outlay line (also known as iso-outlay curve).
See ISO-COST CURVE.

iso-product curve (also known as producers' indifference curve, or isoquant). An iso-product curve traces out the combinations of any two or more INPUTS which give rise to the same level of OUTPUT. These combinations must be the most efficient ones - i.e. any point on an iso-product curve shows the minimum quantities of the inputs needed to produce the given output. Iso-product curves are typically drawn as being convex to the origin because of the assumed substitutability of inputs (Curve 2 in the diagram). Where inputs are complementary the iso-product curve will be a perfect 'L' shape (Curve 1). Where they are perfect substitutes the iso-product curves will be straight lines. (See PROCESS, ELASTICITY OF INPUT SUBSTITUTION.)

iso-profit curves. The locus of combinations of two or more independent variables of the PROFIT FUNCTION which yield an equal profit. This is a commonly used concept in OLIGOPOLY theory.

isoquant.
See ISO-PRODUCT CURVE.

iso-revenue line (curve). The locus of combinations of OUTPUT and marketing outlays which yield a given level of TOTAL REVENUE. Thus for instance, the general functional form of an iso-revenue curve comprising output and ADVERTISING outlay combinations will be

\[ \overline{TR} = f(Q,a) \]

where \( \overline{TR} \) is the given level of total revenue, \( Q \) is output and \( a \) is units of advertising. This function will then trace out those combinations of \( a \) and \( Q \) which yield \( \overline{TR} \). Totally differentiating (1) gives

\[ d \overline{TR} = \frac{\partial TR}{\partial x} dx + \frac{\partial TR}{\partial a} da = 0 \]

and manipulating to solve for

\[ \frac{da}{dx} \]

yields:

\[ \frac{da}{dx} = -\frac{\partial TR/\partial x}{\partial TR/\partial a} \]

(3) states that the slope of an iso-revenue curve, i.e. the rate at which output can be substituted for units of advertising in order to maintain \( TR = \overline{TR} \), is given by the ratio of the marginal revenue product of output to the marginal revenue product of advertising.

issued capital. When a COMPANY limited by shares is formed it is authorized to raise capital by the issue of shares up to a certain amount. The issued capital is the amount of the authorized capital which has in fact been issued as shares. A company will not usually issue the full amount of the shares which it is authorized to issue, reserving part for later issue as capital needs arise. (See LIMITED LIABILITY, PAID-UP CAPITAL.)
issue department. The department of the BANK OF ENGLAND responsible for the bank's note issue. It was established under the BANK CHARTER ACT of 1844, to separate the Bank's note issuing function from its other banking business, for which the Banking Department was formed, and to manage the Bank's note issue in accordance with the principle of currency control embodied in that Act. Thus the Issue Department was responsible for the FIDUCIARY ISSUE, holding the government SECURITIES against which this issue was made. But, additionally, it issued banknotes in excess of the fiduciary limit on a one-for-one basis against holdings of gold, and as a consequence became the repository of the country's gold reserve. Also under the 1844 Act, the income derived by the Department from note issue was payable to the Exchequer. At the outbreak of war in 1939, all the Department's gold was transferred to the EXCHANGE EQUALIZATION ACCOUNT and the Bank's note issue became wholly fiduciary, which it has remained ever since. A function of a different kind performed by the Department since the late 1920s is as an underwriter of new issues of GILT-EDGED. Stock not taken up by the public on issue is absorbed by the Issue Department and certain other public agencies, to be sold subsequently through the 'tap'. (See CURRENCY SCHOOL, TAP ISSUE.)

issuing broker. Some new issues of securities by companies or other bodies are handled by stockbrokers acting in this respect like ISSUING HOUSES. In all new issues where a Stock Exchange quotation is desired, a stockbroker to the issue employed to negotiate the quotative advise on terms and conditions of the issue and acting with the issuing house which undertakes the issue and acting with the issuing house which undertakes the issue advises on terms and timing of the issue, arranges a quotation on the EXCHANGE (in the case of a public company) and also the sub-underwrites the issue in INSURANCE companies a financial institutions. In the UK the Issuing Houses Association which 160 members. (See ISSUING BROKER.)

Issuing Houses Association. An institution, free of Merchant Bank, which amongst other ties specializes in handling new issues and bonds on behalf of companies or other finance requiring e.g. governments and local authorities. Issuing house is the main underwriter of new issues of GILT-EDGED. Stock not taken up by the public on issue is absorbed by the Issue Department and certain other public agencies, to be sold subsequently through the 'tap'. (See CURRENCY SCHOOL, TAP ISSUE.)

ISSUING HOUSES. See INTERNATIONAL TRADE ORGANIZA
**J curve.** In the period immediately following a DEPRECIATION or DEVALUATION of its currency a country may experience a BALANCE OF PAYMENTS deficit. In the subsequent period however this will be eliminated and the current account slowly moves into surplus. The J curve is so named since it describes the shape of the time path the current account figures may follow if time is plotted on the horizontal axis and the balance of trade on the vertical. In explanation of these events it is usually argued that the volume of EXPORTS and IMPORTS respond only slowly to the change in relative prices that the devaluation has introduced and therefore imports remain high and exports low in the immediate post-devaluation period. Moreover when both exporters and importers quote prices in their own currency the foreign currency receipts from exports will decline while the amount of domestic currency paid for imports will rise.

**'jelly' capital.** The term used to describe CAPITAL when it is theoretically assumed that the CAPITAL-LABOUR RATIO can be altered immediately.

**Jevons, W. Stanley** (1835-82). A civil servant and later Professor, first at Owens College, Manchester and later at London University, Jevons was an economist of great originality, though he neglected to work most of his ideas out fully. In his major work, *The Theory of Political Economy* (1871), Jevons largely anticipated the ideas of the AUSTRIAN SCHOOL on the marginal utility analysis of value and on the theory of capital and interest. Of the three recognized founders of the marginal utility approach to value (the others being Menger and Walras), Jevons has claim to priority having first publicly expounded the doctrine in 1862. He also introduced the notion of DISUTILITY of labour.

He brought time into the production process and into the theory of capital before BOHM-BAWERK. He regarded investment as having two aspects, volume and period for which it is invested. He held that an increase in capital was synonymous with a lengthening of the period of investment and that the productivity of capital is a function of time. The rate of interest in turn depended on the MARGINAL PRODUCT of Capital.

Jevons also made celebrated contributions to the problem of index numbers, where he constructed a weighted price index, and to the theory of trade cycles with his 'sunspot' theory. Sunspots affected the weather, which affected harvests which in turn influenced the general economy.

**jobber.** The name prior to the Big Bang of 1986 for a market-maker on the London STOCK EXCHANGE.

**job cluster.** A stable group of occupations or work assignments within an INTERNAL LABOUR MARKET which are so linked that they have common wage settling characteristics. The jobs are linked together (a) as a result of the technology of the workplace, (b) as a result of the administrative organization of production or (c) as a result of social custom. Each job cluster will contain one or several 'KEY RATES' of pay and associated with each of these will be further jobs which enjoy an established DIFFERENTIAL between their rate of pay and that of the key rate.

**job competition theory.** An attempt to replace the orthodox wage competition model in which workers compete with each other for jobs by altering the wage rates for which they will work. The main elements of the theory are that the number and type of jobs available are technologically determined; that workers' skills (see HUMAN CAPITAL) and their wage offers (see RESERVATION WAGE) are irrelevant in determining the number and type of jobs actually filled; that wages are rigid and as such determined by custom and institutional factors; that queues of workers at fixed wages constitute the supply of labour - workers thus compete for
Job search channel; that employers use screening devices to hire workers based upon their presumed adaptability and trainability (see SCREENING HYPOTHESIS); and that all training is acquired on-the-job, so that the labour market is a market for training slots. (See INTERNAL LABOUR MARKET.)

Job creation. Action in the widest sense to reduce the stock of unemployment in recession, either by reducing the flow of redundancies or by increasing the rate of outflow from the ranks of the unemployed. Job creation may be either direct or indirect in form. By direct job creation is meant the provision of jobs in the public sector. This method is favoured by those of DUAL LABOUR MARKET persuasion and by those who see in the very directness of the measures the prospect of a 'bigger bang' per fiscal pound. Indirect job creation, on the other hand, operates via the subsidization of the private sector. Private sector employers may be given subsidies to preserve employment (i.e. defer redundancies). It has been claimed that job subsidies can reduce the budget deficit and dampen the rate of inflation at the same time as they promote or maintain employment. However, each of these claims has been strongly countered and there is no consensus on the efficacy of the measures in question. A similar conclusion follows in the case of public sector job creation.

Job duplication. This occurs when an individual has more than one form of employment at the same time and therefore is not dependent on only one source of income. It is particularly prevalent in underdeveloped countries especially in the INFORMAL SECTOR.

Job evaluation. A process whereby the various elements of a job - such as different skills, acquired knowledge, responsibility, and physical working conditions - are each rated and an overall rating for the job obtained. Points are accorded to the various job factors and these points are aggregated following the weighting of each component. The differences in the weighted totals for different jobs are then used to determine relative wages. The process is, however, related to the market rates ruling for certain key jobs. From these KEY RATES a curve, or REGRESSION line, is obtained relating pay to the job evaluation. The wage rates for remaining non-market jobs can then be fitted into the structure and differences between current pay levels and evaluate levels met by upgrading or downgrading (while maintaining 'personal' wage levels met by upgrading or downgrading (while maintaining 'personal' wage levels met by upgrading or downgrading (while maintaining 'personal' wage levels met by upgrading or downgrading (while maintaining 'personal' wage levels met by upgrading or downgrading the old level) as appropriate. Note that evaluation is a subjective process, the success of which depends on its concordance with what the market would dictate.

Job search. The process of gathering information about the existence of job vacancies and the wage rates attaching to each vacancy in the labour market. Even in a world of HOMOGENEOUS commodities there will normally exist some dispersion of prices. With perfect information is costlessly provided so that market participants will know the price. The labour market is characterized by neither job/worker homogeneity nor perfect information. Thus there will be some job search dispersion and because of this it will be necessary for workers to search the market for a wage rate offer. The more an individual searches, the greater the probability that he will locate a higher-paying job offer obtained although the search process will produce diminishing returns, because there are fewer options to examine. The search for information is costly with the chief cost being a loss of time. It is often assumed that the process is most efficient when the workers are unemployed. From this arises the notion of search unemployment. Here, the cost of search is the income foregone from earning less any unemployment benefit received. The costs represent an investment on which a return in the form of a higher wage offer is expected. Not all wage offers will be identified: the worker will not search when it seems that the benefits of additional search are probably not worth the costs of additional search. An actual received change in the costs and benefits of search will thus have an effect on the duration of search and hence upon unemployment and wage dispersion.

Job search channels. The methods through which jobs are identified and/or obtained are classified as either 'formal' or 'informal'. Formal methods include public employment service, private employment agencies and trade union networks.
Informal methods comprise employee referrals and gate applications. Informal search activities are not only the most common, they are also the most effective job search methods for BLUE-COLLAR WORKERS (effectiveness here being defined as the change in the probability of finding a job when the particular search activity is used, rather than cost-effective).

**job shopping.** A tendency among younger workers, and in particular teenagers, to search for suitable employment on a trial and error basis. Job shoppers tend to move from one job to another, finding out in a rather expensive way what kind of work they like.


A member of the CHICAGO SCHOOL, in addition to original contributions in the field of BALANCE OF PAYMENTS, TARIFFS, and factor payments, he synthesized much of the contemporary work on INTERNATIONAL ECONOMICS and INTERNATIONAL MONETARY ECONOMICS.

**joint probability distributions.** Probability distributions which give the probability with which two or more variables take on certain values (or fall within certain ranges) simultaneously. Included amongst their parameters are the MEANS and VARIANCES of the individual variables, and the COVARIANCES between them.

**joint products.** Commodities which have the property that in production a change in the rate of output of one brings about a similar change in the other(s). Any change in supply and demand conditions will therefore be transmitted between the markets of joint products. Examples of joint products are wool and mutton, gas and coke, petrol and heavier oils.

**joint profit maximization.** The maximization of the combined profits of an existing group of FIRMS. This is a feature which can characterize OLIGOPOLISTIC market structures, where firms mutually recognize their interdependence and are thus motivated to overcome rivalry and adopt goals such as joint profit maximization.

Joint profit maximization requires the group of firms to find that industry output level at which industry MARGINAL COST and MARGINAL REVENUE are equal. Each individual firm's output level is found by equating industry marginal revenue with the firm's marginal cost. If there is variance in the cost conditions facing each individual firm, then this requires each firm adopting an output level which they would not have adopted if acting independently. To induce allegiance to the goal of joint profit maximization SIDE PAYMENTS between the firms in the oligopoly will be necessary. (See CARTELS.)

**joint stock company.** Joint stock companies developed out of the requirements by many undertakings for large amounts of FINANCIAL CAPITAL. A distinctive feature of these business units is their issue of financial capital in the form of SHARES which are of small denomination, thus allowing investors to purchase small or large sums as they please. DIVIDEND payments are made out of PROFITS and are distributed in proportion to the number of shares held. Regulation over the establishment of joint stock companies is the responsibility of the registrar of Companies, who ensures that all legal formalities are carried out. Joint stock companies are often referred to simply as limited companies.

**joint venture.** A situation where both public and private sectors work together in an economic activity; this is particularly prevalent in underdeveloped countries where capital is very scarce in the private sector and government funds are often needed in order to develop industry, or banking services etc.
Joint Ventures in East European Countries. A form of international business cooperation between Western companies and East European enterprises and the major form of FOREIGN INVESTMENT in East European countries. The ventures are of two types, contractual and joint EQUITY. The former denotes an association of individuals or companies, formed to prosecute a specific business project while the latter is represented by a JOINT STOCK COMPANY with foreign capital participation. For East European countries such ventures are appealing as a means of obtaining access to technological advances and to foreign capital, since many of these countries are heavily indebted internationally. Foreign companies designing global strategies have been happy to find additional markets for products with short lives and also low cost locations for production. In the late 1980s fiscal concessions such as tax holidays also counted with overseas companies. A common feature of joint ventures in Eastern Europe has been the low level of initial CAPITALISATION.

J-test. A test designed to deal with non-nested hypotheses in the framework of the regression model. The J-test is a test designed to deal with non-nested hypotheses in the framework of the regression model. Irrespective of the explanatory variables in $H_0$ and $H_1$.

Juglar cycle. A TRADE CYCLE in economic activity with a period of ten years. It is named after the Jnomist C Juglar (1819-1905) with being the first to recognize movements in economic activity. The cycle into three periods: prosis, liquidation, and emphasizes of BANK CREDIT on the debts.

justice as fairness. See RAWLSIAN JUSTICE.

just price. A moral criterion of a commodity or service - i.e. is judged 'morally correct'. This is associated with the medieval Scholastic particularly St Thomas AQUINAS. is an equity concept based on nature and unlike the market price plays a passive role.
K

Kahn, Richard F. (1905-89). British economist who had a major influence on economics at Cambridge from the 1930s to the 1970s. His reputation and influence vastly exceeded his published work, of which his Selected Essays on Employment and Growth (1973) contain his major contributions. He is credited with the introduction of the concept of the MULTIPLIER and for important work in the 1930s in WELFARE ECONOMICS in establishing conditions for a SOCIAL OPTIMUM.

Kaldor, Nicholas (1908-86). Born in Hungary, Kaldor studied and taught in Britain from the 1920s. He made a number of contributions to economic theory and was at times an influential figure in advising governments on economic policy. He made contributions to economic theory in the field of WELFARE ECONOMICS where he revived with J.R. HICKS the idea of a COMPENSATION TEST for welfare gains. He was a major protagonist in the CAPITAL CONTROVERSY, and with Joan ROBINSON and others attacked the NEO-CLASSICAL theory of income distribution and technical progress based on marginal analysis replacing them with models based on the analysis of J.M. KEYNES, David RICARDO and Piero SRAFFA. As an adviser to the Chancellor of the Exchequer on Taxation policy from 1964 to 1968 and 1974 to 1976 he suggested the use of a CAPITAL GAINS TAX for income redistribution and a selective employment tax to encourage the transfer of labour to the manufacturing sector. His influence as a stalwart defender of Keynesian economics has been substantial in certain quarters. In particular the work of the Cambridge Economic Policy Group owes much to Kaldor’s emphasis on EFFECTIVE DEMAND and the necessity for government intervention to stabilize the economy internally and externally and to encourage growth.


Kaldor-Hicks test. This test was proposed by N. KALDOR and J.R. HICKS in articles published in the Economic Journal in 1939. State A is to be preferred to state B if those who gain from the move to A can compensate those who lose and still be better off. Compensation here is hypothetical and the Kaldor-Hicks criterion suggests that A is preferable to B even if compensation does not actually take place. (See COMPENSATION TESTS.)

Kalecki, Michael (1899-1970). Polish economist who in the early 1930s developed independently a theory of savings, investment and employment similar to that of KEYNES. Kalecki is also responsible for the introduction of the concept of the 'degree of monopoly', measured by the ratio of profit margin to price, which is an indicator of the absence of price competition. The concept is used to explain why prices do not fall during depressions and also as an explanation of the share of wages and profits in the NATIONAL INCOME.

Kalecki is also responsible for the dictum 'workers spend what they earn and capitalists earn what they spend'. If workers spend all their wages on wage goods, the rest of national income, profits, must be available for investment and capitalists' consumption. If capitalists increase their consumption, it will come back to them in the form of higher profits.

In 1943 Kalecki also predicted the political stop-growth cycle, which has arisen in the UK since the end of World War II.

Towards the end of his life in Poland, Kalecki concerned himself with ECONOMIC DYNAMICS and with growth in socialist economies.

His major publications are Essays on the Theory of Economic Fluctuations (1939),
Kalman filtering. This is an optimal method of predicting endogenous variables and updating the parameter estimates in the predicting equations. The filter comprises two sets of equations, one set of which are prediction equations, the other updating equations. It operates in two stages. The first is to predict the value of an endogenous variable given all the available information. When the actual value of this variable becomes known the prediction error can be calculated and the second stage then follows with the updating of the parameter estimates of the prediction equations using the updating equations.

The filtering equations may be used as a recursive system as each new observation becomes known with the filter based on the prediction errors, each of which is generated by a different information set and are often called recursive residuals. They have properties of independence, not associated with ordinary least squares residuals and they belong to the LUS class. See A.C. Harvey, *Times Series Models*, 2nd edn., P. Allen (1990).

Kantorovich, Leonid (1912-86). Russian economist and mathematician and the originator of linear programming in the 1930s. Kantorovich applied the theory not only to the problem of combining available productive resources in a factory to maximize production, but also to the problem of optimal macroeconomic planning in a socialist economy. His conclusion was that production decisions could be decentralized and remain efficient if shadow prices (derived from the solution to linear programming problems) were used at low levels of the decision process. The main thesis of his work and of those economists in the USSR who have been influenced by him is that a successful centrally planned economy should use a constructed system of prices including a social rate of discount or rate of interest. He recommended a reform of the planning techniques then in use in the USSR. He was awarded the Nobel Prize for Economic Science in 1975 (with T. Koopmans). His major works include *Mathematical Methods in the Organization and Planning* (1939), *The Best Use of Resources* (1965) and *Optimal Design* (1972) (with A.G. Goode).

Kennedy Round. The sixth multilateral trade negotiations, under the auspices of the General Agreement on Tariffs and Trade, which in Geneva between 1964 and 1967 was the earliest series of trade negotiations designed to encourage multilateral trade rather than multilateral trade barriers, the Kennedy Round resulted in across-the-board tariffs on specific groups of goods to negotiations conducted on a sectoral basis. This general approach to negotiations was made possible by the Expansion Act of 1962 which per administration of President J.F. Kennedy, to negotiate up to a 50 per cent reduction in the average level of world industrial tariffs on a reciprocal basis. By 1967 Kennedy Round agreements had reduced tariffs by approximately one-third. (See Round.)

Keynes, John Maynard (1883-1946). John Maynard Keynes was a member of the Royal Commission on Indian Currency and Finance (1917-19) and served in the Treasury (1915-19) as principal representative of the Treasury at the Paris Peace Conference. Keynes recommended a reform of the level of reparations in Germany by the Allies. In his *Consequences of the Peace* he asserted that the level of reparations should not cripple the German economy. He was awarded the Nobel Prize for Economic Science in 1975 (with T. Koopmans). His major works include *Mathematical Methods in the Organization and Planning* (1939), *The Best Use of Resources* (1965) and *Optimal Design* (1972) (with A.G. Goode).
the City. From 1911 he was editor of the *Economic Journal*. His early work which was of a more practical nature, e.g. the return of the UK to the GOLD STANDARD (*Economic Consequences of Mr. Churchill* (1925)), and the reform of the UK currency (*Tract on Monetary Reform* (1923)), led to the production of a new theoretical framework in which to analyse the problems of the day, and formulate public policy towards them (*Treatise on Money* (1930) and especially *General Theory of Employment, Interest and Money* (1936)). Keynes continued to play a part in the formulation of government policy being a member of the MACMILLAN COMMITTEE on Finance and Industry (1930) which highlighted the difficulties of small firms trying to raise capital (MACMILLAN GAP). He was also a major contributor to the BRETTON WOODS Conference (1944) which set up the INTERNATIONAL MONETARY FUND. He analysed the problem of inflation in the pamphlet *How to Pay for the War* (1940). A director of the BANK OF ENGLAND, he was created Lord Keynes of Tilton in 1942. The *General Theory* is undoubtedly Keynes’ most significant work, and is regarded by many as a turning point in the course of the history of economic thought. Such a claim rests on four main contributions: (1) a reformulation of contemporary monetary theory emphasizing the difference between a monetary economy and a BARTER economy, (2) the creation of an aggregative GENERAL EQUILIBRIUM model of the economy which is simple, capable of manipulation and of empirical formulation, and, at the same time, is relevant to problems of economic policy, and from these (3) an explanation of why a competitive capitalist economy does not automatically maintain a level of full employment, and (4) thereby stimulating a new revolution in the orthodox thoughts on the role of government in such an economy. The policy problem which occupied Keynes in the 1930s was that of mass UNEMPLOYMENT. This led him to focus his attention (in the *General Theory*) on what determined the level of output rather than the question of what determined the general price level (which was the major concern of contemporary economic theory).

Keynes stressed the mechanism of EFFECTIVE DEMAND. This mechanism determined the level of employment in an economy of a given population with a particular technology. This was in contrast to the prevailing orthodox economic theory which attributed high unemployment to excessive REAL WAGES and high INTEREST RATES. If money wages were reduced and thereby consumption cut, employment would increase (a) because firms would take on more labour at a lower price and (b) because increased SAVINGS would lead to greater INVESTMENT. In the *General Theory* Keynes argued that far from increasing employment a wage cut, by depressing demand, would increase unemployment. The level of employment was not determined by the level of real wages, but rather by the level of aggregate demand which in turn largely depended on the level of investment in the economy. Moreover a fall in the rate of interest might have little effect on the level of investment especially in times of depression. The reasoning behind such statements and the conclusion that SAY’S LAW is inoperative in a capitalist economy is as follows: the level of output and employment at a given wage rate and population depends on (1) the MARGINAL PROPENSITY TO CONSUME, (2) the MARGINAL EFFICIENCY OF CAPITAL, (3) the QUANTITY OF MONEY and (4) LIQUIDITY PREFERENCE. The effective demand in the economy acts through the propensity to consume and the rate of new investment to set a ceiling on the level of economic activity. Keynes assumes that aggregate consumption is a relatively fixed proportion of aggregate expenditure - the CONSUMPTION FUNCTION. Given that consumption will adjust to any level of income the level of employment is determined by the other components of aggregate expenditure (in Keynes’ model the only other component is investment). There exists an equilibrium level of employment at every level of investment. Full employment occurs at a unique level of investment and unless there is some mechanism to ensure the ‘correct’ level of investment full employment will not come about automatically. The orthodox view was that investment adjusts to the full employment level automatically via the rate of interest. Any deficiency in investment is considered to be an excess of the supply funds over the demand for those funds. The rate of interest is the price of LOANABLE FUNDS and like any other price will equate supply and demand in this case.
Keynesian economics

Keynesian economics

asserting a tendency towards equality of savings (the supply of funds) and investment demand for funds). The labour market similarly cannot show a prolonged tendency of disequilibrium as real wages (the price of labour) will tend to adjust the supply and demand for labour.

A major difference between Keynes and his predecessors is the explanation of the determinants of the rate of interest. For Keynes the level of investment is determined by the relation between expected marginal yields of assets and their marginal costs of production (the MARGINAL EFFICIENCY OF CAPITAL).

Expectations of future yields by entrepreneurs are related to their confidence in the state of the economy. The rate of interest plays a secondary role in determining the inducements to invest. Unlike contemporary economists Keynes regarded the level of investment as the major determinant of the level of income, and the lack of a straightforward automatic adjustment mechanism through the rate of interest was a major feature of his under-full-employment equilibrium system. For Keynes the rate of interest was a monetary phenomenon determined by the demand and supply for stocks of bonds and money. The role of money as a hedge against an uncertain future allowed Keynes to postulate a liquidity preference theory of the rate of interest which emphasized the distinction between decisions to save and decisions to invest. The possible inequality between planned savings and planned investment allows changes in investment to determine changes in the level of output and employment. In Keynes' system the equality of savings and investments is achieved by changes in the level of aggregate income and not by changes in the rate of interest.

Keynes demonstrated that autonomous expenditure such as government spending would increase aggregate income by a greater amount through the MULTIPLIER mechanism and thus provided the analytical stimulus for DEMAND MANAGEMENT by the state. He saw an increasing role for the government in this respect as he expected the inducements to invest to decline in the future.

The Keynesian system has led to: (1) the growth of macroeconomic models based on the formulation of the new economic problem of determining the level of economic activity, (2) the use of a nati income-expenditure approach to describe the economy, and (3) demand manager by political and monetary authorities, acceptance has generated the subject area of CONTEMPORARY MACROECONOMICS. Its validity has been questioned in recent years by J.R. HICKS and others has tended to reduce Keynes' contribution to a special of NEOCLASSICAL equilibrium with 1 money wages and a LIQUIDITY TRAP, 'standard interpretation or NEOCLASSICAL SYNTHESIS has itself been subject to criticism especially by those who emphasis the part played by uncertainty and tim Keynes' analysis. (See KEYNESIAN ECONOMY, MONETARISM, GENERAL EQUILIBRIUM.)


Keynes effect. A change in the demand for commodities as a result of a change in general price level. For example, a fall in general price level will increase the quantity of real money balances and therefore more money will be available for speculative purposes. As a result the price of bonds will rise and the interest rate fall which in turn will stimulate a rise in investment and increase in the demand for commodities. Clearly a rise in the general price level will set in motion an opposite sequence of events. This indirect change in the demand for commodities for investment should be distinguished from the direct effects of change in the general price level on demand for commodities for consumption described by the direct real balance effect. The Keynes effect is illustrated by a shift the LM curve in the IS-LM DIAGRAM while the direct real balance effect manifests itself a shift in the IS CURVE. (See REAL BALANCE EFFECT.)

Keynesian cross.
See INCOME-EXPENDITURE MODEL.

Keynesian economics. A term used to describe macroeconomic theories of the level of economic activity using the technique developed by J.M. KEYNES. The methodology of Keynesian economics may...
Keynesian growth theory

The standard exposition of the Keynesian system attributes the possible instability of the system to rigidity in wages and the existence of a LIQUIDITY TRAP. The latter phenomenon and an interest inelasticity of investment were sufficient to recommend the adoption of fiscal policy as opposed to monetary policy. This so-called NEO-CLASSICAL SYNTHESIS formulated as the IS-LM model, and the passive role of money have been questioned not only by post-Keynesians who stress the Disequilibrium nature of a model where decisions are made under conditions of uncertainty, but also by the CHICAGO SCHOOL which claims that monetary policy is the only effective way of changing the level of activity and prices. A number of economists have used the Keynesian aggregates as a basis for a dynamic theory of growth. Following R.F. HARROD, the CAMBRIDGE SCHOOL use investment functions which imply that investment determines savings to generate models of accumulation. While neo-classical economists have adopted the new classical model (NCM), rational expectations (RE) and more recently the real business cycle (RBC) as an approach to macroeconomic problems, Keynesians have been less clear in their objectives. They have adopted different definitions of equilibrium, such as path dependent or hysteretic equilibria and non-competitive aspects of the economic system, to explain why high unemployment is so persistent. The dominant analysis of the economic system has tended to pass to the NCM and RBC schools with Keynesian economists seeking to distance themselves from this neo-classical dominance. While macroeconomics continues to be the most unsettled area of economics, Keynesians would take the view that the most important issue is that of neutrality, with the NCM and RBC economists taking the view that transitory shocks do not have permanent effects on real magnitudes such as output and employment, while Keynesians would consider such shocks to have permanent effects. This runs counter to the view that classical and Keynesian macroeconomics are converging, a view particularly popular in the US, but the persistence of high unemployment and the apparent failure of the NCM, RE and RBC theories to explain it have reinforced Keynesian economists in their view that there is a fundamental difference between their analysis and that of those schools within neo-classical economics. See Blanchard, O. and Fischer, S., Lectures on Macroeconomics, MIT Press, Massachusetts (1989).

Keynes Plan.

SeeHARROD-DOMAR GROWTH MODEL.

Keynes Plan. The UK TREASURY proposals for the establishment of an International Clearing Union which received consideration at the United Nations Monetary and Financial Conference convened at BRETTON WOODS, New Hampshire in 1944. As JOHN MAYNARD KEYNES was primarily responsible for their formulation, these proposals were collectively referred to as the Keynes Plan. The proposals recommended the creation of an international means of payment called BANCOR which would be used to clear international debts on a multilateral basis between the members of the International Clearing Union. Members experiencing temporary balance of payments deficits could obtain bancors, up to a credit quota or overdraft limit, from the clearing union with which to settle their international debts. The overdraft limits would increase automatically as each member country increased its volume of imports and exports. Although the value of the bancor was initially linked to gold, it was anticipated that it would eventually replace gold as a means of financing international payments. In order to discourage persistent credit or debit balances, the plan also recommended that INTEREST should be paid on both credit and debit balances held by the union. In contrast to the bancor credit quotas, the number of bancors held by a surplus country was unlimited, or limited only by the sum of member country credit quotas, as they were obligated to accept
bancor cheques. This aspect of the plan, which potentially could have resulted in a situation whereby the US was the sole surplus member in the Clearing Union, was vigorously opposed by the US delegation at the Conference. The Keynes Plan was eventually rejected by the Conference which instead established the INTERNATIONAL MONETARY FUND (IMF) following the proposals set out by the US or WHITE PLAN. The idea of a bancor, however, has to some extent re-emerged within the framework of the IMF in the form of SPECIAL DRAWING RIGHTS (SDRS).

key rates. The wage rates of those occupations in the INTERNAL LABOUR MARKET which serve as points of contact with the external market associated with each key rate is a JOB CLUSTER; a set of associated rates for occupations of varying job content and description which are specific to the firm. The wage rates of these occupations are generally tied to the key rate and move in association with these. (See WAGE CONTOUR.)

kinked demand curve. Based on the presumption that in markets characterised by OLIGOPOLY perceived interdependence leads businessmen to believe that reduction of price below that which prevails will be imitated by rivals, but not so with a price rise. This introduces a kink into the DEMAND CURVE at the prevailing price and a corresponding discontinuity in the MARGINAL REVENUE CURVE, both of which result from different perceived ELASTICITIES OF DEMAND above and below the prevailing price. Demand is relatively inelastic downwards, the only expansion in demand coming from a constant share of a somewhat larger market. It is elastic upwards, however, as a unilateral price rise results for the particular firm in a significantly contracted share of a constant or slightly smaller market. The kinked demand curve has been used to explain the alleged rigidity of prices in oligopolistic markets compared to those in COMPETITIVE MARKETS. The diagram illustrates the rationale behind the analysis. Assuming PROFIT MAXIMIZATION to be the objective of the firm, price rigidity arises because significant variations in marginal cost (such as the shift from MC to MC* in the diagram), leave the output level at which marginal cost equals marginal revenue unchanged. Thus any change in cost conditions which take the new marginal cost curve the discontinuity in the marginal curve, leaves price unchanged.

Klein-Goldberger model. A me ECONOMETRIC MODEL of the US eco the period 1929-52 (excluding which has exercised a pervasive important influence on econometi building from the time of its publ 1955, to the present.

The model consists of 20 equati while 5 are IDENTITIES. It is domi consumer demand betraying its c KEYNESIAN ECONOMICS. It treats b and MONETARY variables but the PRI or supply side and monetary pheno inadequately dealt with.

The model was estimated by LI FORMATION MAXIMUM LIKELIHOOD.

Klein, Lawrence R. (1920– ). Economist and Professor of Econ the University of Pennsylvania; aw Nobel Prize for Economics in 198 pioneering work in the developmer nometric forecasting models, which used to predict variables such i NATIONAL PRODUCT (GNP), exportment etc. and the effects of policy on these variables. Of the many
associated with his name the best known and most successful has been the Wharton Econometric Forecasting Model of the US economy, developed at the University of Pennsylvania.

Klein has specialized more on the application of theoretical developments in econometrics to applied work than on developing the theory of econometrics itself. His work has shaped developments in the field and influenced model-building on a world-wide scale. Klein's unique achievement can be said in general terms to have been his translating of the broad KEYNESIAN model into statistical terms. His two best known books are *The Keynesian Revolution* (1947) and his *Textbook of Econometrics* (1953).

**knife edge.** In GROWTH THEORY, an obstacle to steady growth where the WARRANTED RATE OF GROWTH is unstable, apart from the further problem of whether or not the warranted rate is equal to the NATURAL RATE OF GROWTH. The role of EXPECTATIONS about the future level of output is central to the knife edge problem: if the expected rate of growth of income is below the warranted rate then ENTREPRENEURS will invest too little, causing a fall in AGGREGATE DEMAND and an increase in EXCESS CAPACITY causing a further fall in the expected rate of growth of income.

**Knight, Frank** (1895-1973). American economist; Knight was appointed Professor of Economics at Chicago in 1928. He made important contributions to the ethics and METHODOLOGY of economics as well as the definition and interpretation of SOCIAL COST. His most celebrated contribution to economics was *Risk Uncertainty and Profit* (1921). A disciple of J.B. CLARK, he was concerned to show that, contrary to the statements of Clark and Alfred MARSHALL, profits could exist in a STATIONARY STATE. The followers of Marshall argued that profits only appear as the income of entrepreneurs in conditions of change. In a stationary economy factors receive only WAGES, INTEREST and RENT. Profits are a reward for the talent of the entrepreneur in organizing the productive process to changed conditions. Knight argued that it was not change as such which gave rise to profit but that deviation from expected conditions. Uncertainty about the future causes the special reward of profit. He was concerned to distinguish between insurable risk and uninsurable uncertainty. Only the latter was responsible for pure profit. Profit as a reward for undertaking production in the face of uncertainty is therefore related to the rate of change of economic variables and the availability of entrepreneurs willing and able to make accurate guesses about future conditions.

His other major publications include *The Economic Organization* (1933), *The Ethics of Competition* (1935), *Freedom and Reform* (1947), *Essays on the History and Methods of Economics* (1956), and *Intelligence and Democratic Action* (1960). A founder of the CHICAGO SCHOOL of 'liberal' economists, Knight has had considerable influence on members of that tradition but although he was critical of state power, he was sceptical of the ability of a free enterprise to function efficiently and in an ethically satisfactory manner. He was particularly critical of the implications of free enterprise for the distribution of income.

**Kondratieff, Nikolai D.** (1892-?). A Russian economist who did notable work in agricultural economics and in the development of economic planning in the USSR. In 1925 he published *The Long Waves in Economic Life*, for which he is best known. He identified long cycles from the end of the 1780s to 1844-51, from 1844-51 to 1890-96 and an upswing from 1890-96 to 1914-20. He held that the existence of long waves was 'at least very probable' but offered no systematic theory, merely outlining certain relevant factors. Subsequent work has suggested that the waves identified may be due to the statistical techniques used by Kondratieff. His attempts to analyse economic conditions objectively brought him into conflict with official Soviet policies. He was arrested in 1930, never brought to open trial and died in prison at an unknown date.

**Koopmans, Tjalling** (1910-85). American economist born in the Netherlands. Koopmans was Professor of Economics at Chicago (1948-55), Director of the Cowles Foundation (1961-67) and Professor of Economics at Harvard (1960-61). Credited with the independent development of LINEAR PROGRAMMING, Koopmans linked linear
programming with traditional **microeconomic** theory and developed a model of source allocation in a competitive economy. He saw that such a production model could serve as a basis for a formulation of **general equilibrium** theory. In 1951 he expounded this view in *Activity Analysis of production and Allocation*, where he introduced the tool of activity analysis. The conclusion of this work was that the use of **shadow prices** created the possibilities of decentralization of production decisions within the economy.

Koopmans has made important contributions to the theory of optimal growth and econometric theory. He formulated a number of important theorems concerning the optimal division of **national income** between investment and consumption through time, and has shown the consequences of such choices for the distribution of welfare between generations. He was awarded the Nobel Prize for Economic Science in 1975 (with L. Kantorovich.) His other major works include *Three Essays on the State of Economic Science* (1957).

**Koyck transformation.** A set of algebraic manipulations whereby an equation containing a geometrically declining **distributed lag** of infinite length is converted into one involving a finite number of variables, including a lagged **endogenous variable**. The original equation is of the form

\[ Y_t = a + bX_t + \lambda bX_{t-1} + \lambda^2 bX_{t-2} \]

where \(0 < \lambda < 1\).

Multiplying the equation by \(\lambda\) and lagging all variables by one period gives

\[ \lambda Y_{t-1} = \lambda a + \lambda bX_{t-1} + \lambda^2 bX_{t-2} + \ldots \]

Subtracting this from the original equation and rearranging terms gives

\[ Y_t = (1 - \lambda)a + bX_t + \lambda Y_{t-1} \]

The transformation allows the estimation of the parameters of such infinite lags, which are often the result of including **adaptive expectations**, however, have consequences for the term of the equation, and can often produce **serial correlation.** As a result, the transformed equation is usually estimated using specific techniques, such as the **GIESEL** procedure.

Kuznets, Simon (1901-85). **Russian-American** economist, winner of the Nobel Prize for Economics in 1971 for his collecting, estimating and interpreting data relevant to the process of **social change**, means of which he has thrown new light on economic growth. He was concerned with long growth cycles, which appear strongly **influenced** by variations in population growth, the stability of the industrial countries over many decades and the ratio of consumption to income, discovery that the quantity of real income needed to produce a given volume of commodities shows a declining trend. Some dispute as to whether the cycle he identified may not have been due to statistical techniques which he adopted, Fishman, G.S., *Spectral Methods in Econometrics*, Harvard University Press (1969). Kuznets' major publications include *National Income and its Composition* (1946), *Economic Growth* (1966) and *Economic Growth of Nations* (1971).
labour. All human resources available to society for use in the process of production. (See FACTORS OF PRODUCTION.)

labour augmenting technical progress. TECHNICAL PROGRESS which raises output in a way similar to that arising from an augmentation of the LABOUR FORCE, without such an actual change in the physical numbers of the labour force being carried out. It increases the share of labour in output without increasing the numbers of the workforce in production.

labour economics. The study of the nature and determinants of pay and employment. The study emphasizes the role of institutions which are significant in determining the pattern and speed of adjustment in the labour market. While the traditional tools of micro- and macro-economics are employed in this analysis their limitations lead to a more discursive treatment of certain topics. See R.F. Elliott, Labour Economics: A Comparative Text, McGraw-Hill (1991).

labour force. The labour force consists of persons who are either working or looking for work: it comprises the employed plus the unemployed. The employed comprise employees in employment, the self-employed and the armed services. Those not in the labour force are usually students, retired people, housewives, female heads of families and some 'discouraged workers' who are usually not considered as unemployed because they are not actively seeking work. (See DISCOURAGED WORKER HYPOTHESIS, HIDDEN UNEMPLOYMENT)

labour force participation rate. For the population as a whole, or for any section of it by age, sex, or race, the participation rate is defined as the ratio of the economically active (employed or unemployed) population falling within that category to the total population of that category. It may be expressed as

\[
\frac{\text{LF}}{\text{LF + NLF}} = \frac{U + E}{U + E + NLF}
\]

where \(\text{LF}\) is the number in the labour force; \(\text{NLF}\) is the number not in the labour force; \(U\) is the number unemployed; \(E\) is the number employed.

The labour force participation rate can be interpreted as the probability that a person of a certain age, sex, and race will be in the labour force. Labour force participation rates have been used to estimate the size of labour reserves within the economy (see HIDDEN UNEMPLOYMENT) and have an important bearing on the meaning of unemployment statistics.

labour hoarding. When firms have invested heavily in the hiring and training of a worker they will be reluctant to dismiss that worker during an economic downturn. As a defensive mechanism, the firm will thus attempt to retain or hoard workers in whom firm-specific investments have been made. Thus at the onset of a recession, labour input is not simultaneously cut back with output and the labour utilization rate falls accordingly. With the upturn, increased output can similarly be achieved without a simultaneous increase in labour input, again measured in terms of employees, because the supply of labour services is increased simply by raising the utilization rate of already employed labour. In both cases there will be a lagged adjustment of employment to changes in output. In this situation, it can be seen that measured rates of unemployment will be lagged indicators of excess supply in the labour market. Labour becomes a 'quasi' fixed factor. (See FIXED LABOUR COSTS.)

labour intensive. A process or technique of production A is said to be more labour intensive than an equivalent process of
labour st

labour technique $B$ if the ratio of labour to capital used is greater in $J$ than in $B$.

labour market. A labour market concerns the activities of hiring and supplying certain labour to perform certain jobs, and the process of determining how much shall be paid to whom in performing what tasks. In addition, the way in which wages move and the mobility of workers between different jobs and employers falls within the definition. Note that to use the term 'market' is not to imply that labour is exactly the same as any other commodity; rather, the labour market is to be seen as a 'place' in economic theory where labour demand and supply interact. (See LOCAL LABOUR MARKET, EXTERNAL LABOUR MARKET, INTERNAL LABOUR MARKET, DUAL LABOUR MARKET HYPOTHESIS.)

labour power. A term used by Karl MARX to describe the commodity which workers sell to capitalists. The distinction which Marx makes between labour and labour power stems from his development of the LABOUR THEORY OF VALUE. The price of all commodities is related to the labour time embodied in their production. The WAGE RATE is the price of the commodity labour power, and is determined by the labour embodied in the production of the workers' means of subsistence, though the level of subsistence was not fixed, e.g. at the physiological minimum, but was subject to an upward drift with the development of society.

labour-saving techniques. Technological processes or production methods which are biased towards mechanization and sparing use of manpower. If manpower is scarce then these are the ideal processes to implement, and are more common in industrialized nations than less developed countries. However there have been many instances where MULTINATIONAL COMPANIES have been responsible for transmitting these techniques to the developing world in order to take advantage of cheap labour, cheap electricity generated by hydro-electric power or to exploit mineral resources. This then leads to various problems, such as emphasizing WAGE DIFFERENTIALS; or for the firm itself, equipment often breaks down in tropical areas, and skilled technicians have to be brought from abroad; often spare parts can be on order for months, and in difficult to maintain plants at 1

labour's share. The share of NATIONAL INCOME. There are two theories of labour's share: the PRODUCTIVITY theory with its relative factor prices, factor q, and technology (in particular the factor INPUT SUBSTITUTION), and the neoclassical theory stressing aggregate differences in savings propensities for the classes of workers and capital share of wages in national income increased considerably over the present century, to about 18% in 1970. In part, this increasing share is measured in the form of the undervaluation of capital income and labour income. This apart, there has been improvement in labour's share, the classical explanation would be when wage having risen, the ELASTICITY of labour for capital is less The neo-Keynesian explanation on a reduction in the investment ratio forcing a change in income in favour of wage earners who have savings propensities.

Neither explanation takes account of potentially important contributions in the potentially increasing levels of human capital and each has associated difficulties as regards the vexed question of measurement of capital and the girds omitted microeconomic and labour standard. A term coined by Hicks to express his particular idea of the manner in which wages prices) were determined. A Hicks, it is no longer useful to determination/INFLATION as simulated by the inter-action of demand. Rather, wages are best as the product of an interplay between (very broad) economic forces money wage level as determined SUPPLY.
labour supply.
See SUPPLY OF LABOUR.

labour surplus economy.
See LEWIS-FEI-RANIS MODEL.

labour theory of value. A theory employed by the CLASSICAL ECONOMISTS, e.g. RICARDO and especially MARX, to explain the determination of relative prices on the basis of quantities of labour, immediate and accumulated, embodied in goods. By immediate labour is meant the current effort of a worker and by accumulated labour is meant the services of capital which represent the past input of labour. It was argued that prices would be proportional to quantities of embodied labour in goods. It was recognized, e.g. by Ricardo, that the theory broke down when goods were produced which had different periods of production or different capital to labour ratios. If two goods had identical labour inputs but one was produced with more capital, then the producer of the capital intensive good would need to be remunerated for the greater volume of capital out of the price of the commodity. If the prices were the same his rate of profit must be lower: if he is to earn an equal rate of profit, his price must be higher. Embodied labour then fails to explain prices. A similar argument holds for different periods of production, if rates of profit are to be equalized.

For Marx the labour theory was more than just a theory of relative prices and was in effect the key to understanding CAPITALISM. In his system only labour can create value, but it is unable to keep to itself all the value created, for the capitalist is able to extract a SURPLUS VALUE, the source of profit, which is then reinvested in machinery, which leads to capitalist development and eventual collapse. Marx did qualify the labour theory by introducing the qualifications that different grades of labour should be reduced to simple labour, i.e. a unit of standard efficiency, and that the labour should be SOCIO-NECESSARY LABOUR. Socially necessary labour is that required by the average technology of the time (to prevent labour operating with a backward technology being credited with the creation of unjustified value) and which makes a product for which there is a demand. Without the demand the labour is not socially necessary and so no value can be created. This latter qualification substantially weakens the claim of the labour theory to explain prices. (See TRANSFORMATION PROBLEM.)

labour turnover. An expression used at the firm level to describe the number of job changes, separations and new hires that occur. Separations may be of either a voluntary, employee-initiated nature, termed QUILTS or of an involuntary, employer-initiated nature, termed SACKINGS or discharges. A labour turnover rate may be calculated by taking the sum of the number of separations and number of new hires, dividing the resulting magnitude by two, and expressing the result as a percentage of the number employed.

Laffer curve. An illustration of the thesis that there exists some optimal tax rate, shown as $t^*$ in the diagram below, which maximizes government tax revenues. The thesis may be expressed in terms of either personal or corporate taxes and it proposes that taxes above the optimal rate discourage production and hence result in lower revenues. These arguments represent an aspect of SUPPLY-SIDE ECONOMICS and the curve takes its name from its originator, the American economist Arthur Laffer.

lagged relationship. A relationship between a set of variables in which the current value of the DEPENDENT VARIABLE is related to
Lagrangean technique. A method for solving constrained optimization problems, in which the constraints written as implicit functions are incorporated along with the objective function to form a new equation called the ’Lagrangean’. If the problem is, say, to maximize

\[ y = f(X_1, X_2), \]

subject to the constraint

\[ g(X_1, X_2) = 0, \]

the Lagrangean is

\[ L = f(X_1, X_2) + \lambda(g(X_1, X_2)). \]

The maximization of \( L \) with respect to \( X_1, X_2 \) and \( \lambda \) will yield the values of \( X_1 \) and \( X_2 \) which maximize \( Y \), while still satisfying the constraint. The term \( \lambda \) is called a ’Lagrangean multiplier’.

laissez-faire. A doctrine that the economic affairs of society are best guided by the decisions of individuals to the virtual exclusion of collective authority. The idea has its basis in the writings of the Physiocrats, but its analytic foundations lie in the work of Adam Smith and the Classical School.

Adam Smith argued that individuals acting purely out of self interest will be a progressive force for the maximization of the total wealth of a nation. The role of the authorities, given this aim, should be permissive, creating a legal defensive apparatus sufficient to allow individual action. Interference with the free working of this natural order will reduce the growth of wealth and misdirect resources.

The theme was extended by the Neo-Classical writers to include not just freedom of production and accumulation but also freedom of choice in consumption. The model of perfect competition provided further analytic evidence that free competition and unrestricted expression of consumer preferences maximize the economic welfare of society. The doctrine in this form presupposes that collective action will be beneficial if in addition to providing the basic requirements of legal property ownership and national defence it will also act to maintain competition by breaking up monoply and outlawing restrictive practices. The doctrine has thus been criticized for its ideological over-simplification, particularly its implication for economic policy. The apparent inability of a free economy in the twentieth century to provide many important social goals such as full employment and stable growth has led to the abandonment of laissez-faire policy. The Keynesian revolution of international trade, and income distribution have economists urge the use of state planning in order to achieve broader social aims and prevent an increasing number of state restrictions.

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land. A term used in economics not only that part of the earth covered by sea, but also all resources such as forests, sources of the sea, soil fertility that can be used in the process of production. Land is therefore conventionally considered a separate factor of production.

land intensive. A process of production \( J \) is said to be intensive than an equivalent process of production \( B \), if the ratio of land to other inputs used is greater in \( J \) than in \( B \).

land reform and tenure. Generally referring to the obtaining increases in productive areas (usually in developing countries) through changes in the institutions in the agricultural system. A wide variety of such arrangements are inimical to progressive ownership of land is exterritorial with each family having only a small plot of land. New equipment and technology cannot be economic proposition on larger farms simply because they cannot afford the inputs required to increase productivity. At the same time there are cases where the ownership is concentrated among a few
of whom owns an enormous acreage. This may also inhibit the growth in output per acre. The landlord may be interested only in the rent which he can obtain from the tenant farmers. He may be unwilling to invest in drainage, fencing, irrigation and ditching schemes which could possibly lead to large increases in output per acre. The tenant farmers may be unwilling to incur such expenditure on land which does not belong to them, or they may not be able to afford such investments. There is a considerable amount of statistical evidence to suggest that on very large farms output per acre is often less than in rather smaller holdings. In current circumstances where the objectives are generally to increase output, probably with an employment constraint, there is a presumption that owner-occupied farms of a size at least sufficient to permit the improvements referred to above are optimal. (See LAND TAX.)

**Land tax.** A tax based on land values or size of land holdings. It has been proposed by some economists as a device for mobilizing any surplus from agriculture and for encouraging productivity growth. The experience of Japan in the nineteenth century is cited as an example in favour of this tax. The tax could be formulated in such a way that it encouraged farmers to cultivate land more intensively (e.g. if the tax were based on potential productivity per acre if cultivated with 'average' efficiency). The tax base would be greatly broadened by such a tax. Administration of a land tax could be very expensive in most DEVELOPING COUNTRIES. Considerable information on landholdings would be required. On balance the arguments in favour of such a tax appear stronger than those against it. What is frequently lacking is the political will to introduce it because of the influence of the landowning classes on government. There are examples of types of land taxes which are difficult to administer - e.g. in Nicaragua there is one related to the fertility of land. (See LAND REFORM AND TENURE.)

**Laspeyres price index.** A base year weighted PRICE INDEX. If expenditure in year 1 is

\[ I_1 = \sum_{i=1}^{n} p_{1,i} \cdot q_{1,i} \]

for \( n \) goods then the price increase in year 2 can be calculated by taking year 2 prices and weighting them by year 1 quantities. That is, expenditure in year 2 is calculated at year 2 prices but with reference to year 1 quantities. This expenditure would be

\[ I_2 = \sum_{i=1}^{n} p_{2,i} \cdot q_{1,i} \]

Dividing the two expenditure totals gives

\[ P = \frac{\sum p_{2,i} \cdot q_{1,i}}{\sum p_{1,i} \cdot q_{1,i}} \]

which is a Laspeyres price index. A quantity index would be obtained in the same way (substituting \( q \) for \( p \) and \( p \) for \( q \) in the above equation). (See PAASCHE PRICE INDEX, PRICE INDEX.)

**Lausanne School.** A school of economic thought based at the University of Lausanne in Switzerland which placed great emphasis on the use of mathematical techniques to show the interdependencies in a market economy. The great achievement of Leon WALRAS and Vilfredo PARETO was the demonstration of a GENERAL EQUILIBRIUM system based on individual buyers and sellers.
was determined by a unique set of prices and quantities. The modern general equilibrium theory of John Hicks, Kenneth Arrow and Frank Hahn owes much to the work of these early authors.

law of demand. The widely accepted view that, other things being equal, more of a good will be bought the lower is its price, and the less will be bought the higher is its price. Strictly, the law states a general expectation and is not a law at all since demand may rise as price increases and it is not always clear what 'other things' are being held equal. For situations in which demand behaves 'perversely' see Giffen Goods. On the complexities of the various interpretations of what Alfred Marshall meant by the law of demand see M. Friedman, 'The Marshallian Demand Curve', *Journal of Political Economy*, vol. Ivii, Dec. 1949.

law of diminishing returns. When increasing quantities of a variable factor are added to fixed quantities of some other factor, first the MARGINAL and then the average returns to the variable factor will, after some point, diminish.

law of variable properties. See LAW OF DIMINISHING RETURNS.

Layfield Committee. See LAYFIELD REPORT.

Layfield Report. A government commissioned report on the tax and expenditure powers of British local authorities published in 1976 (in full, HMSO, *Local Government Finance, Report on the Committee of Enquiry*, Cmnd. 6453, London, 1976). The report proposed a number of reforms to the existing system of local government finance, principal among which were that GRANTS from the national government to local authorities should be calculated with reference to income per head in the local authority area rather than, as at present, on the basis of Property values and that the system of RATES should be supplemented by a local income tax. These proposals have not, as yet, been adopted as government policy; in particular, the local income tax suggestion has been rejected on grounds of administrative cost. (See RATE SUPPORT GRANT FEDERALISM.)

layoffs. See TEMPORARY LAYOFFS.

leading links principle. In an economy the authorities may attach importance to a particular TARGET. may therefore be given special priority in other sectors (e.g. trade union public sector may cite the general settlements in the private sector point of reference). Wages may initially rise faster in one sector of the economy than others due to the faster rate of productivity growth in that sector or other specia tional or market circumstances. (BARGAIN, WAGE LEADERSHIP, ABILITY.)

leakages. See WITHDRAWALS.

leap-frogging. A process also known as the wage/wage spiral and held to be a pendent cause of wage and price infla tion those who espouse COST-PUSH INFLATION theories. The argument stresses specific aspects of COLLECTIVE BARGAINING and the tendency for a wage increase obtained in one sector or the industry or intra-industry productivit ies; the tendency to maintain traditional WAGE DIFFERENCES of skill or trade; and the disadvantage suffered by any group which hangs back when wages are rising faster than productivity. The process of leap-frogging takes its most form when wages are negotiated separately for individual industries, but it also occurs inside individual industries and in establishments, between classes of and especially between time-paid and piece-rate workers.
learning (or learning by doing). An explanation of TECHNICAL PROGRESS (as seen in declining labour inputs per unit of output) in terms of experience in carrying out an operation. Increases in efficiency arise from familiarity with the technique, i.e. as a result of experience, where experience is measured as the sum of all past outputs. The improvements in labour productivity are irreversible, so that per unit labour input does not increase when the scale of output is reduced. The process of productivity increase is thought to be subject to DIMINISHING RETURNS through time.

The classic example of learning by doing was in the US airframe industry during the Second World War, where a doubling of cumulative airframe output was accompanied by an average reduction in direct labour requirements of about 20 per cent.

learning curve. A relationship showing an increase in cumulative average output per man and the cumulative number of units of output produced, usually in some manufacturing industry. For a typical learning curve, see diagram below.

![Learning Curve Diagram](image)

least cost method of production. See COST MINIMIZATION.

least squares. A general term descriptive of the basis of a family of econometric ESTIMATION techniques. The objective of the estimators based on the principle is to minimize the sum of the squares of the vertical distances between the observed data points, and the REGRESSION line. Examples of this type of estimator include ORDINARY LEAST SQUARES, TWO STAGE LEAST SQUARES and GENERALIZED LEAST SQUARES.

Le Chatelier principle. A mathematical principle with wide applications in economics, dealing with the effects of CONSTRAINTS on maximising behaviour. For example, it can be used to explain why LONG-RUN demands have greater ELASTICITY than those in the SHORT RUN as a lengthening of the time span allows new factors to be varied resulting in greater changes in the factor whose price has changed, no matter whether the factors which vary are complementary or competitive with the one subject to a price change.

lender of last resort. One of the functions, and a major raison d'être, of a modern CENTRAL BANK. The need arose originally - and still can arise - in extreme financial crises when confidence in private CREDIT is collapsing and holders of private claims press to convert them into ASSETS of unquestioned soundness, e.g. gold or legal tender money. The pressures concentrate with especial force on the banking system whose DEPOSIT liabilities are convertible on demand return for an agreed fixed charge which is generally paid in periodic instalments. Leasing has long been a common practice with land and buildings though in the recent past other ASSETS such as machinery, aircraft and motor cars have been available for lease. For companies, the main advantage of leasing is as a method of avoiding large CAPITAL EXPENDITURES. It is also a less risky method of finance on the part of lenders, as they continue to own the tangible asset. Many banks have now formed their own leasing companies and will lease equipment to firms to whom they may well not lend money.
at very short notice; unless the banks can liquidate assets, which are mostly non-liquid, the system would be in danger of collapsing. This can be averted by the central bank, or exceptionally another public agency, supporting the banking system by providing its own liabilities, by loans or purchases of appropriate assets. The BANK OF ENGLAND, the pioneer in this role, came to channel such assistance through the DISCOUNT HOUSES, charging BANK RATE for it. From 1971 to 1981 such assistance was given at MINIMUM LENDING RATE. In similar circumstances other central banks deal directly with the commercial banks. In the UK, up to the 1970s, the lender of last resort had come to be used more or less routinely as part of MONETARY MANAGEMENT. It was one of the modes by which the Bank of England smoothed out the effects of the large flows of funds between the public and private sectors on the liquidity of the whole banking system. Under the new monetary control arrangements introduced progressively from 1980 onwards (and completed in August 1981) the Bank now makes much wider and more active use of open market operations to perform this smoothing function. Although the papers setting out the arrangements make no reference to it, the need for a traditional lender of last resort type operation could still arise in a financial crisis, as indeed it did in the 'secondary bank crisis' of 1973-6. (See LIFEBOAT, LIQUIDITY.)

Leontief, Wassily W. (1906– ). Born in the USSR, Leontief became Professor of Economics at Harvard in 1946. His major work is an analysis of the interdependencies within an economic system, and particularly the production sector, using a technique which he called INPUT-OUTPUT analysis. In such works as Studies in the Structure of the American Economy (1953) and Input-Output Economics (1966) he extended the interactive models of QUESNAY and others into an advanced mathematical construction which showed the relationships between the parts of an economic system. Leontief has applied the technique to the economy of the USA, providing interesting results in the fields of international trade and the economics of natural resources. The technique has become the basis for planning in many non-market economies. Leontief was awarded the Nobel Prize in Science in 1973.

Leontief inverse. In INPUT-OUTPUT analysis, the inverse of the IDENTITY MATRIX of the TECHNOLOGY MATRIX common

\[(I - A)^{-1}\]

This matrix multiplied by a giver final outputs gives the total outputs from each sector of the economy to produce those levels of final demand.

Leontief paradox. See HECKSCHER-OHLIN APPROACH NATIONALTRADE.

Lerner, Abba P. (1903–83). Russia and educated in England, Lerner's academic life was spent in various universities in the USA. His early work consists of grammatical exposition and extension of Marshallian price theory to include imperfect competition by Joan ROBINSON and CHAMBERLIN. The work centres around search for an adequate concept of power and a defence of egalitarianism, the law of diminishing marginal utility. His major work is The Economics of Politics (1944) which makes extensive Marshallian analysis to make out MARKET SOCIALISM. He also sets out the conditions under which a change in an EXCHANGE RATE would improve it for TRADE. The condition is often called the MARSHALL-LERNER CONDITION. In this early work, Lerner was an importer, and indeed defender, of economics.

Lerner case. The situation an importer faces when introduced to the TARIFF theory where the imposition of a tariff on an import, for which demand is very price INELASTIC in worse TERMS OF TRADE be increased demand for the product. MUM TARIFF.)

Lerner index. An indicator of power that is defined as

\[
\frac{\text{price} - \text{marginal cost}}{\text{price}}
\]
When PERFECT COMPETITION exists price equals marginal cost; therefore the index assumes a value of zero. When price exceeds marginal cost, the Lerner index becomes positive and varies between zero and unity. The closer the index to unity the greater the degree of monopoly power is said to be possessed by the firm. Note that the index is a measure of actual conduct and does not measure the potential for monopoly behaviour on the part of the firm.

less developed countries.
See DEVELOPING COUNTRIES.

letter of credit.  A document issued by a BANK on behalf of a customer which guarantees payment by the bank of CHEQUES drawn by the customer, or more commonly today of BILLS drawn on that customer by parties from whom he has bought goods. Letters of credit are used largely in association with BILLS OF EXCHANGE, to which they give added security in the financing of foreign trade.

level of significance.  A concept used in HYPOTHESIS TESTING to determine the CRITICAL VALUE against which to compare the TEST STATISTIC. A test at, say, the five per cent significance level involves choosing the critical values such that under the NULL HYPOTHESIS there is a five per cent probability of the test statistic falling outside them. For example, a parameter estimate in a REGRESSION analysis is said to be significantly different from zero at the five per cent level, if its test statistic (usually a T-STATISTIC) is above or below the values of the t-DISTRIBUTION outside of which there is 0.05 probability that a t-statistic will lie. (See STATISTICAL INFERENCE.)

leverage.  An indicator of the relationship between long-term debt and capital employed. It is measured by the ratio, long-term DEBT ÷ total CAPITAL employed. The denominator includes all fixed interest securities. This measure considers that the more relevant issue concerning CAPITAL STRUCTURE is the proportion of capital employed represented by long-term debt. All capital is invested in a company's activities and it is not meaningful to say that any one operation was financed by any particular class of funds. (See GEARING, CAPITAL STRUCTURE.)


His main concern was with public policy and with the economics of underdeveloped countries and the Lewis model of development, which assumes a dual economy with an expanding modern sector, in which profits are reinvested, and which absorbs unlimited supplies of labour from the traditional agrarian sector, is widely accepted. His major work is the Theory of Economic Growth (1955), which presents a readily accessible synthesis of work on development to that date. In Development Planning; The Essentials of Economic Policy (1966) he provides a guide to the practitioner on how to devise and assess an economic plan. His other publications are Economic Survey, 1918-1935 (1949), which reviews and analyses the events and policies of that period, Overhead Costs (1949) and Principles of Economic Planning (1949). (See LEWIS-FEI-RANIS MODEL.)

Lewis-Fei-Ranis model.  An economic model of unemployment in DEVELOPING COUNTRIES which was put forward by A. LEWIS in 1954 and 1958 and then formalized by Fei and Ranis in 1964. The model highlights the need to distinguish the agricultural and industrial sectors in the dual economy - i.e. one characterized by two separate sectors such as agriculture and industry - and the problem of labour movements between them. The agricultural sector, at SUBSISTENCE level, has surplus labour which moves gradually into the modern industrial sector. The labour absorption of the industrial sector depends on the rate of CAPITAL ACCUMULATION and hence profit levels, which are by assumption, reinvested. Lewis originally held the industrial wage level as a constant, being related to the subsistence income levels in the agricultural sector. Full employment is finally reached when all the surplus labour from the agricultural areas has been absorbed into industry.

This model made a major contribution in its emphasis on the rural-urban problem and that of labour transfer but empirical work
has undermined two of its precepts. First, in general, there is little unemployment in rural areas, yet it is widespread in industrial areas. Second, industrial wages, far from being constant, are rising continually in relation to those in rural areas.

**lexicographic preferences.** The preferences of an individual who strictly prefers one bundle of goods to another, so long as it contains more of a particular good and regardless of the amounts of other goods in the bundle.

**liabilities.** Any claims, actual or potential, on an individual or institution. The term usually refers to financial liabilities of which the commonest form is a DEBT of any kind. Thus bank deposits, which are bankers' debts, are commonly referred to as 'deposit liabilities'. Some liabilities are contingent, i.e. result in actual claims only in specified circumstances. A guarantee issued on behalf of a borrower, e.g. by a bank, is a contingent liability of the guarantor: it only becomes an actual claim if the borrower fails to meet his obligations.

**liberalism.**

*See ECONOMIC LIBERALISM.*

**LIBOR.** The London Interbank Offer Rate; a rate - a different rate according to circumstances - at which funds can be borrowed in particular currencies, amounts and maturities, in the EUROCURRENCY MARKET. Such a rate is used as the base for determining the lending rate charged by banks engaged in medium-term lending of Eurocurrencies for a variety of purposes, the development of North Sea oilfields being a notable example. Since the periods for which currencies can be borrowed rarely exceed two years, a bank (e.g. a CONSORTIUM BANK) making a four-year loan must borrow at short term, 'rolling over' the borrowings (in effect reborrowing) at intervals during the course of the loan. The RATE OF INTEREST charged on such loans is set at a margin over the LIBOR for the particular amount, term and currency composition of the funds borrowed, and so may vary at each borrowing term with movements of LIBOR.

**licensed deposit takers.** Under the Banking Act of 1979, a class of institutions which are licensed to carry on the business of DEPOSIT taking. The Act, which is frame to protect the depositing public, effects restrictions on the business of deposit taking to classes of institutions, 'recognized banks' and 'licensed deposit takers'. The latter deposit taking institutions which meet certain conditions in regard to the scale of their net assets and the conduct of their business but which do not provide the range of financial services broadly denoted by the terms RETAIL and WHOLESALE BANKING. Such institutions may not describe themselves as 'banks', though under the new arrangements for monetary control established in 1981 they are defined as forming part of the monetary sector for statistical purposes and are subject to the same CASH RATIONMENT as recognized banks.

**‘Lifeboat’.** The colloquialism for the operation mounted in December 1973 by the BANK OF ENGLAND, with the help of London and Scottish CLEARING BANK; to deal with the so-called secondary bar crisis which broke in that month. The ORDINARY BANKS concerned were large deposit-taking FINANCE HOUSES which grown in numbers and size in the late 1960s and early 1970s, aided by the quantitative restrictions on lending applied (before 1973) to the clearing banks and larger financial institutions. In the 1970s these institutions, drawing funds largely from the MONEY MARKET and also from depositors, lent heavily for property development. Tightening money policy in 1973 created liquidity problems for these houses, as money market funds were withdrawn; but these subsequently moved into insolvency problems as the rise in property values, halted in 1973, turned into a peak in 1974. In order at first to protect individual depositors, but later as the deepened, to avert the threat to the financial system, the Bank of England organized the 'Lifeboat' operation - effectively a joint lending operation - to prevent those institutions which seemed capable of eventual solvency or reconstruction from collapse. By 1975 over 20 companies were in receipt of support, which totalled over £13C million. (See LENDER OF LAST RESORT.)
life-cycle hypothesis. The hypothesis that individuals consume a constant proportion of the present value of their lifetime income each period. Precisely what this proportion will be depends on each consumer's tastes and preferences but provided the distribution of the population by age and income is relatively constant these individual consumption functions can be aggregated to produce a stable aggregate consumption function. This theory associated with Ando-Modigliani and Brumberg attempts to explain the empirical evidence on the specification of the CONSUMPTION FUNCTION by reference to the pattern of lifetime earnings of the average individual.

They argue that the general pattern of lifetime earnings is such that a random sample of households ranked according to income level would reveal a disproportionately large number of people in middle-age at the upper end of the income distribution and a disproportionately large number of young or old people at the lower end. Young and old households have a high AVERAGE PROPENSITY TO CONSUME, indeed they are often engaged in dissaving. Frequently they either borrow against their future income, as in the case of the young, or run-down their life savings as in the case of the old. In contrast middle-aged households are either paying back earlier debts or saving for old age and therefore have a low average propensity to consume. As a result low income households reveal high average propensities to consume and vice versa; these facts explain the form of the consumption function by cross sectional analysis. In the long-run, this hypothesis suggests households consume a constant proportion of the PRESENT VALUE of their lifetime income and the LONG-RUN CONSUMPTION FUNCTION is suggested to capture this effect. Finally since actual labour income will rise and fall around this long-run average the average propensity to consume will be found to vary inversely with income over the length of the business cycle as suggested by the SHORT-RUN CONSUMPTION FUNCTION. (See RELATIVE INCOME HYPOTHESIS, PERMANENT INCOME HYPOTHESIS, ABSOLUTE INCOME HYPOTHESIS.)

likelihood function. In econometrics, a means whereby the most likely true model can be inferred from a finite set of observations on events hypothesized to be generated by the model.

Let \( L(y_1, y_2, \ldots, y_n | \beta) \) be the joint probability density function (pdf) of the sample observations \( y_1 \ldots y_n \) conditional on \( \beta \), where \( \beta \) is a vector of parameters in the underlying model generating the \( y \)'s. Then if the pdf is rewritten as \( L(\beta | y_1, \ldots, y_n) \) this implies that for a given set of observations \( y_1 \ldots y_n \) the function \( L(\beta | .) \) is a function of the parameters \( \beta \) and is called the likelihood function. Since \( \beta \) is in general unknown in MAXIMUM LIKELIHOOD estimation the value \( \beta \) is chosen for which \( L(\beta | .) \) is a maximum. In REGRESSION, the ORDINARY LEAST SQUARES ESTIMATOR is a MAXIMUM LIKELIHOOD estimator provided the DISTURBANCE TERM is WHITE NOISE. (See PROBABILITY DENSITY FUNCTION.)

likelihood ratio test (L.R.). This test uses the ratio of two maximised LIKELIHOOD FUNCTIONS as given by \( \lambda \) to determine whether or not a given NULL HYPOTHESIS \( H_0 \) is plausible where

\[
\lambda = \frac{\max L(\beta) \text{ for values of } \beta \text{ specified by } H_0}{\max L(\beta) \text{ for all values of } \beta}
\]

with \( L(\beta) \) the likelihood function. The LR is unbiased and consistent, while for large examples \( -2 \log X \) has a CHI-SQUARED DISTRIBUTION with \( r \) degrees of freedom where \( r \) is the number of parameters in \( \beta \) for which \( H_0 \) specifies particular values. The LR test is equivalent to the Wald(W) test and the Lagrange multiplier (LM) test at the asymptote, but for small samples \( W \geq LR \geq LM \).

limited company. There are two types of limited company in the UK, a public limited company (PLC) where its shares or those of the parent company are quoted on the STOCK EXCHANGE, and a private limited company, when the shares are held privately. (See LIMITED LIABILITY.)

limited dependent variables. Occur in REGRESSION models where the DEPENDENT VARIABLE is restricted to some range of values. They arise particularly in MICRO-ECONOMIC problems of CONSUMER choice where the dependent variable may assume a range of values (the 'truncated' variables problem) or where some values may not be
Observables (the ‘censored’ samples problem), in the case of binary choice the LINEAR PROBABILITY MODEL can be used.

**Limited information (LI)**. A term descriptive of a family of econometric ESTIMATION techniques used in estimating the PARAMETERS OF SIMULTANEOUS EQUATIONS. The distinctive feature of this type of estimator is that they do not take the entire structure of a simultaneous equation model into account, but merely the form and variables of a subset of those equations. In particular, the term is often used to describe techniques for estimating single equations separately from the model. Examples include TWO STAGE LEAST SQUARES, and limited information MAXIMUM LIKELIHOOD (See SINGLE EQUATION ESTIMATOR.)

**Limited liability**. The so-called limited liability company, registered under the Companies Acts, is one of the most common forms of business organization in the UK. A company may be limited by SHARES or by guarantee, but the latter is rarely met in commerce. The liability which is limited is in fact that of the members of the company, the shareholders. In a company limited by shares they are liable to pay to the company the full issue price of their shares, i.e. the nominal value plus the PREMIUM, if any, charged at the time of issue. In practice this is almost invariably fully paid when the shares are issued and if this is the case there is no further liability on the members. The company itself is fully liable for its own debts and may be put into liquidation if it is unable to pay these. (See LIMITED COMPANY.)

**Limit pricing**. The way in which established firms within an industry can set price with the objective of preventing new entry. In the presence of BARRIERS TO ENTRY, this can be achieved by setting a price just below the minimum long-run average cost of the best placed potential entrant. Such a price level is known as the maximum ENTRY FORESTALLING PRICE.

**Lindahl model**. See VOLUNTARY EXCHANGE MODEL.

**Linder thesis**. The thesis of the Swedish economist of that name that the closer together are countries in terms of incomes, the greater the volume of manufactured goods they trade with each other, since for regarded as an extension of production and consumption. G neon first for the home market the volume of output increase if markets are sought. Empirical w support to the thesis.

**Linear combination**. The sum of variables (or VECTORS) which is multiplied by some constant factor to form a FUNCTION the DEPENDENT VARIABLE, a combination of the INDEPENDENT variables. Technically, if for any set of vectors we can write

$$Z = \lambda \cdot X + (1 - \lambda) \cdot Y,$$

is a convex linear combination of the vectors. Convex linear combination is a WEIGHTED AVERAGE.

**Linear dependence**. A property of VECTORS whereby one of the vectors can be expressed as a LINEAR COMBINATION OF the others. Technically, if for any set of vectors we can write

$$\sum_{i=1}^{n} \alpha_i \cdot a_i = 0,$$

where $0$ is a vector of zeros, and one $\alpha_i \neq 0$, then the set of vectors is said to be linearly dependent. If this is the case the vectors are said to be linearly independent. Linear dependence in a REGRESSION analysis represents MULTICOLLINEARITY, which renders the regression analysis impossible.

**Linear estimator**. A formula for the parameters of a REGRESSION which the estimates are linear FUNCTIONS of the values of the INDEPENDENT VARIABLE. The ORDINARY LEAST SQUARES ESTIMATOR is a linear estimator. (See UNBIASED ESTIMATOR.)
linear expenditure systems. In linear expenditure systems the DEMAND FUNCTIONS are expressed for groups of goods rather than for individual goods. Substitutability within the group is significant but is zero between the groups. The demand functions for the groups may then be added to secure a total expenditure function. The implied utility function is additive (see ADDITIVE UTILITY FUNCTION) and has the form

\[ U = U_i + U_j + U_k. \]

where \( i, j \) and \( k \) refer to groups of commodities. Expenditure on a group of commodities tends to be composed of subsistence and supernumerary elements (see SUBSISTENCE EXPENDITURE, SUPERNUMERARY EXPENDITURE).

linear function. A mathematical relationship in which the variables appear as additive elements, with no multiplicative or exponential components. The general form of a linear function is thus given by

\[ a_1X_1 + a_2X_2 + \ldots + a_nX_n = b, \]

where \( X_i \) are variables and the \( a_i \) and \( b \) are constants. The function is so called because the graph of such a function (and in particular for only two variables) is a straight line.

linearly homogeneous. See HOMOGENEOUS FUNCTIONS.

linear probability model (also known as PROBIT MODEL.) A model in which the DEPENDENT VARIABLE is a DUMMY or BINARY variable, and is expressed as a LINEAR FUNCTION of one or more INDEPENDENT VARIABLES. The model is so called since its predictions, given values of the independent variables, can be interpreted as the probability with which the dependent variable will assume the value unity. Such models are useful in the analysis of qualitative phenomena. (See LOGIT ANALYSIS.)

linear programming. A technique for the formalization and analysis of CONSTRAINED OPTIMIZATION problems in which the OBJECTIVE FUNCTION is a LINEAR FUNCTION, and is to be maximized or minimized subject to a number of linear INEQUALITY constraints. The method is very useful in such problems as the determination of the optimal allocation of scarce resources. Because of the linear nature of the function involved, and the fact that the constraints are in general inequalities, it is not possible to use standard optimization methods (such as LAGRANGEAN TECHNIQUES), SO that special solution procedures are generally used. One such method commonly used is the SIMPLEX algorithm. Linear programming is also related to USES OF DUALITY, to SENSITIVITY ANALYSIS and to activity analysis.

liquid asset. See LIQUIDITY.

liquidation. This is the process whereby the existence of a company is terminated, its property having been realized and distributed among its creditors and in the event of a surplus, among its members. Where the company is insolvent, the process resembles BANKRUPTCY, but it may also be used in the case of solvent companies as, for instance, in certain types of MERGER or reconstruction.

liquidity. The quality in ASSETS of 'nearness' to free spending power. MONEY is by definition completely liquid. Other assets vary in degree of liquidity, depending on whether they meet two, not wholly consistent, criteria. An asset is the more liquid the more readily - in terms of time and other transactions costs involved - it may be converted into money. The second characteristic of liquidity, emphasized more strongly in recent times, is degree of freedom from the risk of fluctuation in capital value (in monetary terms). By the convertibility criterion a deposit withdrawable at short notice may be only fractionally more liquid than a five-year GILT-EDGED stock which is readily saleable in a highly organized market. But by the criterion of capital risk, the stock is decidedly less liquid than a deposit, or for that matter, than a short-term bill.

liquidity preference. See MONEY, DEMAND FOR.

liquidity ratio. Before the introduction in 1971 of the monetary control arrangements summarized in the Bank of England paper Competition and Credit Control, control over bank lending was partly exercised by requiring banks to observe a designated minimum ratio between their liquid
Little-Mirrlees method

**ASSETS** defined as cash, money lent at call short notice to the DISCOUNT MARKET, and bills - and their total deposit liabilities.

The method superseded the CASH RATIO as the operative controlling ratio in British banking became generally accepted in the 1950s, and was based on the facts of the greatly increased volume of TREASURY BILLS, the MONETARY AUTHORITIES’ policy of stabilizing the Treasury Bill rate, and the institutional arrangements by which the DISCOUNT MARKET guaranteed the uptake of all Bills issued. Accordingly the banks were required to observe a minimum liquidity ratio of 30 per cent, later reduced to 28 per cent. (See MONEY MULTIPLIER, FUNDING.)

**liquidity trap.** A situation in which an increase in the MONEY SUPPLY does not result in a fall in the interest rate but merely in an addition to IDLE BALANCES: the interest ELASTICITY OF DEMAND for money becomes infinite. Under normal conditions an increase in the money supply, resulting in excess cash balances, would cause an increase in BOND prices, as individuals sought to acquire assets in exchange for money, and a corresponding fall in interest rates. In the situation described by KEYNES as a liquidity trap, individuals believe that bond prices are too high and will therefore fall, and correspondingly that interest rates are too low and must rise. They therefore believe that to buy bonds would be to invite a CAPITAL LOSS, and as a result they hold only money. As a result an increase in the money supply merely increases idle balances and leaves the INTEREST RATE unaffected.

Individuals’ views on the level of bond prices may be summarized in terms of their views about the interest rate. Keynes’ theory hypothesizes that each individual has a view about the long-run EQUILIBRIUM interest rate and that there corresponds to this a critical rate below which the individual holds only bonds. Clearly if everyone is holding money as they are in the liquidity trap then the current interest rate must be below the lowest critical rate of the population. The implications of the liquidity trap are that MONETARY POLICY is ineffective under these circumstances. An increase in the money supply will have no effect on the interest rate and therefore no effect on investment, hence AGGREGATE DEMAND. When originally suggested by Keynes in the General Theory this appeared to be an important qualification of the effectiveness of monetary policy. However in practice there is little empirical evidence to support the existence of a liquidity trap. Furthermore while hypothesis rests on the view that expectations are regressive it offers no precise way how these are formed. (See KEYNES EFFECT, PIGOU EFFECT, REAL BALANCE EFFECT.)

**listed securities.** The name given to SE, or the securities that are traded on the UK’s EXCHANGE. Listed companies have to agree to the terms of the Listing Agreement, which has rulings on disclosure of new acquisitions, new operations abroad, or any change in company likely to affect its share price. Listing is valued by both companies and shareholders. It gives publicity and information about the company and also makes it easier for the company to borrow capital.

Little-Mirrlees method. A technique for project evaluation in DEVELOPING COUNTRIES which has received widespread attention. The authors lay emphasis on the distortions in both the product and factor market starting points to their methodology. Their approach is essentially a COST-BENEFIT ANALYSIS where adjustments are made to product and factor prices and to interest rates. Their numéraire is social uncommitted income in the hands of the government measured in terms of convertible FOREX. They argue that all costs and benefits of projects have a BALANCE OF PAYMENTS effect and that foreign exchange values are likely to be a more accurate reflection of relative social costs and benefits of different goods and services in a developing country. The authors argue that an additional unit of consumption is less valuable than an extra unit of investment. Additional consumption from a project does, however, have some social value. This extra consumption has to be evaluated in terms of numéraire. It is because saving is less socially optimal that an extra unit of government income is thought to be more valuable than an extra unit of private consumption. The SHADOW PRICE of labour for use in
project appraisal is calculated in accordance with these ideas. It is equal to labour’s MARGINAL PRODUCT in its alternative occupation, plus the SOCIAL COST of providing for the extra consumption of the worker employed at (probably) a much higher wage net of the benefit measured in terms of social income of that increased consumption. In their analysis Little and Mirrlees employ the concepts of accounting rate of interest and consumption rate of interest. The former is the rate at which the value of government income falls over time. Its size depends on the social rate of return on marginal public projects, the fraction that is saved and the weight of government income in relation to private consumption. In determining the last factor, information on the consumption rate of interest is required. This is the rate at which future consumption needs to be discounted to make it equivalent to present consumption.

In valuing outputs and inputs Little and Mirrlees classify all goods as traded and non-traded. Traded goods include those which would be exported or imported if the country followed sensible trading policies, and non-traded goods are those which would not enter world trade if there were no restrictions on trade at all. Traded goods are sold at world or border prices with exported goods being valued at FOB prices and imported ones at CIF prices. With non-traded goods a breakdown of their constituent parts (traded, non-traded, labour and foreign exchange) is made. Eventually by examining the inputs (and inputs into other inputs) it is possible to find all costs in terms of foreign exchange and labour. The latter is valued at the shadow wage rate in terms of foreign exchange.

Several criticisms have been made of the Little-Mirrlees technique. Some economists have said that domestic values are better indicators of OPPORTUNITY COSTS than foreign exchange values. Similarly if there is excess capacity in industry a rise in demand for the product concerned may not influence the trade balance. It has been argued that it is not logical to say that only increments to private consumptions are less valuable than saving and investment. It is arguable that a welfare improvement could be made if current consumption were reduced and investment increased.

**LM curve.**

See IS-LM DIAGRAM.

**loan.** An advance of finance by a lender to a borrower. Interest is normally payable on a loan, and the term to maturity (repayment) can vary from the very short to the very long. In many important lending transactions the borrower provides documentary evidence of debt, e.g. a stock certificate, which may be bought and sold on a market, e.g. the STOCK EXCHANGE. (See DEBENTURES, GILT-EDGED, RATE OF INTEREST.)

**loanable funds.** Strictly the term means funds available for lending in financial markets, but it usually arises in the context of the theory of the interest rate. The modern loanable funds theory of interest stems from WICKSELL, though there were precursors, notably RICARDO. According to this theory ‘the’ RATE OF INTEREST is a price determined by the supply and demand for loanable funds in the capital market. The supply of loanable funds comprises savings from current income plus any net increase in MONEY SUPPLY caused by a net CREDIT expansion. Demand for loanable funds consists of investment demand for current (real) capital expenditure plus net ‘hoarding’ demand (i.e. net increase in idle money balances due to a shift in the DEMAND FOR MONEY function). Thus in equilibrium, the rate of interest would be the price that satisfied the following market equation:

\[ S + \Delta M = I + \Delta H \]

Where \( S \) = current saving, \( AM = \) net increase in money supply, \( I = \) investment (real) demand, and \( \Delta H = \) net ‘hoarding’. The theory was an important theoretical development in the theory of interest in that it combined the real (i.e. non-monetary) forces of investment and savings (usually depicted as the sole determinants in textbook presentations of the ‘classical’ theory of interest) with the practical monetary and financial factors which clearly influenced the behaviour of interest rates as observed in financial markets. The theory is essentially a ‘flow’ approach to the rate of interest, in contrast to the ‘stock’ approach of KEYNES' liquidity preference theory which showed interest as determined by the supply of money (independently determined) and the
demand to hold it - this being a functional variable of the rate of interest. In EQUILIBRIUM the two theories come to the same thing; but this does not mean, as has at times been argued, that they are interchangeable. It is fair to say that most exponents of the loanable funds theory see the 'real' factors - savings, as determined by 'thrift', and investment, as influenced by the MARGINAL PRODUCTIVITY OF CAPITAL - as determining the long-run level of the rate of interest, with financial and monetary forces being responsible for short-term movements in the rate and in the economic system. Nevertheless, the two theories can usefully be regarded as complementary models, to be combined with more complex modern analyses of the behaviour of interest rates, e.g. the PORTFOLIO BALANCE approach.

**loan capital.** See DEBENTURES.

**loan stock.** See DEBENTURES, FINANCIAL CAPITAL.

**local authorities' market.** A wholesale MONEY MARKET in London, closely linked with the INTERBANK, EUROCURRENCY and FINANCE HOUSES MARKETS, in which short-term loans are placed, through firms of money BROKERS, with local authorities. The market first developed in the late 1950s when the local authorities were encouraged to resort to the CAPITAL MARKET, but when high long-term rates also encouraged them to borrow short. Banks and other financial institutions are prominent lenders in the market; but at times it has also attracted large sums from abroad.

**local finance.** The income and expenditure of sub-national (or local) governments. In the UK a large element of PUBLIC EXPENDITURE is controlled by local authorities which receive income from the central government (mainly through the RATE SUPPORT GRANT), from a tax known as the COMMUNITY CHARGE and from various rents, fees and charges. In other countries, such as the USA, sub-national governments are more independent of the central government than is the case in UK. (See FISCAL FEDERALISM.)

**local labour market.** The geographical division of LABOUR MARKETS is largely a consequence of the pecuniary and psychological costs of extensive travel to work. These costs act to sub-divide spatially the labour force that is already stratified occupationally; they tend to restrict the labour market to that which is accessible from a given residence. This holds true for lower occupational groups at least.

Changes in the structures of employments within a market and the pattern and level of rewards offered and changes in transport facilities indicate that a perfectly demarcated labour market area will rarely be found. Such changes in the structure of conditions and rewards will affect both the shape and extent of employee work preference areas. If the complex of costs and disutilities of the journey to work were received and evaluated equally, and if constituted the only variable between alternative employments, it would be possible to derive the labour catchment area for employers offering given wages and rewards. Work preference zones of workers living in given areas. Yet, empirical problems as this would only account for but one of a myriad of forces influencing job choice.

In practice, the definition of a local labour market is established on the assumption that its key characteristic is that the bulk of an area's population habitually seek employment there and that local employers recruit most of their labour from that area. Journey to work statistics form the basis of this spatial definition or delineation.

**local multiplier.** See REGIONAL MULTIPLIER.

**local public good.** A good which is provided to a community, for example, street lighting. The analysis of local public goods differs from that of conventional PUBLIC GOOD; that it is concerned with the determination of the allocation of the population among different communities, whereas, for the latter the population of each community is assumed fixed. The TIEBOUT MODEL argues that there is no PREFERENCE REVELATION problem associated with local public goods in that individuals by choosing in which community to live reveal their preferences for public goods.
locational integration. A set of interconnections existing between a number of industries which are both located in close proximity and linked in that the products of some of the industries are inputs for the others. An example would be where petrochemical products such as plastics are produced near a refinery supplying feedstocks. Such integration of activities may lead to savings in transport costs and improve the efficiency of contact between suppliers and purchasers. In this way, locational integration is one source of the cost savings known as AGGLOMERATION ECONOMIES. (See GROWTH POLE.)

locational interdependence. An interrelationship between firms where one firm's decision concerning a choice of location for its plant is affected by the locational choices of its competitors. Thus locational interdependence can be seen as one facet of the problems dealt with in the theory of OLIGOPOLY, since in oligopoly there is an identifiable effect of any firm's actions on the experiences of its rivals.

Various attempts have been made to analyse the patterns of location which will emerge when interdependence exists. For example, in an early, classic contribution H. Hotelling ('Stability in Competition', Economic Journal, vol. 39, 1929) demonstrated that, under certain assumptions, two rivals serving a market which was spread out in a straight line would both locate at the midpoint of the line. However, as with oligopoly theory in general, no single solution has been developed to the problem of location patterns when locational interdependence exists; both the particular circumstances of the case analysed and the assumptions made exert a strong influence on the results obtained.

location quotient. A statistical measure of the extent to which a particular economic activity is comparatively over or under-represented in the economy of a region, compared to its representation in the economy as a whole. The location quotient is calculated as

\[
\frac{E_{ir}}{E_{in}}
\]

where \(E_{ir}\) is the percentage of economic activity (usually measured by employment) in region \(r\) accounted for by activity \(i\), and \(E_{in}\) is the percentage of national economic activity accounted for by activity \(i\). This ratio may then be multiplied by 100 and expressed as a percentage. Where the quotient is 100, activity \(i\) is equally represented in the regional and national economies; where the quotient exceeds 100 the region can be regarded as relatively specialized in that activity.

location theory. That body of economic theory which analyses the forces which determine the location of economic activity, and seeks to explain and predict the spatial pattern of the location of economic agents. Much of the theory has been concerned with the location decisions of producers or firms, but attention has also been given to the spatial pattern of agriculture, the distribution of towns and cities and, particularly in URBAN ECONOMICS, to the location of households.

The first important work on location theory was published by J.H. VON THUNEN in 1826 (see P. Hall (ed), Von Thünen's Isolated State, Pergamon Press, Oxford, 1966). Von Thünen analysed the case of agricultural producers located around a market town. Producers were assumed to be 'price takers', that is PERFECT COMPETITION was assumed. He demonstrated that, assuming that producers seek maximum profits, their decision as to what crops to produce would be determined by the distance between their land and the market. Products which were relatively expensive to transport (i.e. where transport or TRANSFER COSTS were high in relation to product price) would be grown near the town while goods for which transport was relatively less expensive would be produced further afield. Von Thünen's theory is of some importance to the theory of ECONOMIC RENT, demonstrating as it does that the rent received by a FACTOR OF PRODUCTION may be related not only to the factor's quality, but also to its location. The model's main significance for location theory was its introduction of the role of transport costs in influencing location. However, although its insights have received some development in Urban Economics, the model has little to contribute to the analysis of industrial location. The first major
sis of the theory of industrial location was carried out by Alfred Weber at the beginning of this century (See C.J. Friedrich, "Alfred Weber's Theory of the Location of Industries," Chicago University Press, Chicago, 1929). Weber considered the problem of a firm, again in perfect competition, choosing its location given that its market is at one point while raw materials' sources are at other points. As in the theory of perfect competition, firms are profit maximizers, and if production costs are assumed to be the same everywhere, the location decision reduces to finding the point at which transfer costs are at a minimum. In the simplest version of the model we have one market place and one raw material source; the following results are provided by Weber's approach:

1. If production of the good in question is 'weight losing', i.e. the good is less heavy (or bulky, or perishable) than the raw materials from which it is manufactured, then the firm will locate near the raw material source. (INPUT ORIENTATION.)

2. If the production process is 'weight gaining', the good being bulkier, heavier or more perishable than its raw materials, then the firm will locate near the market. (MARKET ORIENTATION.)

3. Generally, the firm will locate either at the market or the raw material source, and not at any intermediate point. This is so because an intermediate location would involve extra costs of loading and unloading (terminal costs), and by involving shorter journeys would lose LONG-HAUL ECONOMIES. More complex versions of Weber's model involve multiple markets, multiple sources of raw materials, spatial variation in costs (notably costs of LABOUR) and the possibility of AGGLOMERATION ECONOMIES.

An important criticism of the Weberian approach is that its assumption of perfect competition leads to a neglect of the influence of location on the demand for a firm's output. The possibility exists that a firm's location may give it some degree of MONOPOLY power, and thus that an approach based on the theory of IMPERFECT COMPETITION would be more appropriate. The analysis of demand influences on industrial location was undertaken in the early 1950s by Augustus L. Losch. (See his (translated) "The Economics of Location," Yale University Press, New Haven, 1954). As well as extending Weber's theory through considering demand and by analysing development of location patterns as a cess of 'trial and error', L. Lösch elaborated on the theory of the pattern of locational economic activity in an economy. L. Lösch began by assuming a country to consist of plain with evenly spread population, raw materials (this can be contrasted with Weber's model). In essence, L. Lösch's nation of the pattern of location of industry is the outcome of the influence of the pattern of transfer costs and ECONOMIES OF SCALE. The theory can be viewed as a development of C.H. CHAMBERLIN'S theory of MONOPOL COMPE TITION. Lösch's theory also presented the first attempt at a GENERAL EQUILIBRIUM approach to location theory. Earlier approaches had considered only one firm or activity at a time (i.e. they were only PARTIAL EQUILIBRIUM approaches). L. Lösch sought to analyse the whole pattern of economic activity. Lösch's approach has developed further by many economists, notably in W. Isard, "Location and the S Economy," MIT Press, Cambridge, 1956.

The economic forces determining the spatial pattern of towns were first analysed by W. Christaller (see C. Baskin (translator), "Central Places in Southern Germany" Prentice Hall, New York, 1966). Christaller's theory, known generally as central place theory, bears some relation to L. Lösch's but is less sophisticated in terms of economic theory and is concerned with the provision of services and the location pattern of market towns rather than with industry.

While most models of location theory are concerned with analysing EQUILIBRIUM location patterns and are based on the standard economic assumptions of profit maximization and UTILITY maximization, alternative approaches do exist. Some economists argued that the dynamic processes of LOCATION will tend to DIS EQUILIBRIUM in that economic activity will tend to become more concentrated at certain locations. These patterns are usually predicted with CUMULATIVE CAUSATION MODELS are applied to location questions and are also suggested by the analysis of GROWTH POLES. Other economists have, in analysing trial location, rejected the assumption of profit maximization. In this way
ments in location theory have been related to developments in the theory of the firm where alternatives to profit maximization have been analysed. In particular, some economists have sought to apply the BEHAVIOURAL THEORY OF THE FIRM to location issues. (See LOCATIONAL INTERDEPENDENCE.)

locking-in effect. The effect by which a holder of an asset is deterred from selling it because of a fall in its market value and the consequent loss that would be incurred. Typically, it may affect holders of GILT-EDGED or other fixed-interest SECURITIES when a marked rise in interest rates causes a fall in the market prices of these stocks.

lockout. Closure of the workplace by the employer in an attempt to compel the employees to accede to the terms of employment desired by the management.

logarithm. The logarithm of a number is that power to which the base of the logarithm must be raised to be equal to that number. If, for instance, the base of the logarithm is $b$, then

$$\log_b a = 1,$$

such that

$$a = b^1.$$

The most commonly used logarithm bases are 10 (the so-called common logarithms) and the number $e$ ($= 2.718...$), the so-called natural or Napierian logarithms, usually denoted by the symbol $\ln$. Logarithms are often used for complicated multiplication or division because of the convenient arithmetic properties of indexed numbers (numbers raised to powers).

logistic function. A function of the form

$$Y = \frac{A}{1 + e^{(a + bX)}}$$

where $X, Y$ are variables, $A, a, b$ are constants and $e$ is the base of the NATURAL LOGARITHM.

The graph of this function has an 'S' shape, and the relationship is consequently often used to represent the value of an economic variable over time. When expressed in logarithmic form it is also the basis of LOGIT ANALYSIS.

logit analysis. A development of the LINEAR PROBABILITY MODEL in which the values of the DEPENDENT VARIABLE are constrained to lie within the 0-1 probability limits by the use of the specification

$$\ln \left( \frac{P_i}{1 - P_i} \right) = a + b \cdot \ln X_i,$$

where $P_i$ is the probability of the dependent variable taking the value 1, $(1 - P_i)$ is the probability of the dependent variable taking the value 0, $X_i$ is the independent variable, and $a$ and $b$ are constants.

Note that $\ln X$, represents the natural LOGARITHM of $X$. (See also LOGISTIC FUNCTION.)

log-linear. A mathematical relationship which, if expressed in LOGARITHMS, is a LINEAR FUNCTION. For instance, the function

$$Y = aX^b$$

is log-linear, since it may be expressed as

$$\log Y = \log a + b \log X,$$

which is a linear function in the logarithms of the variables. This type of relationship is often used in economic applications since it displays the property of constant elasticities between the variables.

log-normal distribution. A PROBABILITY DISTRIBUTION, SKEWED to the right, which has the property that the LOGARITHMS of the values of a log-normally distributed variable follow a normal distribution. The distribution has great similarities to the DISTRIBUTION OF INCOME in a wide range of countries.

logrolling. The name given to a process of 'vote trading' in which one individual agrees to support another individual on a certain issue in exchange for the support of the second individual on a different issue. The possible gain from exchange of this type can be illustrated by the table below in which the figures indicate the costs or benefits accruing
to individuals $A$, $B$ and $C$ from two possible policies

<table>
<thead>
<tr>
<th>Voter</th>
<th>$X$</th>
<th>$Y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A$</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>$B$</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>$C$</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

On a simple majority neither policy would be adopted. However if $B$ supports $C$ on policy $X$ in exchange for $C$'s support on policy $Y$, both make a net gain of 2. Thus an incentive exists for them to exchange in logrolling. Note, however, that individual $A$ loses as a result of the practice. If individual $A$’s losses were larger than the gains of $B$ and $C$ it might be argued that the logrolling caused a social loss. In general, logrolling can enable one group of voters to set up policies which benefit them at the expense of other voters; thus it has been argued that logrolling may lead to over-expansion of public expenditure. Logrolling can provide a solution to the so-called PARADOX OF VOTING.

Lombard Street. The street in the heart of the banking and financial quarter of the City of London. The name originated with the bankers from northern Italy who were prominent in mediaeval times. It is frequently used colloquially to denote the London MONEY MARKET, as in the title of Walter BAGEHOT’S renowned book.

Lome Convention. A trade and economic co-operation convention signed in 1975 at Lome, the capital of Togo, by the EUROPEAN COMMUNITY (EC) member countries and 46 African, Caribbean and Pacific (ACP) developing countries. It replaced and extended the earlier YAOUNDE CONVENTIONS of association which existed between the EC and the Associated African and Malagasy States. The Convention’s trade provisions resulted in the EC granting duty-free access on a non-reciprocal basis to all ACP exports of manufactured goods and tropical agricultural produce. An export revenue stabilization scheme, STABEX, was established to guarantee ACP countries a specific level of income on selected commodity exports to the EC. Agreement was also reached on measures designed to encourage industrial co-operation through the transfer of technology, development of new industrial partnerships and increased EC private investment in ACP countries. The convention also provided for financial and technical assistance to be distributed, generally in the form of grants and soft loans financed by the EUROPEAN DEVELOPMENT FUND and the PEAN INVESTMENT BANK, to the countries. The second Lome Convention was concluded in 1979 by the EC and 58 ACP countries. The convention introduced new areas of co-operation regarding migrant labour, investment protection, energy policy, agricultural development and the stabilization of earnings for mineral producers (SYS scheme). The third Convention came into force in March 1985 and extended the concessions of the second Convention, empowering EC assistance to the ACP country sectoral programmes, furthered co-operation between the EC and states, increased STABEX transfers, and the SYSMIN scheme. The fourth Convention entered into force in December 1989 with the trade provisions effective in 1990 and the remainder in 1990. There were 69 ACP countries party to the Convention.

London Money Market. See MONEY MARKET.

Long cycle theory. A prolonged period of relatively prosperous times followed by a period of hard times of similar duration, often called the KONDRATIEFF cycle, tends much more beyond the periodicity of TRADE CYCLE, a full cycle being considered to take about 50 years in length. Some economists consider that PRICE and INTEREST movements alone were involved, while Kondratieff saw price and not an interest phenomenon. Long cycles may be considered as long-run cumulative movements since large government expenditure during prosperous times, on long cycles is inconclusive.

Long-dated securities. SECURITIES form of DEBT rather than EQUITIES - e.g. long-dated securities.
EDGED stock or DEBENTURES - which have a long term to their maturity (i.e. repayment) dates, usually more than 10 years. Long-dated securities and the dealings in them are frequently referred to, collectively, as the 'long end of the market'.

**long-haul economies.** The tendency for transport costs to rise less than in proportion to distance travelled. Thus where long-haul economies are present the AVERAGE COST per unit distance travelled is a decreasing function of distance. These economies arise principally because any mode of transport will involve certain costs which are fixed and uninfluenced by the distance of the journey. The fixed costs consist of the terminal costs of movement - i.e. those involved at each end of the journey, such as loading and unloading a cargo. Given these fixed costs, doubling (say) the length of a journey will not double its total cost.

**longitudinal data.** A type of PANEL DATA, in which information covering a period of time prior to the point of collection is incorporated. For example, information on the length and number of periods of UNEMPLOYMENT may be incorporated in a current panel data survey of a LABOUR MARKET.

**long rate.** The RATE OF INTEREST, or rather set of interest rates, obtainable on LONG-DATED SECURITIES, and therefore payable on new long-term borrowings.

**long-run.** A time period relating to the process of production during which there is time to vary all FACTORS OF PRODUCTION, but not sufficient time to change the basic technological processes being used. The term was introduced originally by Alfred MARSHALL. In the very long run it is possible totally to change the type of technology being used.

**long-run average cost.** In the LONG-RUN all costs tend to be VARIABLE COSTS. The long-run average cost curve will therefore relate to the minimum cost sections of a series of overlapping short-run cost curves, as shown in the diagram. Thus it is possible to use either plant 1 or plant 2 to produce an output between \( X_1 \) and \( X_2 \). Clearly, for \( X_1 \), it would be more sensible to use plant 1 than plant 2 since the average cost of producing \( X_1 \) is lower. At \( X_2 \), however, it is better to use plant 2. Each of the overlapping sections of the short-run average cost (SRAC) curves may therefore be 'deleted', leaving a cost curve which is seen to be an 'envelope' of the points on the short-run average cost curves which correspond to the lowest possible short-run costs for a given level of output. The 'bumpy' shape of the curve shown is due to INDIVISIBILITIES — i.e. it is not possible to change the size of the factory or plant by very small discrete amounts. If, however, such small changes could be made, the SRAC curves would overlap more closely until, in the case of perfect divisibility, a perfectly 'smooth' long-run average cost curve would result. Note that the loci of the short-run cost points may get lower and lower as a result of ECONOMIES OF SCALE. In the diagram shown, the curve is seen to rise eventually due to the presence of DISECONOMIES OF SCALE. Note that there is no 'law' which dictates the shape of the long-run average cost curve and it is entirely a matter of empirical observation as to whether the final curve is one reflecting decreasing costs (increasing returns), constant costs (constant returns) or increasing costs (decreasing returns). (See AVERAGE COST.)

**long-run consumption function.** The functional relationship between consumption and income over periods of over 50 years. In these studies ten-year averages of income and consumption are usually considered...
loss leader pricing

These findings contradict Keynes’ Absolute Income Hypothesis on the shape of the consumption function and suggest a straight line function from the origin, i.e. \( C = bY \), where \( C \) is consumption, \( Y \) is income and \( b \) is a constant. (See Consumption Function, Short-Run Consumption Function, Cross-Section Consumption Function.)

long-run marginal cost. The extra cost of producing an extra unit of output in the Long Run. Since all costs are variable in the long run there is no ‘law’ governing the shape of the long-run marginal cost curve - it may increase, decrease or be constant with the level of output. It nonetheless obeys the same geometric rules as the short-run MARGINAL COST curve in that it must cut the LONG-RUN AVERAGE COST CURVE (LRAC) at its minimum point, must lie below it when LRAC is declining and must lie above it when LRAC is rising.

long-term capital. CAPITAL in financial (i.e. monetary) form which if borrowed on DEBT terms, has a long term to maturity, usually over ten years; or which alternatively is raised by an EQUITY issue and hence is not repayable at all, other than on the winding up of the company.

Lorenz curve. A construct used in the calculation of measures of inequality. Using income as our example, the Lorenz curve plots cumulative percentages of total income received against cumulative percentages of income recipients, starting with the smallest income recipient, as in the diagram. A point on the curve gives the percentage of the Population that account for a given percentage of total income. The Lorenz curve would assume the characteristic of the 45° line shown in the diagrams if all income recipients had equal shares; i.e. where 10 per cent of the Population had a 10 per cent share, 20 per cent had a 20 per cent share, and so on. The extent to which the measured Lorenz curve deviates from the hypothetical line of absolute (income) equality indicates the degree of (income) inequality within the (population) sample. (See Gini Coefficient.)

Lösch model. See Location Theory.

loss aversion. The assumption that the DISUTILITY resulting from the loss of a commodity is greater than the UTILITY associated with acquiring it. (See Endowment Effect.)

loss function. A DISUTILITY function which a policy-maker is assumed to minimize. A loss function usually contains the squared difference between the actual and desired value of each target variable multiplied by a WEIGHT associated with that variable. For example a loss function to be minimized may take the form:

\[
L = a_1(u - u^*)^2 + a_2(P - P^*)^2
\]

where \( u^* \) and \( P^* \) are desired rates of unemployment and price inflation respectively while \( u \) and \( P \) are actual levels. \( a_1 \) and \( a_2 \) are weights whose relative size gives the ranking assigned by the policy-maker. The minimization of a loss function enables a trade off to be made between the targets (i.e. \( u^* \) and \( P^* \)). It owes much to the work of the Dutch economists Jan Tinbergen and Henri Theil.

loss leader pricing. The practice of diversified firms who offer some portion of their product range at prices below cost, in the belief that this will encourage sales of...
other higher profit margin products. This is common amongst retailers who use 'loss leaders' to attract customers, who then may buy high profit margin goods as a matter of convenience or impulse.

**loss-offsetting provisions.** Generally refers to the arrangement whereby losses from a project can be offset against income from other sources. It is very significant when analysing the effects of income taxation on investment. Such taxation by itself reduces the return from a project but if loss offsetting arrangements exist the government shares in the gains as well as in the losses and the mean expected return from a new project may not be reduced.

**low-level equilibrium trap.**

*See POPULATION POLICY, POPULATION.*

**low wage trade.**

*See DYNAMIC THEORIES OF COMPARATIVE ADVANTAGE.*

**Lucas critique.** A criticism of the use of an ECONOMETRIC MODEL for evaluating the outcome of policy decisions as the estimated PARAMETERS implicitly contain policy effects. Thus changing the POLICY INSTRUMENTS will also change the parameters of the model either negating the effect of the policy or making its effect unpredictable. The critique is closely associated with the RATIONAL EXPECTATIONS aspect of the NEW CLASSICAL MACROECONOMICS. See Lucas, R.E., 'Econometric policy evaluation: A critique', in K. Brunner and A.H. Meltzer (eds), *The Phillips Curve and Labour Markets*, Supplement to the *Journal of Monetary Economics* (1976).

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**LUS.** An adjective used to describe RESIDUALS which are Linear, Unbiased and possess a Scalar COVARIANCE MATRIX. They include RECURSIVE RESIDUALS and those generated from regression models using the Householder Transformations. BLUS RESIDUALS are of the LUS class but possess properties of uniqueness.

**luxury (also known as 'elitist' good).** Not a widely used term in modern economics, but, if used, is taken to refer to a GOOD with an INCOME ELASTICITY OF DEMAND greater than unity such that, as income rises, the good accounts for an increasing proportion of the consumer's income.

**luxury taxes.** Raising taxes for government funds can be very problematic in less developed countries; many people are self-employed or paid in kind and cannot be made liable for INCOME TAX. An attempt to tax luxury goods is often evaded as corruption can be widespread. One effective method can often be via CUSTOMS duties especially if most luxuries are imported. Import taxes on foreign cars can be as high as 300 per cent. Nevertheless, there is often tax evasion even in the case of customs duties and another method suggested is to estimate a level of tax on luxury spending by observing an individual's CONSPICUOUS CONSUMPTION. This system too is open to corruption because of the necessary level of discretion on the part of the officials. However, in general most less developed countries attempt to tax luxuries.
Macmillan Committee. The UK Committee of Inquiry set up in 1929 as the 'Committee on Finance and Industry', under the chairmanship of H.P. (later Lord) Macmillan, KC, to examine the banking and financial system, in its internal and international operations, and to make recommendations on how the system could promote 'the development of trade and commerce and the employment of labour'. The Committee, whose members included J.M. (later Lord) Keynes and Ernest Bevin, reported in 1931. Its Report (Cmd 3897) is a major document on the structure and operation of the monetary system and of Money Policy, at that time; on the working of the international Gold Standard, to which the UK returned in 1925; and on the role of monetary factors in the economic depression of the time. It recommended the maintenance of the gold standard, together with an active and internationally co-ordinated use of monetary policy to combat cyclical instability of output and employment. In its examination of how the system served the financial needs of industry, the Report identified two 'gaps' in the institutional provision of finance: first, a need for a combination of large-scale finance and what are now termed 'corporate financial services' - advice and assistance with share issues, mergers, capital restructuring etc.; and second, the provision of long-term capital for small and medium-sized companies, in amounts too small for a public issue of shares. It is the latter which is normally referred to as 'the Macmillan gap'. In 1946 the Finance Corporation for Industry (FCI) and the Industrial and Commercial Finance Corporation (ICFC) (now Investors in Industry) were established to fill the two gaps.

'Macmillan gap'.
See MACMILLAN COMMITTEE.

McGuire Act. A 1952 amendment to the US Federal Trade Commission Act, the McGuire Act was designed to enforce 'fair trade' pricing on retailers who did not sign such agreements. It closed a loophole in the MILLER-TYDINGS ACT OF 1937, thus permitting individual states to pass and enforce mandating manufacturer's price floors on retailers as long as one retailer signed a trade price agreement. (See FAIR LAW.)

macroeconomics. The study of the behaviour of the economy as a whole. The economy is disaggregated into what are believed to be broadly homogeneous categories and the determinants of the behaviour of each of these aggregates is integrated to produce a model of the whole economy. Increasingly it relies on deductions from microeconomics about the determinants of the behaviour of each aggregate variable but in so doing elements of the macro system may be overlooked. (See PARADOX OF THRIFT.) Economic macroeconomics dates from KEYNES and the principal aggregates studied are those suggested by him. See Parkin, M. and R., Modern Macroeconomics, 2nd ed, Philip Allan, London, 1988.

majority rule. A form of COLLECTIVE CHOICE or SOCIAL DECISION RULE in which a proposal obtaining the support of more than half of the 'voters' is chosen. Although widely used, majority rule can give rise to the PARADOX OF VOTING and leads to inconsistent choices.

malleable capital. An assumption in the nature of physical CAPITAL much used in NEO-CLASSICAL ECONOMICS, which is that the materials incorporated into a particular machine may be instantly and easily changed into a different machine. The effect of this concept, in NEO-CLASSICAL GROWTH THEORY for example, is to reduce unimportant the question of EXPECTATIONS and their impact on the CAPITAL STOCK: a 'wrong' investment can instantly and easily be changed into the 'correct...
Malleability of capital is also compatible with the combination of a given piece of capital with any number of workers and thus with a variable CAPITAL-LABOUR RATIO. (See CAPITAL-LABOUR SUBSTITUTION, PUTTY-PUTTY, PUTTY-CLAY, CLAY-CLAY.)

Malthus, Rev. Thomas Robert (1766-1834). Malthus was a clergyman and a professor of Modern History and Political Economy (the first to be so titled in the UK) at the East India College at Haileybury. Though he made contributions to monetary analysis and the 'theory of gluts' (in which KEYNES recognized him as a forerunner) and engaged in a celebrated controversy with his friend RICARDO, he is best remembered as the author of an Essay on the Principle of Population (1798). In this he challenged the conventional view of economists that a numerous and increasing population was synonymous with wealth and argued that numbers would increase until they met the constraint of limited food supplies. He stated that population tended to grow in a GEOMETRIC PROGRESSION and food supply in arithmetic progression. Population growth could be checked either positively (i.e. by increased deaths) by e.g. wars, pestilence etc. or negatively (i.e. by fewer births) by e.g. moral restraint, later marriages etc. This Malthusian theory of wages implied a constant level of wages at the subsistence level. Both population and wages have tended to increase in developed countries despite the prediction of Malthus; this is due to technical progress, whose role Malthus undervalued, to a decline in the birthrate as income rises and to the opening of new lands. The spectre of the Malthusian problem is still raised today in underdeveloped countries as they import the medicine that gives developed country deathrates along with developing country birthrates. It is also raised on a global scale by some ecologists who predict that growth in population and industrial production will cause the world to run out of resources.

Malthus' law of population. See IRON LAW OF WAGES.

management. Those staff within the firm who exert control over its activities on behalf of owners. Of interest to economists is the influence which the pursuit by management of their objectives can have on firm behaviour. The management class has in the period since the Second World War become increasingly professional. The benefits which MANAGEMENT SCIENCE can provide for management training are increasingly accepted, though UK has tended to lag behind countries such as the US in this regard.

management buyout. The acquisition by management of the assets of a company. Management raise the capital to acquire the company by borrowing on the strength of its assets, presumably in the belief that it is acquiring assets or earnings at a discount from its holding company. In many cases some of these assets are sold to pay for the debts incurred in purchase. Popular in the USA since the 1960s, and often called a leveraged buyout, it became more popular in the UK in the early 1980s.

management science. In the context of the study of firms, this discipline applies scientific principles to aid pursuit of operational efficiency with regard to business objectives. Importance is therefore attached to deducing the principles underlying rational coordination of the units which comprise firms. LINEAR PROGRAMMING and dynamic programming are among the techniques used.

manager-controlled firm. A company which has no individual shareholder or group of shareholders owning a sufficiently high proportion of the voting stock to exert control over company policy. The execution and design of policy is thereby placed in the hands of the company's managers. (See OWNER-CONTROLLED FIRMS.)

managerial capitalism. The organization of the economy into large corporations with the power over resources located within a definable managerial class separated from the property owning class and largely independent of their control. It differs from CORPORATE CAPITALISM in that the managerial class pursues goals which may be independent of those of workers, the state and society. The development of tendencies towards such a system in contemporary
capitalism have been identified by A.A. Berle and G.C. Means, R.L. Marris and J.K. Galbraith.

managerial discretion. The ability of a corporation's managers to pursue objectives which they themselves deem beneficial. The extent to which this discretionary behaviour can be sustained will be determined by how competitive product and capital markets are.

managerial revolution. A label associated with the Galbraithian idea that economic power has passed from capital to the owners of technical expertise, i.e. the managerial class. This is due to the alleged inelastic supply of managers relative to that of capital. (See TECHNO-STRUCTURE.)

managerial slack. See X-EFFICIENCY.

managerial theories of the firm. Theories which have been developed from a belief that contemporary CAPITALISM is characterized by the dominance within the production sector of large corporations, where ownership and control is separated between shareholders and managers respectively. It can then be argued that given imperfect capital markets and uncompetitive product markets, managers will have the scope to pursue objectives other than PROFIT MAXIMIZATION.

Managerial theories of the firm have generally made use of managerial UTILITY FUNCTIONS to formalize the objectives pursued. When maximized subject to given specified constraints, predictions on firm behaviour can be derived. Thus for example, a specification representative of GROWTH THEORIES OF THE FIRM is one in which managers are assumed to maximize a utility function whose arguments are growth and the firm's VALUATION RATIO. This is maximized subject to a constraint imposed by the capital market, which states that the firm's valuation ratio must achieve a value greater than or equal to the valuation ratio set by the most dangerous RAIDER FIRM, this being based on the policy it would pursue if successful.

The major managerial theories of the firm are W. Baumol's SALES MAXIMIZATION HYPOTHESIS, O.E. Williamson's MANAGERIAL DISCRETION model of the firm and R. Marris's growth theory of the firm. (See also CORPORATE CAPITALISM.)

managerial utility function. This relationship specified the arguments upon which the preference ordering of firms' managers depends. Variables commonly used are growth, staff outlay, VALUATION RATIO and managerial involvements. (See MANAGERIAL THEORIES OF THE FIRM.)

managing director. A person appointed as a director of a limited company who takes chief responsibility for the day-to-day running of the company's activities. In general managing directors have a shareholding within the company.

Manoilescu argument. A version, developed by the economist of that name, of the INFANT INDUSTRY argument which rests on the empirical observation that the average wage in the manufacturing sector in an underdeveloped country exceeds that in the agricultural sector although labour productivity may be similar. The manufacturing industry is at a disadvantage vis-a-vis imports and the argument is that it should be compensated by a TARIFF on manufactured goods.

manpower policy. An attempt to improve the functioning of the labour market, and, if possible, the trade-off between unemployment and inflation. Two main forms of manpower policy may be distinguished. The first accepts the existing characteristics of supply and demand and aims for better 'matches' between workers and jobs by improving placement efforts and by counselling workers looking for jobs and employers looking for workers. Programmes of this kind may also include schemes for increasing the mobility of workers. The second form attempts to influence the pattern of the supply of labour by upgrading skills and abilities. There is also a third form, which seeks to influence the composition of demand by establishing measures to increase the number of employment opportunities, especially by opening up good jobs for DISADVANTAGED WORKERS. (See JOB CREATION.)

manual workers. Employees engaged in physical work and who are paid a wage. Frequently used interchangeably with BLUE-
COLLAR WORKERS. The opposite of NON-MANUAL WORKERS.

margin. In economics, 'at the margin' means at the point where the last unit is produced or consumed.

marginal. A marginal unit is the extra unit of something, as with MARGINAL COST, MARGINAL UTILITY etc.

marginal analysis. See NEO-CLASSICAL ECONOMICS.

marginal cost. The extra cost of producing an extra unit of output. Algebraically it is written

\[ MC = \frac{AX}{C} \]

where A means 'a small change in', C is total cost and X is output. In the SHORT RUN the marginal cost curve slopes upwards due to the operation of the LAW OF DIMINISHING RETURNS. Note also that marginal cost cannot be affected by the level of FIXED COSTS. Quite simply, if an extra unit of output is produced fixed costs do not change and hence extra fixed costs must be zero. It follows that marginal cost is determined by VARIABLE COSTS only. In the LONG RUN marginal costs may rise, fall or stay constant depending on the presence of ECONOMIES or DISECONOMIES OF SCALE. (See LONG-RUN MARGINAL COST, LONG-RUN AVERAGE COST.)

marginal cost of funds schedule. The schedule detailing the true cost of financial capital to the enterprise. In an imperfect capital market the true cost will exceed the INTEREST RATE. Firms can raise money to finance investment from many sources and the cost of finance will vary with the source. The least expensive source of finance may be the firms retained profits or its depreciation fund. More expensive will be a RIGHTS ISSUE or new issue of EQUITIES or borrowing on fixed interest.

marginal cost pricing. A pricing practice pursued by private firms or public corporations in which price is made equal to MARGINAL COST. Given continuous revenue and cost curves, this implies setting price at the point at which the demand curve cuts the marginal cost curve. The market conditions prevailing in perfect competition ensure marginal cost pricing since average and marginal revenue are the same. Hence the requirement for profit-maximization, that marginal cost be equal to the marginal revenue, means that price equals marginal cost. Under IMPERFECT COMPETITION, however, profits will not be maximized with price equal to marginal cost since average revenue will exceed marginal revenue. Hence marginal cost pricing under imperfect competition will only come about through some form of regulation or taxation. In the PUBLIC SECTOR, NATIONALIZED INDUSTRIES are recommended to use marginal cost pricing, the rationale being that it maximizes economic welfare, for then buyers put a valuation on the last unit consumed, which is just equal to the resource cost of the last unit produced, a condition necessary for the optimal allocation of resources.

marginal damage cost. The extra cost of damage done, usually by pollution, from an extra unit of the nuisance-creating activity. (See DAMAGE COST.)

marginal disutility. The extra DISUTILITY resulting from a small change in some variable.

marginal efficiency of capital. That unique RATE OF DISCOUNT which would make the PRESENT VALUE of the expected net returns from a CAPITAL ASSET just equal to its supply price when there is no rise in the supply price of the asset. The term originates with KEYNES and is sometimes known incorrectly as the INTERNAL RATE OF RETURN. This latter concept is distinct in that it takes specific account of the fact that the supply price of capital assets will rise in the short run as all firms simultaneously seek to increase the size of their CAPITAL STOCK. (See MARGINAL EFFICIENCY OF CAPITAL SCHEDULE, MARGINAL EFFICIENCY OF INVESTMENT SCHEDULE, INVESTMENT.)

marginal efficiency of capital schedule. The schedule detailing the long-run equilibrium relationship between the desired CAPITAL STOCK and the INTEREST RATE. At all points along this schedule the MARGINAL EFFICIENCY OF CAPITAL is just equal to the
rest rate. The schedule is downward reflecting DIMINISHING RETURNS to the capital stock. At the firm level this schedule is sometimes considered to represent the demand curve for capital. However, it cannot do so for the concept of the marginal efficiency of capital takes no account of the rising supply price of capital assets the firm will encounter in the short run. (See MARGINAL EFFICIENCY OF INVESTMENT, MARGINAL EFFICIENCY OF INVESTMENT SCHEDULE.)

marginal efficiency of investment (also known as the internal rate of return). That RATE OF DISCOUNT which would make the present value of the expected net returns from the CAPITAL ASSET just equal to its supply price where it is recognized that this price will rise in the short-run. (See MARGINAL EFFICIENCY OF INVESTMENT SCHEDULE, MARGINAL EFFICIENCY OF CAPITAL, MARGINAL EFFICIENCY OF CAPITAL SCHEDULE.)

marginal efficiency of investment schedule. The demand curve for investment. The schedule detailing the relationship between the MARGINAL EFFICIENCY OF INVESTMENT and the RATE OF INTEREST. Investment will be carried in the short run to the point where the marginal efficiency of investment equals the rate of interest, while in the long run the equilibrium of the capital stock is given by the point of equality of the MARGINAL EFFICIENCY OF CAPITAL and the interest rate. In contrast to the MARGINAL EFFICIENCY OF CAPITAL SCHEDULE this schedule describes a FLOW and not a STOCK relationship.

marginal per capita reinvestment quotient criterion. An investment criterion with the objective of maximizing income per head at a future date. It states that the best allocation of resources will be achieved by equating the marginal per capita reinvestment quotient of capital in each of its uses. It is assumed that profits are reinvested and wages consumed. Gross productivity per worker minus consumption per worker determines the gross amount per worker available for reinvestment. The criterion thus favours projects where profits are high. The development objective underlying the criterion has been criticized as being unrealistic. Governments are likely to consume to increase in the near future a main objective. The use of the criterion will not give priority to increasing employment, which may well be considered a main objective.

marginal physical product. This is defined as the addition to total OUTPUT resulting from the employment of an additional unit of LABOUR, and may be derived from the PRODUCTION FUNCTION, holding other factors fixed. The marginal physical product schedule may be regarded as the DEMAND CURVE for labour. Labour is employed up to the point at which the payment to the last worker equals the output produced by the unit. It is more conventional by means of a simple change in scale to convert marginal physical product into value of marginal physical product namely by multiplying former by product price. (See MARGINAL REVENUE PRODUCT.) If there is a rise or fall in the wage, then the number of units of labour employed will fall or rise according to the slope of the marginal physical product schedule. In the long run, labour demand will still be determined by labour's marginal physical product although in a more complex fashion. A wage rise, for example, will have a relative SUBSTITUTION EFFECT as the firm substitutes cheaper capital for the more expensive labour, thereby reducing the quantity of labour demanded. There will also be a relative scale effect as a wage increase leads to a higher MARGINAL COST of production which in turn reduces the firm's optimal output hence DERIVED DEMAND for labour. The effects reinforce each other to lead to an unambiguously inverse relationship between wages and the firm's demand for labour. This demand curve is more elastic than short-run demand.

marginal product. The extra OUTPUT obtained by employing one extra unit of input (FACTOR OF PRODUCTION,) given INPUT (FACTOR OF PRODUCTION,) the term should be qualified with respect to which input is in question - e.g. the marginal product of labour, the marginal product of capital, etc. (See LAW OF DIMINISHING RETURNS.)
marginal productivity doctrine. The hypothesis states that an employer who seeks to maximize his profits will be guided by the law of diminishing marginal productivity whereby successive units of LABOUR hired yield successively diminishing returns to OUTPUT. At a given level of wages, the entrepreneur will continue to hire labour until the contribution of the last unit employed is equal to the wage paid. Increased employment is compatible only with a decreased wage, CETERIS PARIBUS (see ECONOMY OF HIGH WAGES.)

The doctrine is not a theory of wages. It refers only to the demand side of the wage determination process: only if supply is perfectly inelastic will marginal product uniquely determine the wage. At the level of the firm, the doctrine is best thought of as determining employment; here the wage rate can be taken as exogenous. At a more aggregate level, wages and employment are jointly determined by supply and demand.

marginal propensity to consume. The change in consumption as a result of an additional unit of income. It can be written as

\[ MC = \frac{AC}{AX} \]

where C is consumption, Y is income and 'A' means 'small change in'. It can be stated as a propensity to consume out of either NATIONAL INCOME or DISPOSABLE INCOME. (See CONSUMPTION FUNCTION.)

marginal propensity to import. The change in IMPORTS as the result of a unit change in income. Imports constitute one of the major WITHDRAWALS from the CIRCULAR FLOW OF INCOME, and thus the marginal propensity to import is one of the major constituents of the MARGINAL PROPENSITY TO WITHDRAW. It may be written

\[ MPM = \frac{\Delta M}{\Delta Y} \]

where M is imports, Y is income and 'A' means 'small change in'.

marginal propensity to save. The change in savings as a result of an additional unit of income. It may be written

\[ MPS = \frac{\Delta S}{\Delta Y} \]

where S is saving, Y is income, and 'A' is 'small change in'.

It can be stated as a propensity to save out of either NATIONAL INCOME or DISPOSABLE INCOME. (See SAVINGS FUNCTION.)

marginal propensity to tax. The change in TAX revenues as the result of a unit change in income. Tax represents one of the major WITHDRAWALS from the CIRCULAR FLOW of INCOME, and thus the marginal propensity to tax is one of the major constituents of the MARGINAL PROPENSITY TO WITHDRAW.

marginal propensity to withdraw. The change in WITHDRAWALS (W) as a result of one additional unit of income (Y) which may be written as

\[ MPW = \frac{AW}{AY} \]

It is the proportion of any extra unit of income that is not passed on in the circular flow of income.

marginal rate of substitution (MRS). In CONSUMER DEMAND THEORY the marginal rate of substitution refers to the amount of one good, say Y, that is required to compensate the consumer for giving up an amount of another good, say X, such that the consumer has the same level of welfare (utility) as before. In INDIFFERENCE CURVE analysis it is in fact the slope of the indifference curve which, in turn, is equal to the ratio of the MARGINAL UTILITIES of the two goods in question, i.e.

\[ MRS_{X,Y} = \frac{MU_x}{MU_y} \]

The term derives from J.R. HICKS' Value and Capital (Oxford University Press, 1939)- Other writers prefer different terminology and the MRS is sometimes referred to as the PERSONAL RATE OF SUBSTITUTION, or the RATE OF COMMODITY SUBSTITUTION.

marginal rate of tax. The rate of TAX on an incremental unit of income but the concept applies equally to increments of expenditure, wealth or gifts. The higher the
marginal rate of tax the greater is the SUBSTITUTION EFFECT likely to be. Thus very high marginal rates of income tax could encourage people to take more leisure or possibly undertake less risky investments. In the UK in the 1960s and 1970s marginal income tax rates were very high reaching 83 per cent for earned income and 98 per cent for UNEARNED INCOME. Though these high rates have been widely criticized conclusive empirical evidence that they have had very significant disincentive effects is not available. Marginal rates of tax are now very high for operators of North Sea oil fields. The combined take of royalty, PETROLEUM REVENUE TAX and CORPORATION TAX on an incremental barrel from a reasonably profitable field can reach over 80 per cent.

marginal rate of technical substitution. The marginal rate of technical substitution of two inputs, for example, of LABOUR for CAPITAL is the amount of labour that needs to be substituted for a very small reduction in the amount of capital employed in order to maintain the level of output. Its value is equal to the ratio of the MARGINAL PRODUCT of capital to the marginal product of labour and is equal to the slope of the production ISOQUANT.

marginal rate of transformation. The numerical value of the slope of the PRODUCTION POSSIBILITY FRONTIER. The marginal rate of transforming good A into good B is the fall in the rate of output of good A which permits an additional unit of good B to be produced. It is equal to the ratio of the MARGINAL COST of good B to the marginal cost of good A.

marginal revenue. The change in total revenue arising from the sale of an additional unit of output. In PERFECT COMPETITION marginal revenue will equal price because the FIRM faces an infinitely elastic DEMAND CURVE, i.e. it can sell any amount of output at the prevailing market price. Within market structures such as IMPERFECT COMPETITION, the firm faces a downward sloping demand curve and thus in order to sell an additional unit of output, it must reduce the price on all the output it sells. Marginal revenue will then be equal to the new price minus the fall in revenue on those units which would otherwise have sold at the higher price. Marginal revenue is an important concept in the analysis of the firm. A necessary condition of profit maximizing equilibrium is that marginal revenue be equal to MARGINAL COST.

marginal revenue product. The MARGINAL PHYSICAL PRODUCT multiplied by the MARGINAL REVENUE from the sale of the extra unit of output from the employment of the extra unit of input. Under PERFECT COMPETITION price equals marginal revenue, so that we can write

$$MRP = MPP \cdot P$$

where $MPP$ is marginal physical product and $P$ is price. Under IMPERFECT COMPETITION, however, price does not equal marginal revenue and it is necessary to modify the equation to:

$$MRP = MPP \cdot MR$$

where $MR$ is the marginal revenue associated with the sale of the extra units of output.

marginal user cost. In the economics of NATURAL RESOURCES the net benefit (the valuation of a unit of resource, i.e. its price less its costs of extraction) denied to a future generation through the use of a unit of a finite resource by the current generation. To determine the optimal rate of use of the resource through time the present generation must equate selling price with the sum of marginal extraction cost plus marginal user cost. This condition is identical to HOTELLING'S RULE, since the net price of a resource in a future generation is identical to marginal user cost.

marginal utility. The extra utility obtained from an extra unit of any GOOD. Mathematically expressed as

$$MU = \frac{\Delta U}{\Delta X}$$

where $U$ is utility, $X$ is the amount of a good, and 'A' is a 'small change in'.

marginal utility of money. See MARGINAL UTILITY OF MONEY.
personal budget (income) is expanded by one unit (£1, $1 etc.). When consumers maximize utility it will be the case that the marginal utility of each good purchased will equal its price multiplied by the marginal utility of money. Strictly speaking, the term is better defined as the MARGINAL UTILITY OF INCOME since money as money has particular attributes which affect the utility it may provide to someone holding it. MARSHALL assumed the marginal utility of money was constant - i.e. did not change as the prices of goods in an individual's 'shopping basket' changed. This was held to be reasonable as long as the items in question formed a small proportion of the consumer's budget. Otherwise it is not.

margin requirement. The percentage of market value of a security that the purchaser can borrow when buying the security. The security itself serves as collateral for the loan. In the US investors can buy common and preferred stocks, convertible bonds, and execute short sales 'on margin'. The Securities and Exchange Act of 1934 gave the Federal Reserve the power to set the margin requirements for these three types of transactions with Regulations G, T and U. Since 1974, purchasers have been allowed to borrow up to 50 percent of the market value of the security in making any of these three types of security transaction.

market. Generally, any context in which the sale and purchase of goods and services takes place. There need be no physical entity corresponding to a market - it may, for example, consist of the network of telecommunications across the world on which, say, shares are traded. Various classifications of markets have been suggested. (See MARKET CLASSIFICATION.)

market classification. Various ways of classifying MARKETS exist. The market for something could be defined according to the SUBSTITUTES available for a good in question. That is, the size of the market is determined by the range of goods that can be held to be substitutes for the good. Another suggestion is that the market for a good is determined by the extent to which producers of the good express concern about the reactions of other producers to any change in the price, output or quality of their own product. Finally, it has been suggested that the type of market should be classified by the extent to which new producers can secure entry into a given market. This seems reasonable where the BARRIERS TO ENTRY are based on product differences between existing and new firms, but less reasonable if the barriers are based on deliberate policies by existing firms to prevent entry - e.g. by engaging in price reductions below new firms' average costs of production, legal manoeuvres etc.

market demand curve. The aggregation of a set of individual DEMAND CURVES for a good. Thus, if at price $p_x$, individual 1 would buy 10 units of good X, individual 2 would buy 15 units and individual 3 would buy 4 units, the market demand curve would show that $10 + 15 + 4 = 29$ units would be bought at price $p_x$. This kind of aggregation is generally valid for PRIVATE GOODS, but not if there is some form of interdependence between individuals' demand curves. For some types of interdependence see SNOB EFFECT, VEBLEN EFFECT. Nor is this form of aggregation applicable to PUBLIC GOODS since, by definition, the provision of a given quantity of a public good to any one individual entails that quantity being simultaneously given to all other individuals.

market demand curve for labour. With a constant product price, the market or industry demand curve is simply the horizontal summation of constituent firms' MARGINAL REVENUE PRODUCT curves. However, increased output resulting from a fall in the price of labour can only be marketed at a reduced price. This reduced price will feedback into labour demand at the level of the firm by reducing the value of labour's marginal revenue product; i.e. the curve will shift leftwards. Consequently, the market demand curve will have a steeper slope than that of the constituent firms. The implication is that unions will seek to organize an entire industry and thus reduce the ELASTICITY of derived demand.

market economy. An economic system in which decisions about the allocation of
resources and production are made on the basis of prices generated by voluntary exchanges between producers, consumers, workers and owners of FACTORS OF PRODUCTION. Decision making in such an economy is decentralized - i.e. decisions are made independently by groups and individuals in the economy rather than by central planners. Market economies usually also involve a system of private ownership of the means of production - i.e. they are 'capitalist' or 'free enterprise' economies. However market economies can function, to some extent, under social ownership. (See PLANNED ECONOMY, MARKET SOCIALISM.)

market failure. The inability of a system of private MARKETS to provide certain goods either at all or at the most desirable or 'optimal' level. In general, market failure arises because of (1) NON-EXCLUDABILITY and/or (2) NON-RIVAL CONSUMPTION of a good. Non-excludability means that individuals who have not paid for a good cannot be prevented from enjoying its benefits. For example, everyone benefits from clean air whether they have contributed to an anti-pollution programme or not. In this case individuals will not pay for a good which they can obtain at no cost. The market system of exchange cannot operate. If a good is non-rival, its consumption by one person does not preclude its enjoyment by anyone else. Again, the pleasures of breathing clean air are non-rival. In this case, charging a price which prevents people from using the good is undesirable since the good could be made available at no cost to someone who would benefit from it. In this case the market system would not allow for the optimal level of consumption. In reality we also observe goods whose consumption is partly rival and partly non-rival. For example, if I am inoculated against disease I obtain a purely personal benefit but I also provide a benefit to everyone else in the community by reducing the risk of infection. This is a case of a beneficial EXTERNALITY being produced by my consumption. In the presence of externalities markets may fail to produce the optimal level of output - though some economists argue that the problem may be overcome by private bargaining (see COASE'S THEOREM.)

The existence of market failure is usually held to provide a case for collective or government action to improve ALLOCATIVE EFFICIENCY. (See PARETO OPTIMUM, PUBLIC GOODS, WELFARE ECONOMICS.)

market forces. Pressures produced by the free play of market supply and demand which induce adjustment in prices and quantities traded.

market imperfection. Any deviation from the conditions necessary for PERFECT COMPETITION. This should be distinguished from MARKET FAILURE, which is the inability of private market to provide certain goods in sufficient quantities if at all. (See IMPERFECTION MARKET.)

marketing. A term used to cover those activities of firms associated with the sale and distribution of product(s). Broadly speaking it covers such activities as sale promotion, advertising and market research i.e. all activities which promote and organize the sale of products to the purchaser.

marketing boards. These have been set up in a number of African countries, for example, Nigeria and Ghana, and they serve various purposes. They give small farmers a stable and secure market for their produce and because the goods are then marketed or sold on a large scale on international markets, the authorities have a better basis for bargaining for a fair price. Sometimes the marketing boards will pay farmers a price greater than the current world price in order to subsidize their activities. However this system is also used to provide revenue for the government as a form of forced savings on the part of the growers as they are often paid below the market price. This is usually done as an attempt to raise capital where the level of voluntary savings and investment is very low.

The disadvantages are that the system does not create much incentive for small farmers unless they are sure that they will receive the benefits from this revenue. As an example, one of the marketing boards in Ghana provided funds to build a hall of residence for the University of Ghana, near Accra. A further problem with the system is the high incidence of smuggling; in central Ghana a great deal of cocoa is smuggled.
across the borders by small farmers who can receive nearly double the price in Togo or Ivory Coast.

Marketing boards in the UK such as the Milk and Egg Marketing Boards perform a somewhat different role as their tasks include: maintaining standards of quality; giving farmers government-subsidized prices for their products and a guaranteed buyer.

**market maker.** The name given in the London STOCK EXCHANGE since 1986 to a firm which makes a market in a range of SECURITIES by always being prepared to buy or sell these securities. In 1991 there were 27 such firms.

**market orientation.** A tendency for producers to locate their factories near the markets in which the products will be sold rather than (say) near a raw material source. In LOCATION THEORY a market orientation is generally explained on the grounds that production is 'weight gaining' - i.e. weight per unit of output is greater than the weight per unit of raw materials which have to be moved to the factory - because of the addition of some local or generally available input - consequently costs of movement will be minimized by locating production near the market thus minimizing the transportation of the relatively heavy output. An alternative explanation of market orientation would be the advantage, in terms of information, of close contact with the market. (See INPUT ORIENTATION.)

**market power.** The ability of a single, or group of buyer(s) or seller(s) to influence the price of the product or service in which it is trading. A perfectly competitive market in EQUILIBRIUM ensures the complete absence of market power.

**market share.** The proportion of total market sales accounted for by one firm. It has been argued that the maintenance of market share is an important objective of firms in OLIGOPOLISTIC market structures.

**market socialism.** A socialist economic system which leaves the day-to-day running of the economy to the market mechanism. Oscar LANGE originally put forward the notion in the 1930s that the means of production can be socially owned and basic decisions and directions of development may be centrally planned but otherwise the operation of the economy may be left to MARKET FORCES.

Although this type of organization has been adopted in Yugoslavia and theoretically expounded by such economists as Ota Šik it is opposed in socialist countries by the influential economists who advocate the use of PLANOMETRICS and computer aided central planning. (See SOCIALISM, PLANNED ECONOMIES.)

**Markov Process.** A process which relates the current value of a variable to its own previous values, and a random error term. A simple example is the First Order Markov Process which is defined as

\[ X_t = aX_{t-1} + e_t \]

where \( X_t \) is the variable concerned, and \( e_t \) is the error term. (See AUTOREGRESSION, UNIT ROOTS.)

**Markowitz, Harry** (1927- ). American economist, who was a joint winner (with M. MILLER and W.F. SHARPE) of the Nobel Prize for Economics in 1990.

His important work, carried out in the 1950s, established the foundations of modern PORTFOLIO theory. His original theory of portfolio selection was developed as a NORMATIVE model for investment managers. His major contribution was to develop a rigorously formulated, operational theory of portfolio selection under UNCERTAINTY. Markowitz showed that under certain given conditions an investor's portfolio choice reduced to balancing the expected return on the portfolio with its VARIANCE. The complicated choice among many assets with varying attributes is rendered in principle as a two-dimensional problem, known as MEAN-VARIANCE ANALYSIS. Markowitz's major publications include the following: *Portfolio Selection: Efficient Diversification of Investments*, Wiley (1959), and *Mean-Variance Analysis in Portfolio Choice and Capital Markets*, Blackwell (1987).

**mark-up.** That portion of price which the seller adds onto AVERAGE VARIABLE COSTS in order to cover overheads and yield a net profit margin.
Marshall, Alfred (1842-1924). British economist who spent most of his academic life as Professor of Economics at Cambridge (1885-1908). A mathematician by training, Marshall limited the use of mathematics in his published works. Although a pioneer of marginal analysis Marshall never totally abandoned his link with English classical economic thought. In contrast with Stanley JEVONS and the AUSTRIAN SCHOOL, he emphasized the costs of production as much as the UTILITY of consumption in his theory of VALUE. To the extent that Marshall used a 'real cost' theory of value based on the DIS-UTILITY of labour together with the waiting required for saving, he emphasized, like the CLASSICAL SCHOOL, the ultimate importance of accumulation, rather than the efficiency aspect of resource allocation stressed by Léon WALRAS, Jevons, and the Austrians. Marshall's analysis of allocation, although static, was not as restrictive as the GENERAL EQUILIBRIUM, stationary, and perfectly competitive models of the LAUSANNE SCHOOL. Instead he favoured partial analysis of markets with particular emphasis on the long-run development of industries in a less than perfectly competitive setting.

The fundamental idea of Marshall's work is the power of DEMAND and SUPPLY to generate equilibrium prices in markets. Marshall was as critical of the classical school as he was of the Austrians, claiming that both had a one-sided view of price determination. He stressed that demand and costs of production each play an important role in the determination of equilibrium values. Marshall envisaged price determination as the outcome of the interaction of market demand and market supply.

Marshall derived the law of a downward sloping DEMAND CURVE from the hypothesis (a) that individuals obtain utility from commodities at a declining rate (falling MARGINAL UTILITY) and (b) that the MARGINAL UTILITY OF INCOME does not vary. The individual is in equilibrium when the utility gained from consuming one more unit of a commodity is just equal to the loss of utility involved in spending money on that commodity. Given equilibrium, a fall in price of the commodity will induce the individual to purchase more of that commodity since utility per unit of expenditure will be increased. The conclusion which Marshall drew from this is that the DEMAND SCHEDULE for all individuals will be negatively sloped in general.

Marshall introduced the concept of ELASTICITY of demand to describe the responsiveness of quantity demanded to a change in price. Marshall was also concerned to compare intergroup utilities both through time and in a static framework. The former led him to develop a theory of TIME PREFERENCE based on marginal utility; and the latter to a discussion of the concept of CONSUMER'S SURPLUS. Marshall was aware of the limitations which the assumptions imposed on his demand theory.

Marshall envisaged equilibrium in a market as the result of price formation arising from the point of intersection of the downward sloping demand curve, and a supply schedule. The supply schedule shows the price at which individual firms are willing to supply the commodity.

The value of a commodity is determined by the forces of demand and supply acting like two blades of a pair of scissors. Behind demand is marginal utility determining the demand price of buyers; behind supply is marginal effort and sacrifice determining supply price of sellers. This view although similar to the Austrian School version is distinguished by Marshall's conception of the cost of production. Marshall distinguishes between 'real cost of production' and 'expenses of production'. The former consists of the disutility of labour, and the sacrifice or waiting involved in providing capital. He argued that the market valuation of two unequal real costs (expenses of production) might be the same. Actual prices may not reflect the real costs of production.

Marshall was well aware of the limitations which a static framework placed on his analysis. He emphasized the changes in production and consumption decisions which may occur over time. Principally he distinguished between the different time periods over which the forces tending to establish equilibrium are operative. He considered: (a) a period where all supplies are fixed and prices correspond to market values; (b) the short period when productive elements are free to vary and supply can be increased up to the point of maximum capacity feasible with the current capital stock; and (c) the long period when all
determinants of supply are free to vary given the existing technology. Lastly, and (d) Marshall seems to have considered the very long period where technology is a variable. In the short and long periods, prices tend towards what Marshall calls normal values and the earnings of factors tend towards their real costs of production. The use of time in Marshall's analysis allowed him not only to apply theory to concrete problems where constraints on adjustment operate, but also to formulate a theory of income distribution which differed from the MARGINAL PRODUCTIVITY theory insofar as the availability of factors is a variable through time, and the quantity supplied is determined by price. In the short run, for example, the incomes of many factors are in the nature of RENT or what Marshall calls QUASI-RENT.

Marshall stands as a bridge between classical economic theory with its emphasis on the costs of production overtime, the neoclassical subjective price theory of Jevons, and the general equilibrium theory of Walras based on a purely static theory of value. Marshall’s major works include: The Pure Theory of Foreign Trade (1879), The Principles of Economics (1890), Industry and Trade (1919), and Money, Credit and Commerce (1923). Not only did Marshall’s work have a considerable influence on economic policy (and it continues to do so) but it also greatly influenced a generation of British economists.

Marshall Aid. The aid given by the US and Canada to UK and other European countries to help their economic recovery after the Second World War. The name refers to General G.G. Marshall who was US Secretary of State at the time. As a result of the War the European countries had built up large BALANCE OF PAYMENTS deficits with regard to the US. The loans made by the US and Canada were thus designed to deal with a shortage of dollars in Europe. The initial loans were made as early as 1946 but by 1948 further massive loans were necessary to avoid a liquidity crisis. The offers of aid were accepted only by countries in Western Europe, who established the ORGANIZATION FOR EUROPEAN ECONOMIC CO-OPERATION in 1948 to implement the EUROPEAN RECOVERY PROGRAMME in co-operation with the American Economic Co-operation Administration.

Marshallian demand curve. The most widely used DEMAND CURVE in which the responsiveness of quantity demanded to price incorporates both the INCOME EFFECT and the SUBSTITUTION EFFECT. This is in contrast to the compensated demand curve where income effects are netted out. Note, however, that the income effect is zero if INDIFFERENCE CURVES are parallel which is how some authors interpret Marshall’s intentions in some of his writings. (See ADDITIVE UTILITY FUNCTIONS.)

Marshall-Lerner condition. A DEVALUATION of the CURRENCY may under certain conditions improve the BALANCE OF PAYMENTS. The Marshall-Lerner condition is one such condition. It is generally expected that the devaluation will increase the value of exports and decrease the value of imports. However, it is still possible for the devaluation to be successful even if it leads to increased imports or decreased exports, as long as this is outweighed by a favourable export effect or import effect. Formally the Marshall-Lerner condition states that, on the assumption of high price ELASTICITIES of Supply, a CURRENCY DEPRECIATION or DEVALUATION will improve the balance of payments on current account, if the sum of the elasticities of domestic demand for imports plus foreign demand for exports exceeds unity.

Marshall Plan. See EUROPEAN RECOVERY PROGRAMME.

Marx, Karl (1818-83). German philosopher, sociologist, historian, political theorist and economist, who because of his radical views had to spend most of his life in exile. From 1849 onwards he lived in Britain, supported financially by his industrialist friend Engels.

He studied philosophy at the universities of Bonn, Berlin and Jena and was strongly influenced by the Hegelian tradition. Though he was to reject Hegel’s conservative political philosophy, he amended and used his dialectic method; thus Marx proposed the thesis of bourgeois society, the antithesis of the proletariat and the synthesis of communism.
Marx, Karl

For Hegel the idea was paramount and would eventually influence society, to Marx the mode of production of the material means of existence conditioned the whole process of social, political and intellectual life. This historical materialism he used to explain his theory of social evolution. He argued that continuous change in the methods of production and exchange cause the existing social relations and political structure, appropriate to an earlier material base, to become outmoded, irrational and unjust, so that an epoch of social revolution is inevitable. Marx identified four stages through which the relations of production and society had passed, namely primitive COMMUNISM, slavery, feudalism and CAPITALISM.

It was as the next stage of this evolutionary process that Marx set out in *Capital* to discover the laws of motion of capitalism [*Capital*, vol. 1 (1867), vol. 2 (1885) and vol. 3 (1894)]. Volumes 2 and 3 were edited by Engels. Capitalism is characterized by two antagonistic classes, the capitalist bourgeois class, which owns the means of production, and the propertyless proletariat, which has emerged from the ranks of the landless labourers and small artisans. Although apparently free and equal before the law, the proletariat is in a weak economic relationship vis-à-vis the owners of CAPITAL and is required to offer itself as wage LABOUR in order to survive. Marx, setting out from the LABOUR THEORY OF VALUE, which also provides him with a system of prices (see TRANSFORMATION PROBLEM), argues that workers are paid their labour values, i.e. the amount needed to buy the subsistence goods to keep the population constant, but they are made to work more hours than are necessary to produce these goods, so that SURPLUS VALUE accrues to the capitalist. By their nature and for fear of losing out to other capitalists in competition, capitalists accumulate the surplus value in the form of machines and the hire of additional labour. Marx assumes that while it is possible to exploit labour by not paying it the full amount of its output, it is not possible to exploit machinery, which simply adds to current output, the same amount as it deprecates - hence its title of CONSTANT CAPITAL. As accumulation proceeds he argues that constant capital will rise in relation to labour (VARIABLE CAPITAL), so the rate of surplus value, $s$, the rate of surplus value, will fall, because exploitable component of total capital declines as a proportion of the whole.

Marx further assumes that TECHNICAL PROGRESS will be LABOUR-SAVING, so that workers be displaced and forced to join the rearmy of the unemployed, whose pre-imposes a downward pressure on the. Increasing competition among capitalists leads to concentration through the tax of the weaker by the stronger, and to polarization of the system into a few capitalists and a mass of miserable workers. The situation is exacerbated by the business cycle. Finally as structural maladjustment mount the system collapses, giving way initially to SOCIALISM and finally to communism.

Marx's predictions for capitalism have yet been fulfilled. The rate of profit remained remarkably stable over the century and real wages have risen, reasons for the failure of the prediction; depend on the validity of several core assumptions which Marx makes, e.g. labour is the only input into product which can be exploited; that as capital man rises, output per man rises more slowly so that surplus value per man, the surplus profit, also grows more slowly; that tech progress is labour-saving. On the other hand, he has been correct in his prediction of increased concentration in INDUSTRY, success of Marxism as a political doctrine probably owes more to the moral indignation that it arouses from its assumptions than to the detail of its economic argument.

Marx's achievements, though they might be false in detail, were immense. In his *History of Economic Analysis* (1954) Schum has written that Marx's economic interation of history, historical materialism, presents a 'powerful analytic achievement and that his 'all-comprehensive system of grand vision of an imminent evolution of the economy process . . . constitutes M claim to greatness as an economic analyst'.

Marx's other major works in econ are *Theories of Surplus Value* (3 vols. 1905-10) and Grundrisse: Foundations of Critique of Political Economy (1973, En. ed.).
Marxist economics. A school of economic thought which seeks to analyse the social and economic development of the CAPITALIST economic system. Modern Marxist economists are a diverse group ranging from the more dogmatic followers of the works of Karl MARX to those, sympathetic but critical, economists who are prepared to modify the tenets of orthodox Marxism. In particular the revival of Marxist analysis in the 1960s and 1970s was largely due to the partial integration of Marx’s economic thought into mainstream economic theory. Many Marxists have recognized the significance of modern economic theories of aggregate demand growth. Adaptation of Marxian economic theory by such prominent Marxists as P. Baran and P. SWEEZY to include KEYNESIAN economic elements and the real world changes of the capitalist system have brought about increasing recognition of the contribution of Marx to economic thought. The critique of NEO-CLASSICAL theory by P. SRAFFA and the CAMBRIDGE SCHOOL has also been influential in adaptations of Marxist theory and a reconsideration of the LABOUR THEORY OF VALUE and the TRANSFORMATION PROBLEM. The overall aim of economists in the Marxist tradition remains an analysis of the long-term development of the capitalist economic system with particular attention to the role of CAPITAL ACCUMULATION, the distribution of the ECONOMIC SURPLUS, and the interaction of the social classes through time. See Junankar, P.N., Marx’s Economics, Philip Allan, Oxford (1982).

material forces of production. The term used by Marx to define the real economic foundation of any society. The forces of production are the factories, equipment, tools, production skills, scientific knowledge, techniques of production, education of the labour force etc. and they differ according to the state of development attained in any society. These forces of production are the major determinants of the social relations of production.

materials balance principle. In environmental economics, the principle whereby the amount of waste products discarded to the environment is held to be approximately equal to the withdrawal of resources to generate production of goods. In essence it is nothing more than the first law of thermodynamics: matter and energy taken from the environment (in the form of materials, fossil fuels etc.) cannot be destroyed and must, therefore, be disposed of somewhere (as gases, solid waste, liquids). The 'approximate' nature of the equivalence arises because some materials are obviously 'embodied' in capital equipment, houses and even in humans. The rate at which this stock grows, however, is offset to an extent by the decay of the past CAPITAL STOCK so that the materials balance principle still holds, albeit in inexact form. Its importance for environmental management is that it demonstrates that waste generation is 'pervasive' to the economy. In turn, if the capacity of the environment to assimilate and degrade the waste into harmless form is limited, then EXTERNALITIES arising from the waste will also be pervasive. This is in marked contrast to the view that externalities are 'occasional' deviations from market perfection. The seminal article is R.U. Ayres and A.V. Kneese, 'Production, Consumption and Externalities', American Economic Review, 1969, although the concept is fairly explicit in Kenneth Boulding's 'The Economics of the Coming Spaceship Earth', in H. Jarrett (ed), Environmental Quality in a Growing Economy (Johns Hopkins Press, Baltimore, 1966). For a separate meaning of the materials balance principle (related to Soviet planning) see BALANCE PRINCIPLE.

mathematical expectation.
See EXPECTED VALUE.

matrix. A rectangular array of numbers (or variables). A matrix of order $m \times n$ has $m$ rows and $n$ columns. The typical element of a matrix is often denoted as $a_{ij}$, which implies that it occupies the $r$th row and $j$th column. Matrices are often used to simplify notation when dealing with large numbers of simultaneous equations. (See VECTOR.)

maturity. The date upon which the liability of the issuer of a BOND is due to be extinguished. The date for the repayment of the PRINCIPAL.

maximax. In DECISION THEORY a rule for making a choice under conditions of
UNCERTAINTY. Given various 'states of nature' that might occur (but each of which has an unknown probability) and various courses of action that might be taken should any one of them occur, the maximax principles suggests that the decision-maker should opt for that course of action which yields the highest PAY-OFF (net benefits, profits or whatever) regardless of any view taken about which state of nature will occur. It is, therefore, an optimistic rule, suggesting that we should always behave as if the best will happen.

maximin. In DECISION THEORY a rule for making decisions under UNCERTAINTY. Given various states of nature and various courses of action that could be taken, the maximin principle dictates that we should first observe all the minimum PAY-OFFS and then select the highest of these. In the matrix shown above, S is a state of nature (probability unknown), C is a course of action and the entries in the 'cells' are the pay-offs. To use the maximin principle we circle the minimum pay-offs from each course of action. Then we select the highest minimum pay-off - this is 4 and entails that we would select course of action 3.

maximum. The highest value of a variable or function.

maximum likelihood. A term descriptive of a general econometric ESTIMATION technique which involves the maximization of the likelihood function of the sample observations with respect to the PARAMETERS of the equation(s) estimated. It chooses these values from among those which are 'most like' the data generated by the sample observations.


mean. A commonly used measure of central tendency of a variable. It is calculated either for a sample or for the entire POPULATION. The sample mean is defined by the formula:

\[ \bar{X} = \frac{1}{n} \sum_{i=1}^{n} X_i \]
where the \( X_i \) are individual sample observations and \( n \) is the number of observations in the sample. The population mean is defined as the EXPECTED VALUE of the variable.

**means-tested benefits.** Benefits that may only be paid if the claimant's income is less than a certain value. The major means-tested social benefits in the UK are income support, family credit, free school meals, rent and community charge rebates, and free medicines/dental and optical treatment. (See BEVERIDGE REPORT, POVERTY TRAP.)

**mean-variance analysis.** A method of finding an efficient PORTFOLIO of assets. Where \( E \) is the expected return of a portfolio and \( V \) the VARIANCE, then an EV combination is efficient, if it has the same \( E \) for less \( V \) than any other combination or more \( E \) for a given \( V \).

**measurement error.** See ERRORS IN VARIABLES.

**median.** A measure of the central tendency of a variable. The median of a sample of observations on a variable is that value above which 50 per cent of the observations lie. It is often used instead of the MEAN where the distribution of observations is highly SKEWED, since under these circumstances it gives a clearer idea of where the distribution is centred.

**median location principle.** A rule for finding the location at which the total amount of transport (at say ton/miles or tonne/kilometres) involved in serving a group of physically dispersed markets is minimized. In general, the principle indicates that total transport required will be minimized by locating at the geographical centre of the set of markets.

**Median Voter Theorem.** A theorem concerning COLLECTIVE CHOICE in a democratic society which predicts that politicians will most closely represent the views of those voters at the centre of the political or social spectrum. The theorem may be explained as follows. Suppose that political preferences can be represented on a continuous scale (say from left to right) and that these preferences are distributed among the population as shown below.

![Median Voter Theorem](image)

If the political positions of two rival candidates, \( A \) and \( B \), were originally as given by \( A\bar{A} \) and 51, and all voters voted for the candidate with views 'nearest' to their own, \( B \)'s support would be as indicated by the diagonal hatching and \( A \)'s support as shown in the area of vertical lines. Now \( B \), say, could steal some of \( A \)'s support by moving to the right. \( B \)'s support would thus increase as all to the 'left' of him would continue to support him. However we would expect \( A \) to take the same action and both would end as near as possible to the 'median voter' - the voter with as many people to the right of him as to the left of him. This model has been used to explain patterns of PUBLIC EXPENDITURE and provides the basis of DIRECTOR'S LAW which states that income redistribution by government tends to favour middle-income groups. The model owes much to a paper by H. Hotelling ('Stability in Competition', Economic Journal, 1929) which has also formed the basis of analyses of location decisions by firms. (See LOCATIONAL INTERDEPENDENCE.)

**mediation.** Intervention in an INDUSTRIAL DISPUTE by an independent and impartial third party who examines the argument of both sides and makes a recommendation for resolving the dispute. The parties are, however, under no obligation to accept this recommendation. (See CONCILIATION, ARBITRATION.)
medium of exchange. Any asset or instrument which serves an intermediary function in the exchange process, i.e. something which a seller of goods or services accepts in exchange, not for itself but in the knowledge that it can be used in further exchange to buy whatever he wants. As such, a medium of exchange facilitates the act of exchange, eliminating the inconveniences and search costs of barter. To act as a medium of exchange is a prime function of MONEY, but historically many objects and commodities have served this purpose.

medium term financial strategy (MTFS). A policy initiated in the Budget of 1980 by the UK government in which it set down declining target annual rates of growth for the MONEY SUPPLY so as to squeeze out inflation. In most years the target rates of growth were exceeded, while the money measures targeted have themselves been changed and redefined. Because it was believed there was a strong positive association between the size of the PSBR and money supply growth the MTFS also entailed constraints on the growth of public expenditure. In October 1985 the strategy was effectively abandoned when the target for Sterling M3, the favoured money measure, was suspended. (See GOODHART’S LAW, OVERFUNDING, PUBLIC SECTOR BORROWING REQUIREMENT.)

Menger, Carl (1840-1921). Austrian economist, founder of the AUSTRIAN SCHOOL, he was one of the formulators of the MARGINAL UTILITY theory of value, the others who independently developed the doctrine being JEVONS and WALRAS. Menger argued that the value of an increment of a good, when a supply exists, is represented by the least important use to which the increment is applied. He also constructed an imputation theory of distribution (i.e. factor rewards) that the value and price of the means of production were derived from the part which they played in the production of goods of the first order, i.e. consumer goods. Value arises from utility and sanctions costs of production; it is not caused by costs of production, in particular labour, as was the widely held view among e.g. English CLASSICAL ECONOMICS. His major work was *Grundsätze Der Volkswirtschaftslehre* (Principles of Economics) 1871.

mercantilism. The economic philosophy of merchants and statesmen during the sixteenth and seventeenth centuries: relied upon a strong state and ex regulation of economic activity. BUL; treasure was seen as the key to the wealth of the state, so that foreign trade was restructured to obtain a surplus of exports over imports and an inflow of specie by such means as Navigation Acts (concerning the carriage of goods at sea), confining the trade of countries to the mother country, subsidizing exports, and taxing imported manufactured goods. The doctrine was attacked by SMITH in *Wealth of Nations* (1776), because it benefited the producer at the expense of the consumer and made for inefficiency in the economic system.

merchant bank. One of a group of institutions which carry on a very wide range of financial or finance-related activities. Amongst these the ACCEPTANCE of MERCIAL BILLS and the financing of overseas trade are prominent and the major merchant banks are all ACCEPTING HOUSES. They originated in the last century with the institutions that came to combine overseas financing with actual merchanting, but mostly dropped their trading activities and specialize in finance and especially in business. Later, arising from the close relations with overseas connections, the larger houses have prominently involved in raising capital for large overseas enterprises. In this capacity this expertise in raising capital has largely directed to the home market or to the home market for foreign governments and large scale overseas enterprises. In this capacity these have become financial intermediaries in corporate financial advisory work - in capital reconstructions, advising on mergers and acquisitions - and the specialized business of PORTFOLIO investment, especially on behalf of PENSION FUNDS. As bankers they take deposits of large sums and lend mainly to corporate borrowers: they are active as FOREIGN EXCHANGE dealers, operate extensively in the FOREIGN EXCHANGE markets. Different house banks have these activities in differing degrees; some of the smaller ones, fin;
speaking, retain connections with, or are offshoots of, trading enterprises.

merger. An amalgamation of two firms where the respective shareholders agree to combine their equity capital to form a single new company. Agreement between the shareholders involves the receipt of shares in the new company in exchange for shares in the old companies at some suitably determined rate. (See TAKEOVER BID.)

merit bad. A commodity, the consumption of which it is argued should be discouraged or prevented even though individuals choose to consume it. In such cases it is claimed that through ignorance or inability, the individual is not the best judge of his or her welfare. Examples of commodities which have been treated as merit bads include alcohol and drugs and a long list of works of literature. It is not clear who, if anyone, should determine which commodities are merit bads or on what principles. (See MERIT GOOD.)

merit good. A good the consumption of which is deemed to be intrinsically desirable. In the case of such goods it is argued that CONSUMER SOVEREIGNTY does not hold and that if consumers are unwilling to purchase 'adequate' quantities of such goods they should be compelled or encouraged to do so. This argument is sometimes deployed in defence of compulsory education or 'free' tax-financed health services. Many economists would reject this reasoning but in any case there is a difficulty in determining who is to decide which goods are merit goods. A variant of this argument is that individuals willingly delegate to governments or professional agencies decisions on certain matters (such as health care) which they do not feel competent to assess. The corollary of this concept is that the consumption of MERIT BADS should be discouraged.

methodology. A term often very loosely used in economics to describe the way in which economists proceed in their analysis of a problem. It is often also used to describe the set of problems which a group of economists are prepared to analyse. In its first sense we may compare the NORMATIVE ECONOMICS and POSITIVE ECONOMICS schools of thought. The former asks questions of a normative type whereas the latter confines analysis to propositions capable of verification by reference to facts. In the second sense we may identify schools of thought which ask different types of questions thus using different 'methods' in the sense of using different tools of analysis. For example, the HISTORICAL SCHOOL or the CLASSICAL SCHOOL were often concerned with economic laws which governed the progress of society through time. On the other hand NEO-CLASSICAL economists tend to ask questions about the allocation of existing resources, thus using a different set of theories, concepts and tools. Similarly the KEYNESIAN revolution emphasizes methodologies using MACROECONOMIC concepts. See Blaug, M., The Methodology of Economics, Cambridge University Press (1980).

Metzler case. The situation in TARIFF theory analysed by the economist of that name, where the imposition of a tariff on an import improves the TERMS OF TRADE to such an extent that not only the external terms of trade improve but even the domestic terms of trade inclusive of tariff. This can happen where the supplier of the import has a very inelastic demand for the export product of the protecting country and to obtain the revenue to buy this product it has to cut the price of its export product considerably. (See OPTIMUM TARIFF.)

M-form enterprise. A common type of internal organization adopted by large corporations in response to MANAGERIAL SLACK. Responsibility for production activities is decentralized by the formation of operating divisions, each of which possess their own managerial structures. Decisions on capital allocation are centralized, in that they are undertaken by higher level executives in the head office. These higher level executives generally have an equity stake in the corporation, and therefore have an incentive to use their control over the flow of capital to sanction those operating divisions whose profitability is unsatisfactory. (See U-FORM ENTERPRISE.)

microeconomics. The term used to describe those parts of economic analysis whose concern is the behaviour of individ-
The economic analysis of individual behaviour concentrates on CONSUMER DEMAND THEORY and to a lesser extent on the theory of the SUPPLY OF LABOUR. The analysis of firm behaviour concentrates on PRODUCTION decisions and PRICE THEORY. Much of the analysis is related to the type of market in which the firm operates, in particular, with the degree of competition.


**Microfoundations.** The attempt to derive the behavioural relationships of MACRO-ECONOMICS (see CONSUMPTION FUNCTIONS, INVESTMENT, MONEY, THE DEMAND FOR) from the behaviour patterns of individuals as discussed in MICROECONOMICS (see CONSUMER THEORY, THEORY OF THE FIRM.) It is an approach much favoured by GENERAL EQUILIBRIUM theorists who see it as making macroeconomics more rigorous, and as a strong justification of much of the esoteric theory of general equilibrium. It is however now widely accepted that general equilibrium does not provide the most useful foundation for the theory of employment or for decentralized transactions which react to macroeconomic policy decisions. The existence of unemployment and various other forms of rationing render unsuitable any model such as general equilibrium which assumes the formation of prices which clear markets.

Consideration of decision makers as PRICE-SETTERS (not PRICE TAKERS) has led to more promising models which however remain in an EQUILIBRIUM framework.

The basic problem still seems to be, that equilibrium theorists use an impressive array of techniques and theorems for systems which work well, while macroeconomics is concerned with systems which work badly.


**Mill, John Stuart (1806–73).** An English philosopher and economist, Mill was something of a child prodigy. He was a prolific writer on logic, the philosophy of science and politics, as well as in pure economics.

His work was eclectic, synthesizing Ricardian economics with the work of many post-Ricardians and as such represents once the most complete and systematic elaboration of CLASSICAL ECONOMICS, and movement towards the NEO-CLASSICAL marginal analysis. This tendency to synthesize to be found also in his political philosophy and its relationship with his economic doctrines. He was an exponent of liberal political philosophy and an advocate of LAISSEZ FAIRE. At the same time he was an advocate of social reform. In his work On Liberty (1859) the principle of non-interference with individual liberty of action is eulogised, but in matters of practical action he saw a role for government in education and the labour contract. His concern for justice and his sympathy for the working class movement of his day tempered his liberalist attitude with respect for socialism, but at the same time had implicit faith in the 'best feature of capitalism' namely, competition. His econometric writings and especially his work on the philosophy of economic science also reveal the spirit of compromise and eclecticism which some claim dominates English economic thought to the present day. Indeed his major work on economics Principles of Political Economy (1848) became the standard textbook on the subject until the end of the century.

In spite of Mill's claim that his work represented no more than an up-dating of Adam Smith's Wealth of Nations taking account of changed conditions and incorporating the work of David RICARDO, J.B. S and Thomas MALTHUS, he did make a number of original contributions. Most important of these was the development of the theory of demand and supply. Mill did develop the theory with either clarity or rigor, but his formulation of value determination by these forces, and his notion of elasticity were in many ways the foundations...
on which Alfred Marshall built his theory of prices. Mill used the concept of demand and supply in the field of international trade as a modification of Ricardo's theory of Comparative Cost. The concept of reciprocal demand between countries allowed a determinate solution to the terms of trade ratio which the real cost theory of Ricardo could not. By admitting the forces of demand and supply into value theory Mill opened the way for a neo-classical theory of value.

Both the Principles, and the earlier Essay on Some Unsettled Questions of Political Economy (published in 1844 but written in 1829) show Mill to be the last in the line of major British philosopher economists in the tradition of Adam Smith. Pure economics for Mill was meaningless and the study of economics was only part of the whole discipline of moral and social philosophy. Only after Mill do economists begin to answer practical questions in terms of economic premises alone. His wider social views are perhaps most evident in his description of the stationary state. Unlike Smith and Malthus, Mill looked forward to the coming of a society in which the struggle for survival has ended and people can enjoy the fruits of past abstinence.

Miller, Merton (1923- ). An American economist, who was a joint winner (with H. Markowitz and W.F. Sharpe) of the Nobel Prize for Economics in 1990 for his contributions to the modern theory of corporate finance.

In a celebrated article written jointly with Modigliani, 'The Cost of Capital, Corporate Finance and the Theory of Investment', American Economic Review (1958), Miller showed that in a perfect capital market the firm's capital structure does not affect the firm's market value and the overall cost of capital (i.e. financial leverage is irrelevant to the cost of capital). In such circumstances the firm should maximize its net wealth and leave shareholder preference for different degrees of risk to be achieved by shareholders' obtaining the leverage they desire in their personal portfolio decisions. Crucial to the validity of the argument is that persons have access to the capital market on the same terms as firms. Miller (and Modigliani) are also credited with deriving under highly simplified assumptions another proposition that dividend policy does not affect the value of the firm in equilibrium. (An additional dividend reduces the firm's value by $1, so that the firm's shares will be worth $1 less in aggregate.)

Much subsequent research in corporate finance has been devoted to an analysis of the implications of relaxing some of the simplifying assumptions, e.g. the effects of taxes and of bankruptcies.


Miller-Tydings Act of 1937. The 'fair-trade' law which established a US manufacturer's right to set minimum retail prices for brand names and trade-marked goods. This law allowed individual states to pass laws requiring all retailers to sell such goods at or above the manufacturer's minimum price provided at least one retailer signed an agreement with the manufacturer. In 1951, the Supreme Court ruled that such agreements were not binding on those retailers who did not sign the agreement. This loophole was closed by the McGuire Act of 1952. Congress declared all such laws null and void in 1972. (See Fair Trade Law and McGuire Act.)

minimax regret. In decision theory a rule for making decisions under uncertainty. Given various states of nature and various courses of action that could be taken, the minimax regret principle dictates that we select measures of 'regret' - i.e. the difference between an actual pay-off and what the pay-off would have been if the correct strategy had been chosen. Borrowing the data in the matrix shown under maximin, first construct a regret matrix. This appears as shown in the diagram.

For example, if state of nature 2 occurs and we choose course of action 2 we make a gain of 2. But had we chosen course of action 1 the gain would have been 5, so the 'regret' is 5 - 2 = 3.

Now we seek to minimize the maximum regrets. The maximum regrets are circled in the regret matrix. The minimum of these is...
minimum wage legislation. The minimum wage is set so as to increase employment targets. (See PLANNING, TECHNIQUES, CHOICE)

minimum lombing rate. The October 1971 replaced 'BANK name for the rate at which ENGLAND will give assistance rediscounting bills to DISC forced by shortage of funds MARKET to go to the Bank as RESORT. As one measure to inc: and flexibility in the financi principal object of the revis monetary control introduce( Minimum Lending Rate was ren short-term interest rates them, though with provision i the link and fixing the rate by decision when policy required onwards a number of suf occurred, and in May 1978 tf was terminated, the Rate be Bank rate, by policy decis 1981 as part of wider changes i ism of monetary control Mini Rate was discontinued, thou provisions for its use in an er Bank of England now conduct MANAGEMENT operations through ket sales and purchases of selected with reference to a bond embracing one or more v rates. (See COMPETITION, CRED

minimum wage leq

minimum employment target. In development plans of less developed countries employment targets are often set. There are various approaches to this; they can be set on an aggregate, sectoral, or project level. At the aggregate level there are two methods: the target is achieved as a hy product after fixing the level of investment and capital-intensity of enterprises. A more direct method is to realize the constraints on employment targets of investment and choice of techniques and to adjust them within the limits available to achieve higher employment targets.

Many development plans look at the problem of employment targets at the sectoral level and set targets for net investment per worker in the different sectors. Industry-oriented plans have also been used to try and include minimum employment targets, especially in small-scale industries. The adjustment at project level often helps to favour labour-intensive techniques which have a major contribution to make to

minimax regret

given by action 3 with a loss of 2. Minimax regret is thus a 'cautious' principle and ensures that, if the worst happens, we make 'the best of a bad job'.

minimum efficient scale. That size of plant or firm at which LONG-RUN AVERAGE COSTS are at a minimum. This may not be a unique size. Empirical evidence from statistical cost analysis suggests that L-shaped long-run average cost curves are quite common. In such cases there will be a range of plant or firm sizes which are of a minimum efficient scale.

minimum employment target. In development plans of less developed countries employment targets are often set. There are various approaches to this; they can be set on an aggregate, sectoral, or project level. At the aggregate level there are two methods: the target is achieved as a hy product after fixing the level of investment and capital-intensity of enterprises. A more direct method is to realize the constraints on employment targets of investment and choice of techniques and to adjust them within the limits available to achieve higher employment targets.

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minimum wage legislati
agers might then be hired at a rate below the general minimum for a limited period of time during which they could be trained and their productivity raised to normal levels.

**minority control.** Refers to the ability of an individual or organization to gain effective control over a company, despite possessing less than 51 per cent of the ordinary voting stock of that company. This can occur in circumstances where there are dispersed and inert stockholders, which facilitates the use of proxy machinery by the minority group to gain control over a majority of the voting shares. Proxy machinery enables the owners of voting shares in a firm to exercise the right of choosing whom to nominate as a proxy at annual board meetings.

**mint.** The place where money in coin form is made. Since earliest times the state has controlled the minting of money. *(See COINAGE.)*

**mis-specification.**
*See SPECIFICATION ERROR.*

**mixed estimation.** ESTIMATION which involves the use of EXTRANEOUS INFORMATION. *(See BAYESIAN TECHNIQUES, RESTRICTED LEAST SQUARES.)*

**mixed good.** Goods, the benefit of consuming which is neither confined solely to one individual nor available equally to everyone. A mixed good thus lies between the polar extremes of a PRIVATE GOOD the consumption of which is RIVAL (i.e. one person's consumption precludes anyone else benefiting from the same unit) and a PUBLIC GOOD which is NON-RIVAL in consumption (the benefits of the good are equally available to everyone), containing elements of both. For example, inoculation against disease is a mixed good since it benefits the community at large (by reducing risks of illness) as well as the individual though the benefits are not equally distributed. In such a case, private consumption confers a beneficial EXTERNALITY on the rest of the community. In order to estimate the best or 'optimal' level of production of a public good we must construct a DEMAND SCHEDULE which includes the effects of both individual demand for the good and the beneficial externality produced by the good. This is illustrated in the diagram below where we have two persons A and B, both of whom have a private demand for good X. In addition we assume that A’s consumption of X benefits B (assume the effects are one-way, i.e. non-reciprocal). The private demand schedules of A and B are indicated as $D_A$ and $D_B$. These are added horizontally to give $D_M$, the market demand schedule which shows the total amount which will be purchased by individuals, acting independently, at each price. This addition is indicated in the left-hand diagram below.

In the case of a mixed good we must add to $D_M,D_E$ - which indicates B's demand for consumption by A. $D_E$ is added to $D_M$ not horizontally but vertically (as with Public Goods) since each unit consumed by A confers a benefit on both A and B; the total benefit of v4’s consumption of each unit being indicated by adding the price A will pay for that unit to the price B would offer for A’s consumption of that unit. This is indicated in the right-hand diagram with total demand given as $D_S$. If $S$ is the supply curve, we observe that a private market would lead to a production and consumption level of $Q_1$ which is less than the optimal level $Q_2$. A case thus exists for collective action to enable $Q_2$ to be reached.

A problem arises with constructing the demand schedules $D_E$ and thus $D_M$ in that individuals may not reveal their true demands for consumption by others. Where private demands are concerned, individuals indicate their preferences by purchasing the goods. However, this mechanism does not operate where consumption by others is concerned. Consequently $D_E$ and $D_M$ are PSEUDO-DEMAND SCHEDULES, constructed on the unrealistic assumption that individuals reveal their preferences through some form of voting.

Another example of a mixed good arises when the use of some facility is non-rival only up to a certain level of consumption. For example, a public park may eventually become so full that the entrance of an extra person reduces the benefit obtained by others. With this type of good there are said to be CONGESTION COSTS. The economic theory of CLUBS analyses this type of good. Some public goods may only confer benefits
demand schedules for mixed goods

within a restricted geographical area. Such goods are relevant to discussions of local government or FISCAL FEDERALISM.

Mixed goods are certainly more common than pure public goods and possibly more common than private goods - thus their analysis is of great importance. The term impure public good is sometimes used to describe mixed goods.

mixed market economy. A system which combines competitive private enterprise with some degree of central control. While the allocation of resources between alternate uses is largely determined by individual actions through the price mechanism, the authorities play some role in determining the level of aggregate output by means of MONETARY and FISCAL POLICIES, and in determining the distribution of income by means of progressive taxation and welfare legislation. In some cases the government may take control of sectors of the economy by nationalizing certain industries. Such a blend of private and public control characterizes most of the industrialized capitalist world. (See MARKET ECONOMY, MARKET SOCIALISM.)

mode. A measure of the central tendency of a variable. The mode (or modal range) of a sample of observations is that value (or range of values) which occurs with frequency.

model. A formal or informal frame of analysis which seeks to abstract from the complexities of the real world those characteristics of an economic system which are crucial for an understanding of the interaction, institutional, and technical relationships which underlie that system. The intention is to facilitate the explanation of economic phenomena, and for the formulation of economic forecasts.

modern quantity theory of money. See MONETARISM and MONEY, THE.

modern sector. Another name for the industrial sector, or sometimes the ment sector, which is often used with reference to less developed countries with a legacy from the colonial era. It comprises plantations, mines, oil refineries and now includes other intensive industries sponsored by governments as well as multinational corporations. Wage levels are often high although widespread unemployment. (See LEWIS-FEI-RANIS MODEL.)
mode of production. MARX'S term for society's economic base, which he believed exerted the most powerful influence in determining social institutions and social and religious thought. The mode of production was further subdivided into the MATERIAL FORCES OF PRODUCTION and the SOCIAL RELATIONS OF PRODUCTION.

Modigliani, Franco (1918- ). Italian-born US economist who was awarded the Nobel Prize for Economics in 1985 mainly for his work on the consumption function, where his major innovation has been the LIFE-CYCLE HYPOTHESIS. Modigliani has also made significant contributions to capital theory, in particular the cost of capital in the MODIGLIANI-MILLER THEORY. (See CAPITAL STRUCTURE.)

Modigliani-Miller theory of cost of capital. See CAPITAL STRUCTURE.

modulus. See ABSOLUTE VALUE.

moments. A term generally descriptive of the summary STATISTICS which serve to characterize the shape and position of either a PROBABILITY DISTRIBUTION, or a data sample. The \( n \)th moment of a variable \( X \) about a given constant \( \alpha \) is defined as

\[
M_n = \int_{-\infty}^{\infty} (x - \alpha)^n \cdot f(x) \, dx,
\]

where \( f(x) \) is its PROBABILITY DENSITY FUNCTION. Common examples include the MEAN, which is the first moment about zero, and the VARIANCE, which is the second moment about the mean.

monetarism. A school of economic thought which argues that disturbances within the monetary sector are the principal cause of instability in the economy. The term 'monetarism' was introduced by Karl Brunner in 1968 and is most commonly employed to describe the school of thought which argues that changes in the level of aggregate money income are due essentially to prior money stock changes. Such a view is frequently attributed to FRIEDMAN whose seminal contribution on 'The Quantity Theory of Money - A Restatement' in M. Friedman (ed) Studies in the Quantity Theory of Money and A Monetary History of the United States 1867-1960 (with J. Schwartz) did much to revive intellectual interest in these issues. The work of Friedman and his associates in the late 1950s and early 1960s stimulated new controversy on the role of money in the modern economy and the 'monetarist revolution' can in fact be attributed to this. That monetarism was considered important must also be attributed to the failure of the Keynesian orthodoxy to explain the emergence of high and sustained levels of unemployment and inflation in many Western industrial countries in the late 1960s. In its earliest phase monetarism rested on an elaboration of the simple QUANTITY THEORY OF MONEY which had explained the determination of the general price level in CLASSICAL ECONOMICS. Thus it argued that in the long run changes in the money stock influenced the value of nominal variables but had minimal effect on the quantity of output or employment. The central propositions of monetarism as it emerged in the late 1960s could be summarized as follows.

First, the demand for money function was more stable and better defined statistically than many of the components of aggregate demand. This implied that the INCOME VELOCITY OF CIRCULATION in the quantity theory of money was relatively stable although it was now admitted that this was a function of several other economic variables, one of which was the interest rate.

Second, the unique properties of money were emphasized. It was argued that money was a commodity which was substitutable for a wide range of other commodities and financial assets. As a result monetary policy would have a direct impact on aggregate demand in contrast to Keynesian analysis which emphasized that the initial impact would fall on financial assets with only a weak and uncertain impact on aggregate demand.

The direct link hypothesized by monetarists is often called the REAL BALANCE EFFECT. Linked to the notion of real balances, (i.e. Private Money holdings divided by a general price index) is the idea of an 'optimal' or 'desired' level of real money balances. Exactly how this desired level of money balance is determined is one of the theoretical weaknesses of the monetarist position, but it follows from this that if an individual's
of money are increased through monetary policy, then the individual will attempt to bring actual and desired money balances into line by spending the excess money. Such efforts will however raise the price level and thus lower real balances. It is therefore that even if it is assumed that the money supply is controlled in some sense (as monetarists do) the real money supply is decided by the actions of all the decision makers in the economy. The real money supply is therefore endogenous and is brought into line with the demand for real balances by changes in the price level. The implication is of a strong positive link from the size and rate of change of the nominal money stock to the price level. Nonetheless monetarists acknowledge that changes in the money stock can affect output and employment in the short run.

One of the more important aspects of modern monetarism is its concern with dynamics and the role of expectations. Expectations are now recognized to be of great importance in determining the path of prices and output. Rational expectations in particular have become associated with extreme monetarist views. If this particular hypothesis is correct then the future for any stabilization policy is bleak, for firms and households will soon learn to interpret economic events with the result that they will perfectly anticipate government action and take action in advance to offset this. The implication is that only unanticipated policy moves will have any effect on real output, even in the short run. This stands in stark contrast to Keynesian type policies which make no allowance for private sector anticipation of government action.

Monetarist ideas also extend to the case of the open economy. Unlike the Keynesian view which emphasizes that balance of payments theory is a problem in the market for goods, monetarists see it as a theory of reserve changes, closely linked analytically to the gold standard. A balance of payments surplus will ceteris paribus lead to an inflow of money and thus an increase in the high powered money base. This follows from the argument that the demand for money will grow in line with income growth and this demand may be met by either the government increasing the money stock or through an inflow of money (i.e. a balance of payments surplus). This result appears intuitively plausible as it suggests why fast growing economies (e.g. Japan, Germany) have balance of payments surpluses while slow growing economies have chronic deficits (e.g. the UK, the USA). The three weaknesses in the monetarist approach may be considered to be:

1. its failure to provide a theory explaining why people should hold money at all. It is not sufficient merely to observe that they do hold it (see F. Hahn, 'Professor Friedman's views on Money', Economica, 1971);
2. the problem of a satisfactory definition of money and therefore of the precise nature of the transmission mechanism;
3. the fact that once some substitution between money and financial assets is allowed for, and short run impacts on output are admitted, then distinctions between monetarist and Keynesian views become a matter of degree and less of substance.

The revival of interest in monetarism during the 1970s did much to clarify the issues that divided monetarists and their critics. Thus it emerged that the early attempts to summarize the position of monetarists and their critics within the framework of the IS-LM analysis was inappropriate, and that the real debate between monetarists and non-monetarists had little to do with the relative potency of monetary and fiscal policy - Friedman had acknowledged that fiscal policy could affect real output in the short run and the price level in the long run, as early as 1966. The chief area of disagreement concerned the principal source of instability in the economy. Monetarists argued that the private economy is basically stable and that fixed policy rules are necessary to insulate the economy against ill-conceived and badly timed government actions which are the principal source of instability, while non-monetarists argued that the principal source of instability is to be found in the private sector. The latter emphasize the instability of private investment decisions in particular and generally support an active government counter-cyclical policy in order to achieve stability. (See money, the demand for.)

Monetary authorities. A general term denoting the agency or agencies responsible for the oversight of the monetary system and...
the execution of MONETARY POLICY and EXCHANGE RATE policy. The agency concerned in most cases is the CENTRAL BANK which may act with varying degrees of consultation with the department of government - in the UK and the US, the Treasury concerned with the formulation of such policies. (See MONETARY MANAGEMENT)

**monetary base.** A term often used interchangeably with HIGH-POWERED MONEY to denote those assets, largely public sector monetary and short-term liabilities, which in the traditional theory of CREDIT CREATION are held to determine the total supply of money through a CREDIT (or money) MULTIPLIER. The term can be used in a more distinct sense to designate any group of assets which the monetary authorities might seek to control, either rigorously in the short-term or in a looser, long-term way, with the object of controlling some chosen money aggregate. Whether or not such control is possible without considerable structural changes in money and security markets, or without causing undesirable instability of interest rates, is a matter of debate. At present, no monetary authority appears to aim at anything approaching a tight, short-term control of a monetary base. In the UK the monetary control arrangements introduced in August 1981 did not constitute a move to monetary base control although they were stated to be 'consistent with' such a move should it later be decided on. Since joining the EXCHANGE RATE MECHANISM (ERM) of the EUROPEAN MONETARY SYSTEM in 1990 with its obligation to maintain the exchange rate with other currencies in the ERM implies that UK monetary policy will have to accommodate to the need to sustain this rate. (See CASH RATIO, DEBT MANAGEMENT, FUNDING, MONEY MARKET.)

**monetary policy.** That branch of economic policy which attempts to achieve the broad objects of policy - stability of employment and prices, economic growth, and balance in external payments - through control of the monetary system and by operating on such monetary magnitudes as the SUPPLY OF MONEY, the level and structure of INTEREST RATES and other conditions affecting the availability of CREDIT. Like other arms of policy, monetary policy operates ultimately through its influence on expenditure flows; but in the UK (and elsewhere) views on the appropriate proximate means for doing this have changed during the last 20 years. In the 1960s and earlier, policy aimed to influence spending through the level of interest rates, which determines whether funds for capital expenditure are dear or cheap. At that time interest rate policy, regarded as only moderately effective, was frequently backed up by direct controls - CREDIT CEILINGS and the like - on BANK lending and HIRE PURCHASE finance. In the 1970s, for a variety of reasons
of which the influence of MONETARISM is only relatively more weight has come to be attached to control of monetary aggregates, i.e. the MONEY SUPPLY in one or other of its definitions. In fact this is a matter of emphasis since, given the size and growth of the NATIONAL DEBT, interest rate policy is a vital ingredient of controlling growth in the money supply. But where the RADCLIFFE COMMITTEE, for example, in 1959, saw DEBT MANAGEMENT as a means of influencing interest rates and ultimately capital expenditure, modern policy sees interest rates policy (and, increasingly, EXCHANGE RATE policy) as vital to debt management and control of the money supply. Since 1971, quantitative credit controls have been abandoned and, until recently, MINIMUM LENDING RATE (now itself suspended) was not used positively, as the former BANK RATE was, to influence short-term interest rates. Generally, the significance attached to monetary policy, compared with FISCAL POLICY, is much higher now than in the 1950s and 1960s, but this is within a more modest view of the possibilities of short-term control of aggregate demand. Finally, a persisting concern in UK monetary policy has been its use to meet external policy needs. Interest rate policy, in particular, is used to influence flows of short-term funds to and from London, in the interests of the short-term BALANCE OF PAYMENTS position and with full UK membership of the EXCHANGE RATE MECHANISM (ERM) of the EUROPEAN MONETARY SYSTEM maintaining the exchange rate relative to other ERM currencies is now the dominant concern of monetary policy. (See COMPETITION AND CREDIT CONTROL, CENTRAL BANK, OPEN MARKET OPERATIONS.) See Artis, M. and Lewis, M., Money in Britain, Philip Allan, London (1991).

monetary theory. This term refers to the branch of MACROECONOMICS which studies money in all its aspects, how it affects the national economy and what part it plays. It covers issues such as MONEY SUPPLY, the demand for money, INFLATION, CENTRAL BANKS, BRANCH BANKING, CREDIT CREATION and financial institutions. (See MONETARISM, MONEY, THE DEMAND FOR, QUANTITY THEORY OF MONEY.)

monetary union. A situation where two or more national CURRENCIES are replaced by one currency, which may be an existing one or a new one. In the unification of the economies of East and West Germany in 1990 the West German currency, the Deutsche Mark, replaced the East Mark. The Delors Report on future EC monetary arrangements envisages a new common currency. Parties to a monetary union lose certain policy instruments, namely MONETARY POLICY and EXCHANGE RATE policy. Against that the degree of UNCERTAINTY in international trade and finance with other parties to the union is diminished, since exchange rate variations can no longer raise problems.

monetization of debt. The process whereby government debt is repaid on maturity, or is for policy reasons 'bought in' without a counterbalancing issue of new non-monetary debt, so that the MONEY SUPPLY increases. This situation may arise in consequence of difficulties of DEBT MANAGEMENT, or as a result of a policy to stabilize interest rates which imposes on the government obligations to buy in all its own debt offered to it, at a constant price. It may also arise as a direct consequence of paying off the NATIONAL DEBT as part of a political programme, which disapproves of public indebtedness.)

money. Anything which is widely acceptable in exchange for goods, or in settling debts, not for itself but because it can be similarly passed on, has the character of money since it serves the primary function of money, i.e. a means of payment. As a means of payment money is an entity which is transferred when a payment is made; as such it acts as a MEDIUM OF EXCHANGE, a function essential to any economy other than the most primitive. The term 'money' is also used in the sense of 'money (or unit) of account': this denotes a system of abstract accounting units in which values are expressed or debts defined. Practically such a system is a necessary precondition of a price system since it reduces RELATIVE VALUES to a manageable number of money prices. In modern monetary systems the principal means of payment are DEBT instruments, namely BANKNOTES and BANK DEPOSITS. Besides serving as exchange media, such means of payment are held as part of the
money, the demand for. The demand for a commodity which performs the role of both a medium of exchange and a store of value. In general it must be recognized that Money is not demanded for itself but for the fact that it can be used to purchase other goods and services. The precise nature of the demand for money has in recent years become a central issue in modern macroeconomics due largely to the development of Monetarism.

Two broad schools of thought on this issue may be identified; the Keynesian and the Modern Quantity Theories.

The Keynesian view argued that three motives give rise to a demand for money. First, individuals will demand money to finance their daily purchases of goods and services, the transactions motive; second, individuals will demand money as a contingency against unforeseen expenditures, the precautionary motive; and third, individuals will hold money as a store of wealth, the speculative motive. In particular they will hold money for speculative purposes because they are unsure about the returns from the alternative financial assets in which they could hold their wealth, i.e. Bonds. The returns from holding bonds comprise the interest payments and the possibility of a capital gain or loss. If the expected capital loss is greater than the interest payments the net return is negative and the individual concerned will hold no bonds, only money. Bond prices are inversely related to the interest rate and therefore, if an individual expects a sharp rise in the interest rate, this is the same as expecting a corresponding sharp fall in bond prices and again he will hold only money. In aggregate Keynes supposed that individuals held a wide variety of different views about the future level of interest rates and therefore as the current rate of interest fell more and more people would expect that eventually it would rise again - the price of bonds fall - and therefore more people would hold only money. In this manner, Keynes argued that in aggregate the demand for money for speculative purposes, \( L_2 \), would be inversely related to the interest rate, \( r \). In contrast the amount of money demanded for transactions and precautionary reasons, \( L_1 \), was determined by the individual's level of income, \( Y \). Thus in Keynesian theory the demand for money function \( M^d \), is:

\[
M^d = L_1(Y) + L_2(r)
\]

The individual's preference for liquidity, money, therefore arises because of his uncertainty about the exact point in time when he will need money - the precautionary motive - and his uncertainty about future interest rates - the speculative motive. Liquidity preference in the Keynesian analysis is therefore largely a function of uncertainty.

In contrast to the above, classical monetary theory as reflected in the Cambridge Cash Balance Approach had argued that individuals would demand money for transactions purposes only. Monetary holdings would be maintained at the minimum required for transaction purposes and thus any form of hoarding, the building up of idle cash balances, was 'abnormal'. The demand for money, \( M_d \), would therefore be some constant proportion, \( k \), of his income, \( Y \), which when taken together with the average price level, \( P \), would determine the volume of transactions he could undertake. Thus

\[
M_d = kPY
\]

Modern Monetarism essentially represents no more than a sophisticated version of classical monetary theory. The demand for money to finance transactions is now viewed as being stably related to a few key variables. Monetarists argue that the demand for money is no longer a function solely of the interest rate and income, but that the rate of return on a much wider spectrum of physical and financial assets will influence an individual's demand for money. Individuals will act in such a way as to ensure that the rate of return at the margin is equal across the complete range of physical and financial assets that they could purchase. Thus money is seen as being a substitute for all other assets and the demand for money is therefore a function of the rates of return on all these. In contrast, of course, money was seen as a substitute for financial assets only in the Keynesian system and thus it was the rate of return on these, the interest rate, that influenced the demand for money. In practice, however, if the rate of return across all
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money market

and financial assets moves to equality then the interest rate will clearly serve as an appropriate proxy for these. Thus the modern quantity theory of the demand for money can be represented in similar fashion to that of Keynes. Namely

$$P = f(y, r)$$

where

$$\frac{M_d}{P}$$

represents the demand for REAL MONEY BALANCES, y income, and r the interest rate. Nonetheless even though both schools use this functional form in empirical work the underlying theories are very different.

Monetarists maintain that the demand for money function is better determined statistically than either the consumption or investment function and this explains their preference for MONETARY POLICY rather than FISCAL POLICY. The monetarist prescription is to allow the MONEY SUPPLY to grow at a constant rate equal approximately to the growth in output (the money supply rule). But in fact recent empirical work has revealed great instability in both the demand for money function and the major components of the AGGREGATE DEMAND function and thus it is certainly not clear that monetary policy is to be preferred to fiscal. On the contrary the money supply rule will under these conditions lead to large and unpredictable changes in individuals' holdings of money and thus to large and unpredictable changes in expenditure.

money at call. In UK official statistics, this denotes loans made by banks mostly to the London DISCOUNT MARKET, on terms which allow recall at any time of the working day. Such loans, which are secured against bills and other securities, were between 1971 and 1981 classed as 'eligible assets' for the purpose of calculation of the RESERVE ASSETS ratio. Prior to 1975 the term 'money at call and short notice' was used, as the item then included loans to the Discount Market subject to recall at varying periods up to seven days. More generally short-term money is with or without security, by a variety of institutions, in various markets, on terms from 'overnight' and 'call', up to seven days' notice and longer. (See LIQUIDITY, MONEY MARKET.)

money balances (also known as nominal balances). The amount of MONEY held on average by individuals in the form of FIAT MONEY and/or BANK DEPOSITS. (See MONEY SUPPLY.) At EQUILIBRIUM, money balances are that amount of money which will remain unspent, but which represents latent demand for commodities and/or financial assets. (See IDLE BALANCES.) Money balances are often measured in real terms as REAL MONEY BALANCES. (See MONETARISM.)

money illusion. An individual is said to be 'suffering from' money illusion if he reacts to changes in values specified in monetarist terms rather than in real terms. Income can be expressed in purely money values or this can be deflated by the current rate of INFLATION which will give an indication of REAL INCOME, which is a more accurate indication of the real purchasing power of income.

money market. A term used in at least three senses, to be judged by the context. In its narrowest and most specific sense appears as 'the London Money Market when it signifies the market in short term secured, loans, most of them 'at call' (ie. recallable immediately), in which the borrowers are the London DISCOUNT HOUSES at a small number of money brokers and market makers, and the lenders are principal the commercial banks, though they include other financial institutions and some companies. In London the terms 'Money Market' and 'Discount Market' are used more or less interchangeably, indicating that even in its narrow sense the money market is to be regarded as embracing the market in bills, which the Discount Houses are predominant. Secondly, the term is used to define any market in highly liquid assets which are supported by an identifiable and active set of operators. In London it embraces the group of closely interrelated markets in which sterling is lent, unsecured, at terms ranging from overnight to several months' notice. This group includes the INTERBANK MARKET, LOCAL AUTHORITY MARKETS, and the market in sterling CERTIFICATES OF DEPOSIT. Fine the term is occasionally met in the literati of monetary theory, where it may refer...
simply to the market in loanable funds in the most general and undifferentiated sense.

money multiplier.

1. See CREDIT MULTIPLIER.

2. coefficient on the real money supply in the reduced form equation for income in a macroeconomic model. The IS-LM model results in a reduced form equation for income of

\[ Y = \alpha \bar{A} + \beta \frac{M}{P} \]

where \( \bar{A} \) is autonomous expenditure, \( \frac{M}{P} \) real money supply, and \( Y \) income.

In this equation (3 is the 'money multiplier', which indicates by how much an increase in the real money supply changes the equilibrium level of income, with fiscal policy held constant.

Confusion often arises between meanings 1 and 2, but most authors use the term in the sense of meaning 1. (See MULTIPLIER, FISCAL MULTIPLIER.)

money price. See PRICE.

money stock. Another name for the MONEY SUPPLY.

money supply. The amount of money in an economy; there are various definitions which are related to the number of LIQUID ASSETS included as MONEY. In the UK (since 1989) figures for five definitions of the money supply are published; two are narrow money definitions relating to the use of money as a medium of exchange and three are broad money definitions, which acknowledge the additional use of money as a store of value. The narrowest money definition is MO, which includes notes and coins (both in circulation and in bank tills) and the operational balances which the banks hold at the Bank of England. M2 excludes the money held by the banks in their tills and at the Bank of England but adds to the notes and coins in circulation all private sector non-interest-bearing sterling sight bank deposits plus private-sector retail holdings of interest-bearing sterling bank deposits along with private sector holdings of retail building society shares and deposits and National Savings Bank ordinary accounts. The broad definitions include other categories of money, e.g. wholesale interest-bearing deposits and money market assets such as bills. Thus M4 includes notes and coin in circulation with the public, private-sector interest bearing and non-interest bearing sterling bank deposits (retail and wholesale), private-sector sterling time deposits, private-sector holdings of sterling bank certificates of deposit, private-sector holdings of building society shares and deposits and of sterling certificates of deposit minus building society holdings of bank deposits, bank certificates of deposit and notes and coin. While M4 relates only to deposits in sterling, the next definition, M4c, contains the same categories as M4 but includes also bank and building society deposits in foreign currencies. The final definition, M5, adds to M4 holdings by the private sector (excluding building societies) of money market instruments (bank, Treasury and local authority bills), certificates of tax deposit and various National Savings instruments.

In the USA the categories are as follows. M1 is currency, demand deposits and other chequeable deposits. M2 is M1 plus overnight repurchase agreements and Eurodollars. Money Market Mutual Fund Balances and Money Market Deposit Accounts. M3 is M2 plus term repurchase agreements, term Eurodollars and institution only Money Market Mutual Fund balances. (See MONETARISM, KEYNESIAN ECONOMICS, MONETARY POLICY, NEW-ORTHODOXY, NEO-ORTHODOXY, RADCLIFFE REPORT.)

money terms. The expression of the values of a good in nominal money terms i.e. including changes in the general level of prices. (See MONEY ILLUSION.)

monoculture. The practice of cultivating only one type of crop in any area which occurred in England before the agrarian revolution and is still prevalent in tropical areas. Its disadvantages are that it makes the crop very susceptible to disease and pests, and gradually renders the soil more and more infertile unlike the practice of crop
rotation which restores goodness to the soil because of the different types of plant. It is not only primitive subsistence farmers who have suffered from the problems affecting monoculture: the cotton, cocoa, rubber and banana industries on small farms and plantations alike have been affected by blights.

Monopolies and Mergers Act 1965. Contained two important developments in UK competition policy. Firstly, large MERGERS were made liable to investigation by the then named Monopolies Commission. The Act set out criteria determining those mergers liable to investigation; these were, any mergers involving the transfer of £15 million or more of gross ASSETS or which would establish a MONOPOLY, then defined as a 25 per cent market share. Investigations of mergers by the Commission put the onus of proof on the Commission to show that a merger is against the public interest. The relevant Secretary of State has the right of veto over Monopolies Commission's recommendations in any referred merger case.

The second major development empowered the Monopolies Commission to inquire into references concerning the supply of services as well as goods. Furthermore, the Commission could also undertake general inquiries into practices likely to restrict competition but not registerable under the RESTRICTIVE TRADE PRACTICES ACT 1956. (See RESTRICTIVE TRADE PRACTICES ACT 1968, FAIR TRADING ACT 1973, COMPETITION ACT 1980.)

Monopolies and Mergers Commission. The Director General of Fair Trading and the Secretary of State for Trade and Industry can refer MONOPOLIES and MERGERS for investigation by the Monopolies and Mergers Commission, an independent administrative tribunal established in 1973 replacing the earlier Monopolies Commission set up in 1948. It deals primarily with cases where a company, or two or more acting in common, supplies 25 per cent or more of a particular good or service, local monopolies which prevent, restrict or distort competition and monopolies in public sector industries. Mergers may be referred to the Commission by the Secretary of State for Trade and Industry if they result in or intensify a monopoly or if the total value of gross assets acquired exceeds £15 million. The Commission may investigate proposed well as existing mergers. Responsibility acting upon the Commission's recommendation rests with the appropriate minister who may seek statutory orders to remedy the situation. Companies, however, do have to notify a dominant market position intention to merge as it is the responsibility of the authorities to identify such situations which in turn they are in no obligation to refer to the Commission.

Monopolies and Restrictive Practices (query and Control) Act 1948. Marked introduction of a UK competition policy with the creation of the Monopolies a Restrictive Practices Commission. The Board of Trade could refer to this Commission any case where a firm supplied or third or more of the UK market in a good, where two or more persons conducted the business in a manner deemed detrimental to competition. References to the Commission took the form of establishing whether MONOPOLY existed, or passing judgement whether the conduct of a particular business practice was in the public interest. Responsibility for taking action on the recommendations arising from these references lay with the relevant Secretary State. The pragmatic approach embodied this 1948 Act has remained an important feature of UK competition policy. (See RESTRICTIVE TRADE PRACTICES ACT 1956, MONOPOLIES AND MERGERS ACT 1965, RESTRICTIVE TRADE PRACTICES ACT 1968, FAIR TRADING ACT 1973, COMPETITION ACT 1980.)

monopolistic competition. A theory originated by E.H. Chamberlin (The Theory of Monopolistic Competition, Harvard University Press, 1933) and J. ROBINSON (77 Economics of Imperfect Competition Macmillan, 1933). Development of the model of market behaviour was stimulated by a belief that actual MARKET STRUCTURE did not appear to correspond with either of the two polar cases (PERFECT COMPETITION OR MONOPOLY. The monopolistically competitive industry is one in which there are a large number of firms producing similar but not identical products. The introduction of PRODUCT DIFFERENTIATION gives firms an element of MONOPOLISTIC POWER in that each firm faces a negative
sloped demand curve, and can therefore influence price. However, the possibility of earning long-run SUPER-NORMAL PROFITS is removed by postulating FREEDOM OF ENTRY, such that firms can set up and produce a different brand of the same product under identical cost conditions. All assumptions of the perfect competition model other than HOMOGENEOUS PRODUCT and perfectly elastic demand curves are retained.

LONG-RUN EQUILIBRIUM in monopolistic competition is illustrated in the diagram. Any SHORT-RUN positive PROFITS are bid away in the long run by new entrants; such entry will ensure that for the firm in the diagram, the demand curve becomes more elastic at any particular price (due to the introduction of close SUBSTITUTES) and shifts to the left (as customers are lost to the new entrants) until there are no positive profits being made to attract new entrants. This point is reached when the demand curve is just tangent to the LONG-RUN AVERAGE COST curve at $P_0Q_0$. At this point price equals long-run average cost and zero profits are being earned. Notice that this long-run equilibrium position differs from that in perfect competition since price does not equal long-run MARGINAL COST, and production takes place on the downward sloping segment of the long-run average cost curve. Thus the firm in monopolistic competition produces its desired output level at more than minimum cost. It is therefore sometimes argued that the firm in monopolistic competition is inherently less efficient than its counterpart in perfect competition as it is producing with EXCESS CAPACITY.

monopoly. In the strictest sense of the term, a firm is a monopoly if it is the only supplier of a HOMOGENEOUS product for which there are no substitutes and many buyers. Such conditions are sometimes termed absolute monopoly and the DEMAND CURVE for the firm's OUTPUT is the MARKET DEMAND CURVE for the PRODUCT. As with PERFECT COMPETITION, absolute monopoly does not occur in real life and actual market structures vary between the two extremes of nearly perfect competition and near monopoly.

The simple economic analysis of monopoly relaxes the assumption of no SUBSTITUTES, but assumes that the monopolist faces a relatively stable and predictable downward-sloping market demand curve and that PERFECT COMPETITION exists in the markets in which the firm buys its INPUTS. Under such conditions a profit maximizing monopolist will set MARGINAL COST equal to MARGINAL REVENUE and sell a lower output and charge a higher PRICE than would pertain under perfect competition (see diagram). Further, lack of COMPETITION may lead to X-INEFFICIENCY and production costs at each output level higher than they would otherwise be under perfect competition. (See BILATERAL MONOPOLY, MONOPSONY, MONOPOLISTIC COMPETITION, MONOPOLY OUTPUT and MONOPOLY POWER.)
moving average. A method of smoothing out fluctuations in data. An $n$ period moving average is calculated from a time series by first calculating the simple average of the first $n$ observations, then calculating the average of the 2nd to the $(n + 1)^{th}$, the 3rd to the $(n + 2)^{th}$, and so on. The technique is often used to eliminate seasonal components (or other intra-annual variation) from data, for which a 12-month (4-quarter) moving average would be needed. (See FILTER, SEASONAL ADJUSTMENT.)

monopoly power. The ability of a firm or group of firms to influence the market price of the commodity or service it sells. The following are conditions which can give rise to some degree of monopoly power. (1) Minimum Efficient Scale of Plant is so large in relation to market size that only one firm can operate efficiently. (2) Product Differentiation. (3) Barriers to Entry which put potential entrants at a cost disadvantage to established firms. (4) Patent Rights which give exclusive use to a technique of production. (5) High transport costs which encourage local monopolies. (See MONOPOLISTIC COMPETITION, MONOPOLY, IMPERFECT COMPETITION.)

monopoly profit. See SUPER-NORMAL PROFITS.

monopsony. In the strict sense a monopsonist is the sole buyer of a Factor of Production; the classic example is provided by the one company town. More generally, monopsony refers to situations of reduced alternative in the labour market. This may result from the limited job search of workers and not simply from limited numbers of potential employers. Whatever the cause, the buyer confronts an upward sloping aggregate labour supply curve. In consequence, his decision to purchase more labour has some effect on the wage level. The monopsonistic employer realizes that the marginal cost and the average cost (i.e. the wage) of an additional worker differ and because of this disparity he hires less labour and pays this labour a lower wage than would occur in competitive circumstances.

Monte Carlo method. A technique for discovering the small sample properties of econometric estimators. A hypothetical economic model with known Parameters is used to generate artificial data with known characteristics, and the estimator is used to estimate the parameters of the model. By comparing these estimates with the actual Parameter values, information about the Performance of an estimator under specific conditions can be gained.

moonlighting. See UNDEREMPLOYED WORKERS.

moral hazard. The effect of certain types of insurance systems in causing a divergence between the private Marginal Cost of an action and the marginal Social Cost of an action thus resulting in an allocation of resources which is not Optimal. For example, a person may be insured against illness in a manner that the cost to him of consuming more medical care is less than the cost to society. Consequently he may increase use of medical facilities beyond the socially optimal level. This in turn would lead insurance companies to recalculate premiums and increase the cost to all consumers. The problem of moral hazard leading to overuse of facilities arises in both private insurance systems and in state controlled agencies such as the British National Health Service.

mortgage. A legal arrangement in which the form of ownership of some Asset is transferred or conveyed to the lender of funds as a guarantee or security against the loan. When the loan is paid off, the Asset reverts to the debtor. The debtor retains control over the Asset and may (for example) sell it in order to repay the loan. This form of agreement is very common in the purchase of housing by individuals and in the agricultural sector.

most favoured nation clause. A clause in an international trade agreement which states that contracting parties to the agreement are bound to grant to each other treatment as favourable as they extend to other country regarding the application of Import and Export duties and other regulations. (See GENERAL AGREEMENT ON TARIFFS AND TRADE.)

moving average. A method of smoothing out fluctuations in data. An $n$ period moving average is calculated from a time series by first calculating the simple average of the first $n$ observations, then calculating the average of the 2nd to the $(n + 1)^{th}$, the 3rd to the $(n + 2)^{th}$, and so on. The technique is often used to eliminate seasonal components (or other intra-annual variation) from data, for which a 12-month (4-quarter) moving average would be needed. (See FILTER, SEASONAL ADJUSTMENT.)
multicollinearity. An econometric problem in which two or more of the EXPLANATORY VARIABLES in a REGRESSION ANALYSIS are highly correlated with each other. Its consequences are that it reduces the precision with which PARAMETERS can be estimated, and increases the estimates of the variances of the parameters. The problem can often be diagnosed by the latter property. (See LINEAR DEPENDENCE.)

multilateral aid. Aid in money or kind given by one group of countries collectively or through an international agency to another group of countries.

Multilateral Investment Guarantee Agency (MIGA). A member of the World Bank Group, MIGA was formed in 1988 with a specialized mandate to encourage equity investment and other direct investment flows to developing countries. This it does by guaranteeing eligible investments against losses resulting from non-commercial risks such as legislative action by host governments or armed conflict and civil unrest. It has an authorized capital of $1082 million.

multilateral trade. Trade among several countries, whose exports and imports are not in balance between pairs of countries, though countries will tend to be in balance with regard to their total foreign payments and total foreign receipts. Such trade usually conforms to COMPARATIVE ADVANTAGE, with countries buying in the cheapest market and selling in the dearest.

multinational corporation. A large enterprise having a home base in one country but operating wholly or partially-owned subsidiaries in other countries. Such corporations expand on an international scale to take advantage of vertical and horizontal ECONOMIES OF SCALE as well as benefits from enjoying near monopoly status.

multiplant economies. Reductions in average total cost brought about by operating more than a single plant. Three sources of these economies are (1) those that arise as a consequence of dispersed geographical markets and significant transportation costs: operating more than one plant can serve to reduce unit transport costs and where significant those can outweigh the disadvantages of operating plant below the scale necessary to achieve minimum average production cost, (2) product DIVERSIFICATION, where there can be advantages in achieving product specialization in different plants - e.g. specialized tools. Also, it can be argued (3) that multiplant firms possess more flexibility in their operations, for example a breakdown in output in one plant can be offset by supplies from the others and cost reductions can therefore be achieved by a reduction in the level of INVENTORIES required to meet shortages.

multiplant operations. The operation of more than one plant by a firm. Common factors inducing such operations are geographically dispersed markets combined with high transport costs, multiplant capital cost economies and the greater flexibility in the face of demand charges which multiplant operations yield. (See MULTIPLANT ECONOMIES.)

multiple correlation coefficient. See COEFFICIENT OF DETERMINATION.

multiple regression. See REGRESSION ANALYSIS.

multiplier. The ratio of the change in income to the initial change in expenditure that brought it about. It can be written as where \( AY \) is the change in national income and \( \Delta J \) the change in INJECTIONS. For example, if \( k = 2 \) then a SUSTAINED rise in the annual flow of injections, perhaps investment, will result in an increase in the annual flow of national income of double this magnitude.

The action of the multiplier can be illustrated by the sequence of events that follows the initial injection. The rise in investment adds to incomes which in turn are partly spent on other goods and services. In turn this means that those who produced the goods have also enjoyed a rise in income and they subsequently spend part of this, and so the chain of events continues with a smaller sum of income being passed on at each
multiplier-accelerator interaction

stage. Clearly the extent of the eventual increase in income is determined by how much income is passed on at each stage, i.e. by the MARGINAL PROPENSITY TO CONSUME of the parties to this sequence of events. Hence the size of the multiplier is found by

\[
\frac{1}{1 - \text{marginal propensity to consume}}
\]

or, because the sum of marginal propensity to consume and the marginal propensity to withdrawn income must equal unity, the multiplier must be equal to \( \frac{1}{1 - \text{marginal propensity to withdraw income}} \). Clearly the larger the propensity to withdraw income the smaller the value of the multiplier, so that in an OPEN ECONOMY in which the propensity to import, tax and save is high, the multiplier will decline. The concept is Keynesian and suggests that the idle resources that are employed to increase income by some multiple of the original injection are immediately forthcoming, at an exogenously determined price. The multiplier is an essential feature of the simple INCOME-EXPENDITURE MODEL. (See REGIONAL MULTIPLIER.)

multiplier-accelerator interaction. An approach to the explanation of fluctuations in the level of economic activity - the TRADE CYCLE - which rests on interactions between the MULTIPLIER and the ACCELERATOR. The basic analysis combining the Keynesian CONSUMPTION FUNCTION and the accelerator principle to produce a self-generating cyclical mechanism was provided by SAMUELSON ('Interaction between the Multiplier Analysis and the Principle of Acceleration', Review of Economics and Statistics, although HARROD (The Trade Cycle, University Press, Oxford, 1936) developed a model along similar lines some years earlier. According to the accelerator principle, amount of capital is proportional to amount of consumption. Thus

\[
K_t = vC_t
\]

where \( K_t \) is the amount of capital in period \( t \); \( C_t \) is consumption; and \( v \) is a constant.

Now as consumption rises, the re-investment increases corresponding hence INVESTMENT is required. The relationship may be expressed as follows:

\[
I_t = K_t - K_{t-1} = vC_t - vC_{t-1} = v(C_t - C_{t-1})
\]

The principle of accelerator-multiplier action can be shown using a simple w example. In the table above it is assumed that there is some EXOGENOUS investment \( c, \) and the accelerator coefficient, \( v, \) of 1. that \( c = cY_{1,t}, \) and \( C + I + G = Y. \)

The data in this table reveal a series of fluctuations in income although these can be seen to be damped; i.e. eventually it will settle down at that level determined by the multiplier, which in this case is 1 million. But the table is only meant illustrative. In fact, mathematical analysis of this question shows that a damped
multiproduct firm. An enterprise which combines factors of production to produce a range of products. With such firms the concepts of a physical volume of total output and unique price are less applicable.

multisector growth model. A model used in GROWTH THEORY which allows for many types of good. It is an extension of the problems considered in GENERAL EQUILIBRIUM continued into growth theory. Considerable mathematical competence is needed to understand such models fully. A TWO SECTOR GROWTH MODEL may be considered as the first step from the ONE SECTOR GROWTH MODEL to the multisector case.

multivariate analysis. An analysis (normally of a statistical nature) which involves more than two variables. (See BIVARIATE ANALYSIS.)

Mundell-Fleming model. A model, developed independently by these two economists, which shows that the expansionary effect of policy variables, FISCAL POLICY and MONETARY POLICY, varies according to the EXCHANGE RATE regime assumed. On the assumption of the perfect mobility of capital, monetary policy is shown to be ineffective with a fixed exchange rate and fiscal policy with a flexible exchange rate. This conclusion is an example of the ASSIGNMENT PROBLEM. The model has been the starting point for most subsequent work on open economy MACROECONOMICS and in exchange rate determination.

mutually exclusive projects. Refers to a situation where two or more projects cannot all be executed because they all require an input which can only be utilized on one project. For example, a piece of land could be used for an office block or a block of flats but not both. In this situation it is necessary to rank the projects. Generally ranking by NET Present VALUE will produce the maximum return to the owners unless there is a capital constraint.

\[ MV = PT. \] The equation of exchange of the QUANTITY THEORY OF MONEY.

Myrdal, Gunnar K. (1898-1987). Swedish economist, politician and international civil servant, Myrdal consistently challenged orthodox economic thought on a wide range of topics.

In *The Political Element in the Development of Economic Theory* (1929) he criticized the orthodoxy of the day which he claimed had turned the doctrine of utility from its logical conclusion of egalitarianism into a defence of the status quo. Such a defence is rooted in the innate conservatism of the economic profession. Myrdal had been critical of the development of sophisticated mathematical economics which he saw as superficial and largely irrelevant, justifiable only as an attempt on the part of economists to withdraw from analysing real problems.

Myrdal's approach to the analysis of 'economic' problems is perhaps best characterized by his *An American Dilemma; The Negro Problem* (1944). In this work he combines economic equilibrium models and dynamic analysis of cumulative processes which follow from disturbances. Myrdal attempts to widen the scope of economics by drawing attention to the interdependence of economic and social factors such as education and health. He shows how a cumulative process of deterioration can arise and is critical of attempts to determine the ultimate causes of any economic situation. He prefers a theory of cumulative causation which in this case may be described as vicious circles.
poverty, discrimination and poor education.

From the 1950s, Myrdal became increasingly associated with the theory of economic development. *The Asian Drama* (1968) is perhaps his best known work in this area, and describes the vicious circle of poverty, ill-health, lack of education and underemployment which occurs in underdeveloped countries. In all his works he consistently stressed the need to take a broad view of economic research and to attach great importance to political, institutional, demographic, educational and health factors. He argued in contrast to the prevailing orthodoxy that economic aid from the developed countries to the Third World is not in the latter's long term interests. It is safer, he claimed, for poorer countries to develop independently of the rich since the policies of the West place restrictions on the development of those countries. Indeed, Myrdal believed that they inhibit that development for their own interests.

In this area and in others Myrdal expressed the view that institutional factors are more important than market relations in the determination of economic events. Myrdal also made contributions to 'pure' economic theory, and his early work, particularly *Monetary Equilibrium* (1931) developed the economics of Knut WICKSELL and anticipate much of the later work of J.M. KEYNES. In this context Myrdal was responsible for the formulation of the concepts EX ANTE and E POST. He used these ideas to discuss aggregate investment decisions and their relationship to equilibrium national output in what became known as Keynesian manner.

His other important works include: *A International Economy: Problems and Prospects* (1956); *Economic Theory and Underdeveloped Regions* (1957); *Challenge to Affluence* (1963) and *Against the Stream* (1973).

Myrdal was awarded the Nobel Prize in Economic Science (with F.A. von HAYEK) in 1974 for his attempts to broaden the scope of economic science. (See INSTITUTIONAL ECONOMICS.)
naive accelerator. See ACCELERATOR PRINCIPLE.

Nash solution. In GAME THEORY this applies under certain conditions to the solution of co-operative two-person games. The players collusively co-ordinate their strategies where failure to do so would result in both being worse off, in that both would receive a lower pay off (the THREAT PAYOFF) than is possible with collusion.

national accounts. The compilation of accounts to derive estimates of the NATIONAL INCOME.

national bargaining. COLLECTIVE BARGAINING between employees and employers' representatives to establish pay and conditions of work in a single industry or industry group throughout the country. Most frequently such negotiations involve a number of different employers and trade unions but occasionally only a single employer or employer's representative is involved. When a single employer is involved this form of bargaining can be equivalent to COMPANY BARGAINING. (See PLANT BARGAINING.)

National Economic Development Council. A council in the UK, chaired by the Chancellor of the Exchequer, which provides a forum for representatives from the government, private and public industry, the trade unions and academics to develop and evaluate policies regarding the performance and growth of the UK economy. The Council's establishment in 1962, by the UK government, operationalized the idea of INDICATIVE PLANNING on a national level. In 1963 the council, in collaboration with its secretariat, the National Economic Development Office, published The Growth of the United Kingdom Economy to 1966, a study of the feasibility and implications of a 4 per cent annual rate of growth for both the economy as a whole and a cross section of 17 industries. Later in 1963 another council publication, Conditions Favourable to Faster Growth presented a set of economic policies designed to overcome balance of payments, government, investment, manpower and productivity constraints on faster economic growth. In 1964 the council established several Economic Development Committees, generally known as 'Little Neddies', each of which addresses and reports on specific problems in particular industries or services. In addition, a set of Sector Working Parties focusing on 39 key sectors of the economy were set up in 1975 to coordinate a tripartite approach to medium term industrial...
planning and strategy involving the government, employers and the trade unions. The role of the Council has diminished since the early 1980s as the Conservative governments adopted a hands-off approach to industry and avoided discussion with representatives of organized labour.

**National Enterprise Board (NEB).** A public corporation established by the 1975 Industry Act. Its major functions included the improvement of industrial efficiency and international competitiveness, the takeover of existing government shareholdings to ensure profitable levels and, initially, promotion of industrial democracy. In 1980 new guidelines for the NEB were established giving it an investment role in connection with companies developing or exploiting advanced technologies, industrial investment in the English ASSISTED AREAS and loans of up to £50,000 to small firms. The NEB is also expected to encourage maximum private sector participation in its ventures and is required to transfer its shareholdings to private ownership as soon as they become commercially attractive. The NEB was merged with the NATIONAL RESEARCH DEVELOPMENT CORPORATION in 1981 to form the BRITISH TECHNOLOGY GROUP.

**National Girobank.** See GIRO SYSTEM.

**national income.** A measure of the money value of the goods and services becoming available to the nation from economic activity. There are three approaches to measuring this: first, as a sum of the incomes derived from economic activity, these broadly divide into incomes from PROFITS and incomes from employment; second, as the sum of expenditures with the main distinction being between expenditure on CONSUMPTION and expenditures which add to the capital stock (INVESTMENT); finally, as the sum of the products of the various industries of the nation. These three measures, the income, expenditure and output (product) approaches, give rise to several different ways of describing the various aggregates employed in compiling the national accounts and these are described and illustrated in the table below.

The income approach to measuring national income.

<table>
<thead>
<tr>
<th>The Income Approach</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Income from employment</td>
<td>5</td>
</tr>
<tr>
<td>plus Income from self employment</td>
<td></td>
</tr>
<tr>
<td>plus Gross trading profits of companies</td>
<td>5</td>
</tr>
<tr>
<td>plus Gross trading surplus of public utilities</td>
<td>5</td>
</tr>
<tr>
<td>plus Rent</td>
<td>5</td>
</tr>
<tr>
<td>equals Total domestic income before providing for stock appreciation</td>
<td>60</td>
</tr>
<tr>
<td>(less)</td>
<td>-15</td>
</tr>
<tr>
<td>equals Gross domestic product at factor cost</td>
<td>45</td>
</tr>
<tr>
<td>plus Net property income from abroad</td>
<td>5</td>
</tr>
<tr>
<td>equals Gross national product at factor cost</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The Expenditure Approach</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumers expenditure</td>
<td>35</td>
</tr>
<tr>
<td>plus Public authorities current expenditures on goods and services</td>
<td>10</td>
</tr>
<tr>
<td>plus Gross domestic fixed capital formation</td>
<td>10</td>
</tr>
<tr>
<td>plus Value of physical increase in stocks and work in progress</td>
<td>5</td>
</tr>
<tr>
<td>equals Total domestic expenditure at market prices</td>
<td>60</td>
</tr>
<tr>
<td>plus Exports and property income from abroad</td>
<td>10</td>
</tr>
<tr>
<td>less Imports and property income paid abroad</td>
<td>-15</td>
</tr>
<tr>
<td>less Taxes on expenditure</td>
<td>-10</td>
</tr>
<tr>
<td>plus Subsidies</td>
<td>5</td>
</tr>
<tr>
<td>equals Gross national product at factor cost</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The Output Approach</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The agricultural and extractive industries</td>
<td>5</td>
</tr>
<tr>
<td>plus Manufacturing industries</td>
<td>20</td>
</tr>
<tr>
<td>plus Services and construction</td>
<td>20</td>
</tr>
<tr>
<td>equals Gross domestic product at factor cost</td>
<td>45</td>
</tr>
<tr>
<td>plus Net property income from abroad</td>
<td>5</td>
</tr>
<tr>
<td>equals Gross national product</td>
<td>50</td>
</tr>
<tr>
<td>less Gross national product</td>
<td>50</td>
</tr>
<tr>
<td>less Capital consumption</td>
<td>-10</td>
</tr>
<tr>
<td>equals Net National Income</td>
<td>40</td>
</tr>
</tbody>
</table>
national income does not simply aggregate all incomes. It aggregates only those of residents of the nation, corporate and individual, which derive directly from the current production of goods and services. It aggregates the incomes of FACTORS OF PRODUCTION, factor incomes and excludes all incomes which cannot be regarded as payment for current services to production (TRANSFER INCOMES). The sum of all factor incomes gives total domestic income which once adjusted for STOCK APPRECIATION gives gross domestic product at factor cost. If we then add on NET PROPERTY INCOME FROM ABROAD we have obtained one measure of gross national income, or, as it is more commonly known, gross national product.

The expenditure approach aggregates consumption and investment expenditures to obtain total domestic expenditure at market prices. It aggregates only the value of final purchases and excludes all expenditures on INTERMEDIATE GOODS. However, since final expenditures at market price include both the effects of taxes and subsidies and our expenditures on IMPORTS while excluding the value of our EXPORTS, all these have to be taken into account before we obtain gross national product by this method.

Finally, the output approach aggregates the sum of the VALUES ADDED at each stage of production by the industries and productive enterprises in the country. The sum of these values added gives gross domestic product at factor cost which after a similar adjustment to include net property income from abroad gives gross national product.

Thus the three approaches give rise to estimates of gross national product which once adjusted to take account of CAPITAL CONSUMPTION provides the measure of national income or more accurately net national income or net national product. A typical account is shown above. The figures are hypothetical.

National Institute for Economic and Social Research. An independent, British nonprofit organization founded in 1938 to increase knowledge of social and economic conditions of contemporary society. It is financed mainly by grants from charitable foundations, government agencies and business. It publishes books and an influential Quarterly Review which contains predictions for the UK and world economies.

National Insurance Contributions. A form of tax on labour, levied in the UK on both employers and employees. Contributions levied are generally related to incomes though there are variations in payments dependent upon employment status (for example, as between employed and self-employed) and entitlement to benefits. The payments are earmarked to finance payments of National Insurance benefits but they do not provide the full revenue required for this purpose. (See BEVERIDGE REPORT. NATIONAL INSURANCE FUND.)

National Insurance Fund. A fund into which NATIONAL INSURANCE CONTRIBUTIONS are paid and from which Social Security benefits are paid out. Although the National Insurance Contributions are the main source of revenue for this fund they are not sufficient to meet its expenditures thus 'topping-up' payments are made from general government revenue. This fund is an insurance fund in name only since its revenue does not meet its payments, the level of payments is not determined by the earnings of the fund and contributions are not based on any actuarial assessment of risk. The fiction of the fund is perhaps maintained in order to remove the stigma of 'charity' from National Insurance benefits. (See BEVERIDGE REPORT.)

National Labor Relations Act. The 'Wagner Act' was passed by the US Congress in 1935. It was the culmination of a long history increasing Federal government pressure to endorse the principle of COLLECTIVE BARGAINING. The Congress ordered employers to stop interfering with unions attempting to organize employees. The central message of the act is summed up in the statement, 'Employees shall have the right to self-organization, to form, join, or assist labor organizations, to bargain collectively through representatives of their own choosing, and to engage in concerted activities for the purpose of collective bargaining or other mutual aid or protection.' The Wagner Act established the National Labor Relations Board to monitor and adjudicate
claims of unfair labour practices. Such claims could be filed if an employer:
1. coerced or interfered with worker rights.
2. attempted to dominate or interfere with union organization.
3. used hiring and job tenure practices to encourage or discourage membership in any labour organization.
4. discharged or discriminated against an employee for bringing charges under the Wagner Act.
5. refused to bargain with duly chosen employee representatives.

Largely as a result of the Wagner Act, union membership in the United States grew very rapidly from 3.9 million in 1935 to 15 million in 1947 when the Wagner Act was amended by the provisions of the Taft-Hartley Act. (See BARGAINING UNIT.)

nationalized industry. An industry which produces output for sale to consumers and other producers by way of MARKETS but which is solely owned by and under the control of the government. Nationalized industries may thus be distinguished from government departments (such as the British National Health Service) which provide goods directly to consumers rather than selling their output. Besides these wholly owned enterprises, governments often have significant holdings in private companies though these are not regarded as nationalized. In the UK, the nationalization of an industry requires an Act of Parliament.

national product. See NATIONAL INCOME.

National Research Development Corporation. An independent public corporation established in 1949 to encourage the development and exploitation of new technology. It provided finance for technical innovations by industrial companies and exploited inventions developed by government establishments, research councils and institutions of higher education. It was merged with the NATIONAL ENTERPRISE BOARD in 1981 to form the BRITISH TECHNOLOGY GROUP.

National Savings Bank. Formerly called the Post Office Savings Bank, this is a UK state SAVINGS BANK operating through Office branches. Funds may be deposited 'Ordinary Accounts' where they attract low rate of interest but may be withdrawn to a certain limit on demand, and above that limit at a few days' notice. Or they may be placed at higher rates in 'Inve: Accounts' where they are subject to a month's notice of withdrawal. A CT ACCOUNT and CHEQUE service is not offered.

natural law. A set of rules which are imposed by nature on man and are quently immutable. The doctrine of r law associated with Scholars such Thomas AQUINAS and the Physiocrats equated natural laws to that set of which conform to social necessity. j analytic concept it has two meanings, natural in the sense of normal, and natural in the sense of just. The i meaning applies to a situation where social situation determines a certain sequence of events which if allowed to themselves out would lead to a definite of affairs free from disturbances. The iNATURAL PRICE is an example of the wo of natural law. The latter meaning is further that such a price is fair and the sueent allocation and distribution of resources is normatively correct.

Adam SMITH accepted the naturalist sophy of his time. The efficacy of the IBLE HAND' was based on the balar natural human motives. Government participation in this sense is unnatural be; upsets the natural balance. Artificial interference in the inherent natural order is harmful. Natural law was abandoned nineteenth century although the see the laws of motion of capitalism was a particular concern to Karl MARX (laws were created by man) and the conce normal values has continued through t MARSHALL and NEO-CLASSICAL econo

natural logarithm. (also know Napierian Logarithm). See LOGARITHM

natural price. A term used by Adam to describe the value of a commodity at which market prices fluctuate. In essence natural price is the long-run EQUIL price of a commodity and is dependent the costs of production.
300

natural rate of growth

natural rate of growth. The rate of growth
of the effective labour force in the HARRODDOMAR GROWTH MODEL. With a FIXED COEFFICIENTS PRODUCTION FUNCTION the natural

rate is the maximum sustainable rate of
growth of real income. The natural rate
(G/v) is composed of the rate of growth of
population (n) plus LABOUR-AUGMENTING
TECHNICAL PROGRESS (X) (also known as
HARROD-NEUTRAL TECHNICAL PROGRESS). T h u s

Gn = n + X.
;i

natural rate of unemployment.
The rate
of unemployment implied by the present
structure of the economy. That rate of
unemployment determined by the structural
and frictional forces in the economy which
cannot be reduced by raising AGGREGATE
DEMAND.

The

VERTICAL

PHILLIPS

CURVE

RENEWABLE RESOURCES.) See Pearce, D.\y

and Turner, R.K., Economics of Natural
Resources and the Environment, Harvester
natural selection hypothesis. Refers to the
argument that competitive product or capital
markets ensure profit maximizing behaviour
on behalf of firms. Under such conditions,
those firms who fail to maximize profits will
not survive.
near money, WEALTH held in a form which
may be quickly and easily changed into
MONEY,

BUILDING

SOCIETY

deposits

are

suggests that any attempt to hold unemployment below its natural rate will result in

regarded as being in this category. Near

accelerating

EXCHANGE property as they have to be converted into money to be used to make
payments.

INFLATION.

Milton

FRIEDMAN

(1968) has provided the most often referred
to definition of the natural rate of unemployment stating that it is 'the level that would be
ground out by the Walrasian system of GENERAL EQUILIBRIUM equations provided there

is embedded in them the actual structural
characteristics of the labour and commodity
markets, including market imperfections,
STOCHASTIC variability in demands and sup-

plies, the cost of gathering information
about job vacancies and labour availabilities,
the costs of mobility and so on'. In simplified terms it may be regarded as that level of
unemployment which nonetheless remains
at full employment. It has also been described as the warranted unemployment
rate, the normal unemployment rate and
the full-employment unemployment rate.
(See
RATIONAL
WALRAS.)

EXPECTATIONS,

monies

do

not

possess

the

MEDIUM

OF

necessity.
Not a widely used term in
modern economics, but, if used, is taken to
refer to a good with an INCOME ELASTICITY OF

DEMAND of less than unity. That is, a smaller
and smaller proportion of income is spent on
the good as income rises.
NEDC.
See
NATIONAL
COUNCIL.
4

Neddy\

ECONOMIC

DEVELOPMENT

The informal name of both the

NATIONAL ECONOMIC DEVELOPMENT COUNCIL
and the NATIONAL ECONOMIC DEVELOPMENT
OFFICE.

HYSTERESIS,

natural resources.
The freely given
material phenomena of nature within the
boundaries of men's activities; at present
these boundaries extend to approximately 4
miles below the earth's surface and 12 miles
above it. There may be additional qualities
of situation and location which can be considered as natural resources. Obvious
examples are fertile land, oil, coal or other
cores or mineral deposits, natural forests,
rivers which can produce hydroelectric

Li,

power because of their location, wind if j t
can be usefully harnessed as a source of
power, rainfall etc. Some of these are nonrenewable and some will always continue
however much they are utilized. (See NON-

NEDO.

National Economic Development

Office. See NATIONAL ECONOMIC DEVELOPMENT COUNCIL.

need.
It is sometimes argued that individuals will not, in a free market, DEMAND as
much of certain commodities as 'society' or
the 'community1 deems that they should consume. Thus a distinction between the individual's own demand for the product and his
or her need is drawn. The 'need' concept
may be justified in terms of the good being f
MERIT GOOD, the consumption of which

lS


intrinsically desirable. An alternative argument, and one which is increasingly used, is that need refers to a demand by some individuals for goods to be provided for the consumption of others. Thus a person's 'need' for state medical care may be said to be determined by the demand which the rest of the community exercises on his behalf. This demand by others arises from altruism. (See INTERDEPENDENT UTILITY.)

negative income tax. An INCOME MAINTENANCE scheme in which individuals or households with an income which falls below some 'break-even' level receive payments, the level of payment being related to the level of income. Those with no other income thus receive a guaranteed minimum. The guaranteed minimum income level may be calculated from the break-even level of income and the rate which relates the 'negative tax' payment to income. This type of scheme is formally identical to the TAX CREDIT system since it is composed of the same elements: (1) a guaranteed minimum (2) a tax rate (3) a break-even point. A system of this type has been operated in a number of cities in the USA. Proponents of this system argue that it acts directly on poverty while critics claim that it fails to recognize the true 'causes' of poverty such as UNEMPLOYMENT or illness.

neighbourhood effects. An alternative term for EXTERNALITIES, when the externality has a spatial dimension. The discharge from a steel mill would constitute a neighbourhood effect for those downwind, whereas the extinction of the blue whale, while it would an external effect, would not be a neighbourhood effect.

neo-classical economics. A body of economic theory which uses the general approach methods and techniques of the original nineteenth century marginalist economists. The term neo-classical derives from the view that the originator of the so-called 'marginalist revolution' were extending and improving on the basic foundations of the classical economists such as D. RICARDO and J.S. MILL. The founders of the neo-classical system, J.M. CLARK, F.Y. EDGEWORTH, I. FISHER, A. MARSHALL, V. PARETO, L. WALRAS and K. WICKSELL used marginal analysis (the concepts of MARGINAL UTILITY and marginal productivity) to analyse the pricing of goods, services and FACTORS OF PRODUCTION in competitive markets. They emphasized that the market prices of goods and factors were related to their scarcity. In particular they studied the possibility of a set of market prices which ensured the equality of supply and demand in all markets. The idea of a perfectly competitive economy in equilib- rium, which may be attributed especially to Walras, is central to the neo-classical scheme. The microeconomic approach to describing the economy is a distinguishing characteristic of this neo-classical theory. Prices of commodities derived from individual rational maximizing behaviour in markets distinguishes this approach from both CLASSICAL ECONOMICS and KEYNESIAN ECONOMICS. While classical economics was concerned with long run developments of economies as a whole, and in particular the relationship between the distribution of the economic surplus and the pattern of development, neo-classical value theory became essentially a theory of the allocation of scarce resources in a static economy. In common with many classical theorists the nineteenth century neo-classical economist accepted that there exist market force* which tend to maintain full-employment. This contrasts sharply with the Keynesiar view that involuntary unemployment may exist even in spite of market forces. Modern neo-classical economics may be said to incorporate most of the central ideas of its founders. The abandonment of a cost of production theory of value in place of a subjective theory of price determination based on demand and supply, a marginal productivity theory of distribution in place of an exogenous socially determined income distribution, and the vision of a harmonious economic system in place of a theory of class conflict all dominate post-Keynesian neo classical economics as much as they did in the nineteenth century. (See NEO-CLASSICAL SYNTHESIS, GROWTH THEORY, GENERA EQUILIBRIUM.)

neo-classical growth theory. A general term referring to the models of economic growth developed in a neo-classical framework, where the emphasis is placed on the ease of substitution between capital and
labour in the PRODUCTION FUNCTION to ensure STEADY-STATE GROWTH, so that the problem of instability found in the HARROD-DOMAR GROWTH MODEL because of the assumed fixed capital to labour coefficients is avoided.

This approach is also to be distinguished from VINTAGE GROWTH MODELS, which assume that new technology can only be incorporated in new machines: neo-classical models typically assume that TECHNICAL PROGRESS is EXOGENOUS (‘manna from heaven’) and that technical advances can be incorporated in existing, as well as new, machines. Neo-classical growth models identify the sources of growth as being population growth and technical progress with capital accumulation simply determining the capital to labour ratio in the steady state.

The logic of the neo-classical model has been undermined by the demonstration that as the wage rate rises (and the profit rate falls) capital need not necessarily be substituted smoothly and in an even greater ratio for labour in the PRODUCTION FUNCTION because of the possibility of RESWITCHING, i.e. the possibility that the same capital to labour ratio can be associated with two relative prices of capital to labour. This arises because capitalists have an incentive to substitute capital for labour as the price of labour rises, but capital itself is made by labour so that its price also rises when the price of labour rises (and the profit rate falls). Because of this, given certain critical values, as the price of labour rises a capitalist may find it more profitable to switch to a more labour-intensive technique as the wage rises rather than a more capital-intensive one. (See also GROWTH THEORY, KNIFE-EDGE and MALLEABLE CAPITAL.)

**neo-classical synthesis.** The argument that the existence of an UNEMPLOYMENT EQUILIBRIUM was to be attributed to the Keynesian assumption of rigid money wages. A synthesis of the Keynesian integration of the real and monetary sectors of the economy, to show the simultaneous determination of money income and the interest rate, and the classical views that the tendency to full-employment equilibrium could only be thwarted by rigidities in the system.

In his original interpretation of the General Theory (1937), HICKS had developed what is now known as the IS-LM model to illustrate the existence of an unemployment equilibrium as suggested in the General Theory. But the model only demonstrated its existence under the assumption of rigid wages and prices. As MODIGLIANI (1944) emphasized effectively this meant that the distinction between real and money wages had been suppressed. The price level was not determined and neither therefore was real income and employment, the system again splits into a real and a money sector. Once the assumption of fixed wages was dropped the forces of competition would ensure full employment equilibrium. Later Patinkin, in his Money, Interest and Prices (2nd edn., Harper Row, New York (1965)), suggested that even the assumption of rigid money wages could not produce an unemployment equilibrium. Rather, under these circumstances we were off the AGGREGATE SUPPLY CURVE and the resulting unemployment was a DISEQUILIBRIUM phenomenon.

The neo-classical synthesis therefore asserted that the General Theory was in fact no more than a special case of the general CLASSICAL theory. Keynes' central proposition, that of an unemployment equilibrium had been shown to rest, if at all, on the special assumptions of rigid money wages. However, many economists have challenged that this line of interpretation of Keynes, started by Hicks and culminating in the neo-classical synthesis, is not the correct interpretation of the General Theory. In contrast to the neo-classical emphasis on the stability of the system one school would emphasize the uncertainty and resulting instability that they argue characterizes capitalist economies, while the other school would emphasize the failure of markets to clear due to the non-transmission of the appropriate price signals. (See IS-LM DIAGRAM.)

**neo-imperialism.** According to SOCIALIST and MARXIST writings, the control of the economies of less developed countries by giant corporations with headquarters in developed capitalist countries.

IMPERIALISM in its original form usually involved the political control of the satellite economy by the government of the metropolitan country as well as the commercial and industrial penetration of the satellite economy by metropolitan economic interests. In neo-imperialism the domination is typically
excercised by the MULTINATIONAL CORPORATION, whose requirement of the government in the mother country is simply that it secures free access to the markets of the satellite. The multinational corporation with a monopoly of technological knowledge penetrates the high profit sectors of the less developed country, impedes domestic capital formation, raises much of its capital requirements from ploughed-back profits generated in the satellite country, subsequently remits most profits to the mother country and allies itself with conservative host governments, whose policies it influences, so that at best it does little to stimulate development within the less developed country and at worst positively impedes it.

neo-orthodoxy. The name given to the opponents of the NEW-ORTHODOXY in the debate over the control of the money supply. The neo-orthodoxy view led by Newlyn in the 1960s said that the control of the CASH base was both necessary and sufficient for the control of the level of BANK DEPOSITS. This contrasts with the new-orthodoxy view that the liquid assets ratio was the variable to be controlled, and bank-cash ratio control would not be sufficient to control bank deposits. (See MONEY SUPPLY, MONETARISM)

nested hypotheses. In the REGRESSION model HYPOTHESES are 'nested' if the EXPLANATORY VARIABLES under one hypothesis are a subset of the explanatory variables in another.

For example consider the two hypotheses

\[ H_0: y = \beta_1 x_1 + \beta_2 x_2 + u_0 \]
\[ H_1: y = \beta_1 x_1 + u_1 \]

where \( u_0 \) and \( u_1 \) are each assumed to be WHITE NOISE under \( H_0 \) and \( H_1 \) respectively. \( H_1 \) is nested in \( H_0 \) as the explanatory variable \( x_1 \) is included in both hypotheses and \( x_2 \) is excluded from \( H_1 \). Simple examples of nested hypothesis testing would be use of the T-STATISTIC or F-STATISTIC to assess the significance of \( x_2 \) in the equation under \( H_0 \) (see NON-NESTED HYPOTHESES).

net advantages, the equalisation of. The hypothesis that competition in LABOUR MARKETS will ensure that the whole of the advantages and disadvantages of different jobs will be either perfectly equal or continually tending to equality. This hypothesis, first advanced by Adam Smith in The Wealth of Nations (1776) Book I, Ch. X, has been suggested to be 'the fundamental (long-run) equilibrium constructed in labour economics'. It proposes that each person seeking his own advantage will move into the most desirable and vacate the least desirable jobs. The rewards in the least desirable jobs will in consequence be improved, as employers seek to retain labour, while reciprocally rewards in the most desirable jobs deteriorate. The concept of net advantages emphasises that rewards in the labour market will take both a pecuniary and non-pecuniary form and that wages will, therefore, differ between occupations to reflect the differential costs necessary to acquire the skills to perform the occupations, the differences in non-wage attributes and the differences in the income variability or riskiness of different jobs. Occupational rates of pay will also differ in equilibrium due to differences in tastes, specifically those regarding internal rates of TIME PREFERENCE, valuation of non-wage attributes and RISK AVERSION/acceptance. (See HUMAN CAPITAL.)

net barter terms of trade.

See TERMS OF TRADE.

net book value. A statement of the value of FIXED ASSETS used in accounting. The appropriate amount of DEPRECIATION is deducted from the original cost of purchase of the asset to give its net book value. This can often differ from market value through INFLATION or other changes in value affecting the purchase price of the asset.

net investment. (also known as net capital formation) The addition to the economy's total CAPITAL STOCK, i.e. the amount of investment net of depreciation. (See INVESTMENT.)

net material product (NMP). A measure used in socialist (largely Eastern Bloc) countries to value the annual output of the so-called 'productive sphere', which includes agriculture, forestry, fishing, manufacturing industry, construction, transport and selected 'productive services' such as
tourism, catering and banking. The classification has its basis in the Marxian distinction between productive and unproductive work. (See PRODUCTION SPHERE AND BUDGETARY SPHERE.)

net national income.
See NATIONAL INCOME.

HHnet national product.
See NATIONAL INCOME.

net present value. The sum that results when the DISCOUNTED value of the expected costs of an investment are deducted from the discounted value of the expected returns. That is, the DISCOUNT RATE is \( r \), the return in year 1 is \( R_1 \), the return in year 2 is \( R_2 \) and so on, and the cost in year 1 is \( C_1 \) and so on, then the net present value is given by the formula:

\[
NPV = \sum_{t=1}^{\infty} \frac{R_t - C_t}{(1 + r)^t}
\]

If the \( NPV \) is positive the project in question is potentially worth undertaking. The precise rule for acceptance or rejection, however, will depend on the method of ranking all available options which have positive net present values and this can require the use of PROGRAMMING techniques. In macroeconomics, the net present value approach can be found in the CLASSICAL approach to investment appraisal originated by Irving FISHER. In contrast, KEYNES adopted the MARGINAL EFFICIENCY OF CAPITAL approach which essentially begins in the same way but does not require the adoption of a discount rate for the purposes of discounting. Rather it asks what rate of discount will equate the two discounted streams of returns and costs. The result then has to be compared with some RATE OF INTEREST. (See MARGINAL EFFICIENCY OF INVESTMENT.)

net profits. That portion of total profits which remains after the deduction of taxation payments and depreciation provisions.

net property income from abroad. The difference between PROFITS, DIVIDENDS and INTEREST received on assets held overseas by domestic residents and profits, dividends and interest paid abroad on ASSETS held in the domestic economy by overseas residents. (See NATIONAL INCOME.)

neutralty of money. This theorem states that via the operation of the REAL BALANCE EFFECT in the MONEY MARKET, there will be an equal proportionate increase in EQUILIBRIUM money prices for a given increase in the MONEY SUPPLY.

neutralizing monetary flows. See INTERNATIONAL MONETARISM.

'new classical macroeconomics'. Essentially a restatement in a more rigorous form of orthodox CLASSICAL ECONOMICS. This restatement rests on the notion of RATIONAL EXPECTATIONS combined with a NATURAL RATE OF UNEMPLOYMENT which emerges as a result of efficient market clearing. Accordingly it is argued that the economy will settle at the natural rate and attempts to disturb this equilibrium, say to reduce unemployment below the natural rate, will be fully anticipated and neutralized by economic agents. Any attempt to stabilize output or employment below or above the natural rate by FISCAL and MONETARY POLICY will prove ineffectual and will not alter the value of real variables in either the long or the short run. The essence of this view is captured in the proposition that there is no trade-off between inflation and unemployment even in the short run, i.e. that both the short-run AGGREGATE SUPPLY CURVE and the short-run PHILLIPS CURVE are vertical. While correctly viewed as a development of MONETARISM this 'school' nonetheless departs from the arguments of mainstream monetarists, such as FRIEDMAN, for the latter concede that demand management policies will probably result in deviations in output and employment from the natural rate in the short run. The new classical macroeconomics purports to show the futility of Keynesian demand management policies and instead focuses attention on SUPPLY-SIDE ECONOMICS.

New Economic Policy. A term used to describe the workings of the economic system in the USSR in the 1920s.

new industrial state. Associated with the work of J.K. GALBRAITH, who argues that
Modern developed capitalist economies have experienced a shift in economic and political power away from the owners of capital to what he calls the TECHNOSTRUCTURE. The technostructure uses corporate planning - i.e. acquisition and merger - in the pursuit of goals such as growth, prestige and power. The implication is that producer sovereignty has replaced CONSUMER SOVEREIGNTY in markets as the driving force in determining the allocation of resources.

**new inflation.** The notion that the current inflation that western economies have experienced since the Second World War is of a different nature or origin to previous inflations in history. The basic argument here is that trade union PUSHFULNESS constitutes the 'vital parameter' or 'motive force' of the current inflation.

**new issues market.** The primary market, not very clearly defined, in which newly created SECURITIES, or securities not previously listed and hence not traded on the STOCK EXCHANGE, are sold: by open offer to the public at large, to existing shareholders in the case of 'rights issues', or to selected individuals and institutions in the private 'placing' of the securities of private companies or of unquoted public companies. The core of the market consists of the financial institutions and operators engaged in some way in floating new issues. These include the ISSUING HOUSES, ISSUING BROKERS and the financial institutions, e.g. INSURANCE COMPANIES, PENSIONS FUNDS and investment trusts, which sub-underwrite new issues, i.e. guarantee to buy any part of an issue not taken up by the public or by existing shareholders in the case of rights issues, or to selected individuals and institutions in the private placing of the securities of private companies or of unquoted public companies. The process of selling a security previously unlisted on the stock exchange does not take place on the floor of the exchange, even when the security is to be quoted on the exchange, but it may be placed with buyers by the stockbrokers to the issue.

**‘new microeconomics’**. The name given to model building exercises which attempt to explain wage and price changes in terms of microeconomic optimizing behaviour. The existence of wage and price contracts means that prices will react sluggish to underlying changes in aggregate demand and that the latter will predictively induce quantity changes in the short run. The causal sequence is from change in aggregate demand to changes in output and employment which then lead to changes in price and wage inflation.

**‘new-new’ microeconomics.** The name given to a body of economic literature which sought to identify the microeconomics macroeconomics; specifically, to provide a firm microeconomic rationale of the mechanisms underlying the aggregate relations between price changes and unemployment (Phelps, E.S. et al., *The Microeconomics of Inflation and Unemployment Theory*, New York, Norton, 1970). The new microeconomics builds upon the NATURAL RATE OF UNEMPLOYMENT hypothesis, jettisons the notion of fully and costlessly informed market participants. Beyond exploring the implications of the natural rate hypothesis (e.g. accelerating inflation when the actual rate of unemployment lies below the natural rate and accelerating deflation after some point, where unemployment exceeds the natural rate), the new microeconomics seeks to explain the existence of a positive natural rate of unemployment in the negative short-run PHILLIPS CURVE relation between wage/price change and unemployment. The new microeconomics models are not identical, but all attribute output changes to price ‘surprises’. Thus unanticipated increases in aggregate demand lead to unanticipated inflation; prices begin rising faster than agents believe they are rising elsewhere in the economy. This perceived increase in the relative wage or price faced by the particular agent leads to an increase in output and employer the usual supply response to a CETERIS PARIBUS price increase. However, once age discover the rise in prices and wages to be quite general and not specific to their particular markets, output and employment return to their previous levels. (See ‘NEW MICROECONOMICS.’)
The new-new microeconomics is commonly contrasted with the new microeconomics, which attributes output or quantity adjustments to price 'surprises'. The new-new microeconomics developed partly in response to perceived limitations of the new microeconomics and, in particular, the alleged failure of the latter to provide an explanation of layoffs (here viewed as an involuntary phenomenon) and the counter-factual prediction of a pro-cyclical behaviour of QUITS. Recent developments have indicated these criticisms to be less damaging than first thought and so the new-new microeconomics is best regarded as an extension of rather than a replacement for the new microeconomics. By introducing the institutional features of labour and product markets it is possible to extend the predictive reach of the latter. Two principal variants of the new-new microeconomics exist in the form of IDIOSYNCRATIC EXCHANGE and IMPLICIT CONTRACT models.

new-orthodoxy. The movement away from the orthodox view that the authorities were unable to control the MONEY SUPPLY. The new-orthodoxy, led by Sayers and the RADCLIFFE COMMITTEE, said that through trying to stabilize interest rates, the authorities had in fact decided not to control the money base. They argued that the significant ratio of the banking system to be controlled was the LIQUID ASSETS ratio and not the CASH RATIO, and that the control of the bank-cash base would not amount to control of the amount of bank deposits, and that bank's liquid assets would also have to be controlled. (See RADCLIFFE REPORT, MONETARY BASE, MONEY SUPPLY, MONETARY POLICY.)

new quantity theory of money. See QUANTITY THEORY OF MONEY.

new view of investment. The view of investment in VINTAGE GROWTH MODELS which noted that EMBODIED TECHNICAL PROGRESS lowered the average age of the CAPITAL STOCK and increased the proportion of that stock which incorporated new technology.

'new view' on money supply. The doctrine of the nature and creation of money which largely rejects the traditional theory of credit creation and the CREDIT MULTIPLIER, as a valid account of how the quantity of bank deposits - the major component of the money stock - is determined. The roots of this view lie in the theoretical contributions of John G. Gurley and Edward Shaw in their Money in the Theory of Finance (Baltimore, 1960) and in the development of the PORTFOLIO BALANCE APPROACH to monetary analysis at the hands of Professor James Tobin and the Yale School of monetary economists. Essentially, this view denies the uniqueness of the banks as credit and money-creating institutions, a proposition central to the credit multiplier approach. The credit multiplier theory (in its simpler forms) takes a supply-based, mechanistic approach to credit creation, portraying a system in which the volume of bank deposits is determined by the size of a monetary base of HIGH POW-ERED MONEY in conjunction with the maintenance by various operators of certain conventional or legally-determined ratios (e.g. the banks' reserve ratios). Again in its simpler versions, the theory postulates that society must hold the quantity of bank deposits which the total operations of the system create. In contrast, the 'New View' takes a demand-based approach, asserting that society is as free to determine its holdings of bank deposits as its holdings of, say, BUILDING SOCIETY deposits, and that its decision here is part of a total portfolio choice. In effect this view sees the quantity of bank deposits (and hence money) as determined like that of all other DEBT claims by a mixture of exogenous (external) and endogenous (internally operating) factors.

New York Stock Exchange. The main STOCK MARKET in the US listing over 1000 securities.

nominal. An adjective which describes the measurement of an economic magnitude in current prices. The opposite of REAL.

nominal balances. See MONEY BALANCES.

nominal value. The stated or face value of a SECURITY, to be distinguished from its market value.

nominal yield. In the case of an ordinary share the declared dividend expressed as a
percentage of its NOMINAL VALUE. (See EQUITIES.)

non-accelerating inflation rate of unemployment (NAIRU). A synonym for THE NATURAL RATE OF UNEMPLOYMENT.

non-bank financial intermediaries. Those FINANCIAL INTERMEDIARIES whose liabilities are not included in the money supply on the usual definitions. Interest and controversy centres on those institutions, e.g. BUILDING SOCIETIES in the UK, savings and loan associations in the US, which in accepting deposits withdrawable at short notice, create claims on themselves similar in many respects to commercial BANK DEPOSITS. TWO main questions are debated. First, does the highly liquid nature of their liabilities give them a monetary significance which qualifies them for inclusion in a broad definition of the money supply? Secondly, how far is the volume of these liabilities determined by processes which differ materially from those which govern the quantity of bank deposits? The latter question boils down to the validity of the traditional CREDIT MULTIPLIER model, and how far it makes the banks unique among financial intermediaries. (See 'NEW VIEW' OF MONEY SUPPLY, RADCLIFFE COMMITTEE.)

non-competing groups. In order to have equalizing occupational differentials, it is necessary that individuals be in a position to choose freely between occupations. Where this is not the case, broad classes of occupations may form non-competing groups, and differentials larger than one could reasonably expect on competitive grounds persist through time. In its original application, non-competing groups were viewed as the consequence of unequal access to education - the difficulty of financing an investment for which collateral could not be offered militated against the formation of HUMAN CAPITAL by poorer groups in society, and served to exclude them from certain professions. More recently, interest in the Phenomenon has focused on the DUAL LABOUR MARKET HYPOTHESIS, and the entry barriers erected by craft unions and professional associations.

non-cumulative preference shares. See FINANCIAL CAPITAL.

non-excludability. A good is said to be non-excludable if its provision to any one person automatically makes it available to others. The term may be applied from the producer's point of view where the supplier cannot prevent individuals from obtaining the good or from the consumer's point of view where the consumer is unable to avoid consuming the good. Non-excludability is a characteristic of PUBLIC GOODS. (See EXCLUSION PRINCIPLE.)

non-labour income. Income that accrues outside the labour market either from investments or, more importantly, from TRANSFER PAYMENTS. The precise role of non-labour income in labour supply is of crucial importance because of the modern trend to provide individuals with income that is independent of hours worked under social security provisions. CETERIS PARIBUS, and assuming leisure to be a NORMAL GOOD, hours of work supplied in the market will always fall with rises in non-labour income because non-labour income induces a pure INCOME EFFECT.

non-linear. Usually refers to a FUNCTION whose graph is not a straight line. In more general terms, a non-linear relationship is one in which the DEPENDENT VARIABLE is not equal to a LINEAR FUNCTION of the INDEPENDENT VARIABLES. Examples include LOGARITHMS and POWER FUNCTIONS. More generally still, non-linear analysis refers to any analysis in which the economic relationships are non-linear.

non-linear function. A mathematical relationship between variables which is not a LINEAR FUNCTION. Examples include multiplicative functions of the form
\[ Y = aX_1X_2, \]
power functions of the form
\[ Y = aX^n, \]
and exponential functions of the form
\[ Y = a \cdot e^{bx}. \]

non-manual workers. Employees and employers engaged in mental rather than
physical labour who are paid a salary. The opposite of MANUAL workers. (See WHITE-COLLAR WORKER.)

**non-nested hypotheses.** In the REGRESSION MODEL two hypotheses are non-nested, if the EXPLANATORY VARIABLES under one hypothesis are not a subset of the explanatory variables in the other.

For example in the two hypotheses

\[ H_0: y = \beta_1 x_1 + u_0 \]
\[ H_1: y = \beta_1 x_2 + u_1 \]

where \( u_0 \) and \( u_1 \) are assumed to be WHITE NOISE under \( H_0 \) and \( H_1 \) respectively, \( H_1 \) is not nested in \( H_0 \) nor vice versa, as \( x_1 \) is not included in the equation under \( H_1 \) and \( x_2 \) is not included in the equation under \( H_0 \). Often the comparison of two economic theories involves the testing of non-nested hypotheses; examples of test procedures are the J-TEST and the more general ENCOMPASSING TEST.

**non-pecuniary goals.** Those objectives pursued by individuals or organizations which are not directly measurable in monetary units. Objectives such as prestige, power, professional excellence and status have this property and are commonly referred to within MANAGERIAL THEORIES OF THE FIRM.

**non-price competition.** The adoption of any policy other than price reduction, which is designed to attract new customers from rivals. Commonly referred-to forms of non-price competition are ADVERTISING, MARKETING and PRODUCT INNOVATION.

**non-profit institutions.** Institutions which either explicitly or implicitly do not exist to make a profit, for example, many health care and educational institutions. It is argued such 'firms' face different constraints and pursue different OBJECTIVE FUNCTIONS from those enshrined in conventional theories of the firm.

**non-renewable resource.** Any resource which exists in a finite form - i.e. in a limited stock which cannot be replenished other than by RECYCLING. The most obvious finite resources are oil, coal, gas and metals such as tin, mercury, aluminium etc.

**non-rival consumption.** When one individual's consumption of a good in no way diminishes the supply of that good to other individuals, the good is said to be non-rival in consumption. There is no OPPORTUNITY COST of consumption of such a good. Non-rivalness is a characteristic of PUBLIC GOODS. An example of a good which is non-rival in consumption is a broadcast television signal; one person's use of that signal does not diminish its availability to other individuals. Economists generally argue that goods which are non-rival should be provided at zero price for MARGINAL or incremental units, on the grounds that if an additional unit of consumption can be provided at zero cost then that consumption should not be prevented by the charging of a price.

**non-tariff barriers.** Restraints on INTERNATIONAL TRADE such as QUOTAS, domestic government purchasing policies and safety and technical standards, which give advantages to domestic producers over foreign producers.

**non-uniqueness.** In PARTIAL and GENERAL EQUILIBRIUM theory, a situation in which more than one equilibrium price exists. (See EQUILIBRIUM.)

**non-wage attributes.** The non-pecuniary characteristics of an employment, such as working conditions, prestige and opportunity for advancement that together with the direct pecuniary or monetary reward go to make up the total net attractiveness of an occupation, and which should in EQUILIBRIUM be equalized among employments. Insofar as people evaluate non-wage attributes alike, their effect will be to shift the SUPPLY CURVE relative to an otherwise similar occupation upward or downward according to whether the non-wage attribute is advantageous or disadvantageous. Where individuals differ in their evaluation of non-wage attributes; this will serve to impart a positive slope to the supply curve.

**non-wage labour costs.** Costs of employment to the firm over and above earnings per
normal good

A good whose demand is reduced as income falls. For normal goods, a price fall gives rise to an increase in income such that the INCOME EFFECT always has the same sign (with respect to the price change) as the SUBSTITUTION EFFECT: both negative. Where income and substitutability effects have different signs the reaction to a price change is determined by the relative absolute size of the two effects such that a good may be an INFERIOR GOOD in which demand will still rise as price falls but...
rise will be smaller than in the case of a normal good. If, however, the income effect is very powerful demand may fall as price falls - the condition for a GIFFEN GOOD. Normal goods are also known as 'superior' goods.

**normal profits.** That minimum amount of profit which a firm must acquire in order to induce the firm to remain in operation. This is where all OPPORTUNITY COSTS are just covered by total revenue and therefore corresponds to a zero level of profits. *(See SUPER-NORMAL PROFITS.)*

**normal unemployment rate.** *(See NATURAL RATE OF UNEMPLOYMENT.)*

**normal variable.** A RANDOM VARIABLE which has a NORMAL DISTRIBUTION. *(See CENTRAL LIMIT THEOREM.)*

**normative costs of production.** Estimated costs, derived from individual industrial enterprises, used by central planners in the (formerly) communist countries as a basis for fixing rates of profit and tax for individual enterprises in the production of plans. *(See PLANNED ECONOMY.)*

**normative economics.** Economic analysis which provides prescriptions or statements about what 'should be' rather than what 'is'. Normative economics gives rise to statements such as 'monopolies should be regulated' or 'profits should be taxed'. This type of economics may be contrasted with POSITIVE economics which is concerned with describing and analysing the economy as it is. In effect, normative economics is constructed from positive economics and some judgements about what society's objectives should be *(also known as VALUE JUDGEMENT). Thus we may dispute a statement of normative economics either because we consider the positive analysis to be incorrect or because we disagree with the value judgements involved.

**norm following behaviour.** The argument that during a period of INCOMES POLICY when a statutory or voluntary NORM exists this effectively becomes the target for all wage settlements, it becomes the going rate. If it is also enforced as an effective PAY CEILING, in which case none can exceed it but all or most achieve this size of wage settlement, it effectively narrows the dispersion of wage settlements. Norm following also implies a reduction in the responsiveness of wage changes to excess demand and may therefore alter the basic PHILLIPS CURVE relationship; effectively it will pivot the Phillips curve in a horizontal direction.

**notional demand.** *(See EFFECTIVE DEMAND.)*

**null hypothesis.** In HYPOTHESIS TESTS, that hypothesis under which the TEST STATISTIC will follow a given PROBABILITY DISTRIBUTION. The Null Hypothesis is normally compared to a competing or 'alternative hypothesis' under which the test statistic will not follow the distribution. Consequently if an extreme value of the test statistic occurs (i.e. one outside the CRITICAL VALUES of the distribution for the test) it is to be deemed likely that the test statistic is not following the distribution, so that the null hypothesis is rejected in favour of its alternative. *(See LEVEL OF SIGNIFICANCE, STATISTICAL INFERENCE.)*

**numbers equivalent index.** *(See HERFINDAHL INDEX.)*

**numéraire.** A UNIT OF ACCOUNT, or an expression of a STANDARD OF VALUE. MONEY is a numéraire, by which different commodities can have values compared.
objective function. A function relating the objective (the variable to be optimized) to the CHOICE VARIABLE in an optimization problem.

occupational licensing. An arrangement whereby the practitioners of a craft or professional occupation license that occupation by defining entry standards and jurisdiction. The problem with occupational licensing is that entry rules (apprenticeship period, initial qualifications, etc.) can be manipulated so as to maximize earnings. At the same time, higher entry standards can be defended on the grounds of improved standards of safety and service for the public. There is evidence to suggest that the higher INTERNAL RATES OF RETURN of, say, lawyers and general practitioners vis-à-vis the generality of first degree university graduates is much higher than we would expect if a competitive return were being earned on their extra investment in training.

occupational wage differentials. Differences in the average levels of pay of groups of workers classified according to the occupation in which they are employed. Adam SMITH provided the earliest explanation of occupational differentials in competitive labour markets. He argued that while competition would ensure that in the long run the net gains of any employment would tend to equality, the composition of these would vary between occupations for five main reasons. He argued that while the net advantages of all employment would tend to equality, rates of pay were only one of these advantages and therefore they would differ between occupations for any one or all of the following reasons.

First, rates of pay would vary between occupations according to the different costs of acquiring the skills necessary to enter the occupation: the greater the costs of training the greater the subsequent wage needed to attract people into this occupation. Second, rates of pay would differ to compensate for the inherent agreeableness or disagreeableness of particular occupations. Third, rates of pay would differ to compensate for the differing social standing of occupations. Fourth, they would differ according to the dispersion of pay levels within the occupation, for Smith supposed that the average would be lower in those occupations which offered a very few individuals the chance of a very large reward e.g. pop stars. Finally, he suggested that wages would on average be higher in those occupations which suffered a greater variability in the pattern of employment, e.g. the seasonal nature of building work. However, Smith's analysis assumes that all workers have the same tastes and abilities. If this is not the case we may observe on the one hand substantial RENTS to scarce natural talents, such as footballing skills, and on the other much smaller differentials for what might be considered undesirable jobs, such as hangmen, for some individuals may exhibit a taste for these occupations. (See WAGE DIFFERENTIALS, OCCUPATIONAL WAGE STRUCTURE.)

occupational wage structure. The ranking of the average pay levels of different groups of workers classified according to the occupation in which they are employed. (See WAGE STRUCTURE, OCCUPATIONAL WAGE DIFFERENTIALS.)

OECD. See ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, formerly OEEC.

OECEC. See ORGANIZATION FOR EUROPEAN ECONOMIC COOPERATION, now OECD.

offer curves. A diagrammatic technique introduced by EDGEWORTH to illustrate the
forces of RECIPROCAL DEMAND. On the diagram British exportable goods are measured on the vertical axis and American on the horizontal. Any point on an offer curve indicates the quantity of its exportable goods which a country is prepared to offer to attain a certain quantity of the other's goods, e.g. at Z on the British curve, the British offer OC of their goods to obtain OD of America's goods. At only one point is the quantity which the Americans are prepared to offer equal to the quantity demanded by the British, and the quantity which the British are prepared to offer equal to the quantity demanded by the Americans. This is P where the offer curves intersect, establishing equilibrium terms of trade given by the slope of line OP. OB British goods exchange for OA American goods, so that the terms of trade for the British are

\[
\frac{OA}{OB}
\]

and for the Americans

\[
\frac{OB}{OA'}
\]

Office of Fair Trading. A UK government agency, headed by the Director General of Fair Trading, which is responsible for a variety of anti-trust functions. The Office administers the Fair Trading Act, 1973, which regulates MONOPOLIES and MERGERS, the Restrictive Trade Practices Act, 1973, which regulates restrictive trade practices and resale price maintenance and the Competition Act, 1980, which regulates anti-competitive practices. Although the Secretary of State for Trade and Industry has similar powers, it is usually the Director General who identifies cases of firm dominance or complex monopoly for referral to the MONOPOLIES AND MERGERS COMMISSION. Thus, although it has no powers of adjudication or enforcement, the Office is primarily responsible for the policing of competition and the initiation of appropriate proceedings if an anti-trust violation is detected.

Office of Management and Budget (OMB). First established as the US Bureau of the Budget in 1921, the OMB is part of the executive office of the President and assists the President in preparing a coordinated federal budget to submit to Congress. It also scrutinizes each federal agency's expenditure requests and provides allotments on a quarterly basis.

offshore investment centres. Places where because taxes on income and wealth are low or non-existent, and where there are developed laws relating to TRUSTS, it is particularly advantageous to hold assets; or from which business, especially financial business, can be conducted again with tax advantages. Prominent among such places are the Channel Isles, some Caribbean states and Luxembourg. From the 1960s onwards large numbers of UNIT TRUSTS, many of them run by financial institutions based in the UK and similar countries, have been established in such centres, while a considerable amount of trustee business, involving the custody
and management of the assets of private individuals on a tax-advantageous basis, is carried on. Some offshore centres are little more than 'paper centres' where offshore institutions are registered and hold records. Others are functioning centres where, in addition to the trust business referred to, there is a considerable amount of international banking, and which are importantly involved in the EUROCURRENCY MARKETS.

Ohlin, Bertil (1899-1979). Swedish economist and politician. Shared the Nobel Prize for Economics in 1977. His major contribution to economics was the development and elaboration in his book *Interregional and International Trade* in 1933 of the approach to international trade initiated by his fellow-countryman, Eli Heckscher. On the assumption of similar demand patterns in trading countries the Heckscher-Ohlin model states that a country will export goods which make intensive use of its abundant factors of production and import goods which make intensive use of its scarce factors. (See *HECKSCHER-OHLIN APPROACH TO INTERNATIONAL TRADE*.)

Okun's 'Law'. The loss in aggregate output that is statistically associated with a given short-run increase in the unemployment rate. Okun's Law, so-called after the American economist Arthur Okun (1929-79), states that the ELASTICITY of the ratio of actual to potential real output with respect to a change in the employment rate is a constant, roughly equal to 3.0. Thus a crude estimate of the welfare cost associated with a temporary increase of 1 percentage point in the unemployment rate would be 3 per cent of real output.

oligopolistic behaviour. Conduct by firms which is characterized by perceived interdependence in decision making with regard to major policy areas such as pricing, advertising and investment. (See OLIGOPOLY.)

oligopoly. A market structure within which firms are aware of the mutual interdependence of sales, production, investment and advertising plans. Hence manipulation by any firm of variables under its control is likely to evoke retaliation from competing firms. These features are commonly ascribed to markets in which the number of sellers is few. There are a number of models of oligopoly in economic theory. These range from theories in which each oligopolist acts independently and bases decision making upon some assumption regarding rival reaction, to those in which rivalry is overcome by means of cooperation and collusion. (See KINKED DEMAND CURVE, PRICE LEADERSHIP, COURNOT'S DUOPOLY MODEL, JOINT PROFIT MAXIMIZATION, COLLUSION, CARTEL.)

oligopsony. Is a market in which a few buyers face a very large number of sellers. This type of market is comparable to that of oligopoly.

one sector growth model. A model used in GROWTH THEORY where a single homogeneous product is produced which is equal useful as a CONSUMPTION or as an INVESTMENT good. An example is the HARROD-DOMAN MODEL. (See TWO SECTOR GROWTH MODEL, MULTISECTOR GROWTH MODELS.)

one tail tests. HYPOTHESIS TESTS in which the alternative hypothesis involves directionality. Thus instead of testing to see if quantity is significantly different from a certain value, a one tail test will determine whether it is significantly greater than (or significantly less than) that value. The difference between such tests and a standard hypothesis test lies in calculating the CRITICAL VALUE such that the probability dictated by the LEVEL OF SIGNIFICANCE lies only in one tail of the test distribution. As a consequence, for a given level of significance these tests are more stringent criteria for the acceptance of the alternative hypothesis.

on-the-job training. Either formal or informal training that is undertaken at the place of work. On-the-job training offered by employers varies from formal programmes of apprenticeship to the most basic forms of learning by doing and observing. On-the-job training may be either specific or general, although much training is an admixture of both. That there are returns to on-the-job training is shown by the positive relation of earnings and seniority and earning and previous work experience.
OPEC.
See ORGANIZATION OF PETROLEUM EXPORTING COUNTRIES.

open access resource. A NATURAL RESOURCE, which is not owned by anyone. The classic example (prior to the limited ownership of the seas introduced by the 1976 Conference on the Law of the Seas) was fisheries. An open access resource is normally overexploited, since the factor payment, which should go to the owner of the resource, is appropriated by other factors, whose consequently enhanced incomes attract too many resources to the exploitation of the resource.

open economy. An economy which engages in international trade. The degree of openness of an economy may be approximated by the size of its foreign trade sector relative to its GROSS DOMESTIC PRODUCT.

opening prices. The stated prices at which dealings will take place when business begins for the day in a MARKET. Dealers in the STOCK EXCHANGE quote opening prices at the commencement of the day’s trading.

open market operations. Sales or purchases of marketable SECURITIES conducted in the open market by the CENTRAL BANK as an instrument of control over the monetary system. The immediate objective of such sales may be to influence the quantity of reserve assets held by the banking system, with the further purpose of affecting the volume of banks’ lending and holdings of other assets: open market sales will contract the reserve base and compel a reduction in banks’ loans and other assets. The further effect of this is to change the quantity of bank deposits and so the money supply. The traditional theory of the CREDIT MULTIPLIER predicts that bank deposits will change by some multiple of the initiating open market operation. In practice central banks’ objectives are usually more complex. Open market operations may be conducted as an adjunct of INTEREST RATE policy, which may have a balance of payment objective, or may itself be a means of influencing money supply by affecting the asset-holding decisions of the public. Where there is a large and continuing public sector deficit, sustained sales of government debt may be seen as directly substituting for and hence controlling, growth in the money supply, though they do also prevent increases in bank reserves which could lead to secondary expansionary effects. It should be noted that in the UK the official use of the term ‘open market operations’ has generally referred to operations in bills in the MONEY MARKET and this usage was made firmer under the regime of MONETARY MANAGEMENT introduced, as part of wider changes, in August 1981. Since 1981 the BANK OF ENGLAND has used much more explicitly ‘open market’ sales and purchases of bills on a daily basis to offset the effects of large and discontinuous flows of funds between the public and private sectors. It conducts these open market operations in the bill market in order to achieve a particular interest rate rather than a particular supply of liquid assets.

open unemployment. A term used generally in the context of developing countries. It refers to the situation where an individual accepts that he has no employment and he may then subsequently register with a labour exchange if that facility is available. The term is used in order to distinguish those wholly unemployed from those who may be considered underemployed owing to low productivity: only working part-time or being in the situation of HIDDEN UNEMPLOYMENT. In many less developed countries, open unemployment in urban areas is increasing rapidly especially among school-leavers. (See UNDEREMPLOYMENT, INFORMAL SECTOR.)

operating gearing. A measure of the percentage of a firm’s operations that constitute FIXED COSTS. BREAK-EVEN ANALYSIS can be used to measure this.

operating income. The income arising out of the normal business of a firm; this will exclude any extraordinary items such as sales of land, buildings or other capital assets, unless the firm is engaged normally in buying and selling of such assets.

operating profit. That profit which would be earned if no resources were diverted to the future expansion of the firm.
opportunity cost. Perhaps the most fundamental concept in economics, the opportunity cost of an action is the value of the foregone alternative action. Opportunity cost can only arise in a world where the resources available to meet wants are limited so that all wants cannot be satisfied. If resources were limitless no action would be at the expense of any other - all could be undertaken - and the opportunity cost of any single action, the value of the 'next best' alternative, would be zero. Clearly, in a real world of scarcity opportunity cost is positive.

Strictly, cost in economics always refers to opportunity cost and hence accountant and economist may well define the cost of an action quite differently. For the accountant what matters are the money outlays on the various resources required to produce a product. For the economist, those money prices may themselves be an inaccurate reflection of the opportunity cost of the resources if for some reason markets have failed to reflect the value of those resources in their highest value alternative use. Additionally, the economist will tend to look at all the benefits sacrificed by taking an action. If he is concerned with a private financial decision he may, for example, wish to look at the foregone profits on the alternative programme, whereas the accountant would typically not do this. If the economist's concern is wider, as in (social) COST-BENEFIT ANALYSIS, the foregone benefits may include many other items such as the value of amenity that may have been produced by the alternative programme, and so on. Although the terminology varies, it is therefore useful to speak of 'private' opportunity cost in cases where one is looking at the foregone private benefits of an action; and social opportunity cost where one looks at the much wider range of foregone benefits. (See IMPlicit COST.)

Opportunity cost approach to international trade. This approach views the cost of producing a particular good not as a certain amount of real costs but as the goods which have to be foregone to obtain this good. Provided opportunity cost ratios differ between countries, it is possible for gains to be obtained from trade, in the manner described in the theory of COMPARATIVE ADVANTAGE.

opportunity cost of money holdings. It is usually reflected in the market RATE INTEREST, in that the OPPORTUNITY COST holding money is the rate of interest foregone which would have been earned had money been put into interest-bearing assets as opposed to being held as cash. (See OPPORTUNITY COST, RATE OF INTEREST.)

opportunity wage. The wage that could have been earned in an individual's 'next best' employment. The highest wage that is foregone remaining in the present job.

optimal. See OPTIMUM.

optimal capacity. That output which corresponds to the minimum point of the AVERAGE TOTAL COST schedule.

optimal distribution. The 'best' or most desirable distribution of (generally) income or wealth between the individuals comprising a society or community. Definition of optimal distribution requires some criteria upon which distributions may be judged, thus the definition of an optimal distribution is inherently a VALUE JUDGEMENT. (See TRIBUTIVE JUSTICE.)

optimal level of pollution. That level of pollution at which the extra cost of abatement is just equal to the extra cost of damage done by the pollution. To abate further would be to incur ABATEMENT costs in excess of the benefits secured by the reduction in damage. Typically, then, the optimal level of pollution will not be zero. It is fact the term used in environmental economics for the optimal level of EXTERNALITY.

optimum. The 'best' situation or state of affairs. To achieve an optimum is to 'optimize' and a situation which is an optimum said to be 'optimal'. Much of economics concerned with analysing how groups or individuals may achieve 'optimal' arrangements. For example, the choices made by consumers are analysed in terms of attempts to obtain the optimal pattern of consumption. Definition of what is optimal does, of course, involve judgements concerning what is or should be desirable. Generally, it is assumed that the satisfaction of individuals...
desires is the objective of the economic system. In attempting to attain an optimum we are usually constrained by the fundamental scarcity of goods and resources - individuals are constrained by their income - thus we speak of 'constrained optimum', the best that can be achieved in view of existing limits. Where we are faced with more than one objective, we sometimes speak of an 'optimum optimorum' - the best of the best situations. This simply means that a number of arrangements may be judged equally desirable in terms of one criterion (say efficiency) while the application of a second criterion (say a 'just' distribution of income) indicates the best overall arrangement. (See PARETO OPTIMUM.)

**optimum optimorum.**

See OPTIMUM.

**optimum plant size.** That size of plant at which long-run average costs are at a minimum.

**optimum tariff.** The name given to the tariff which maximizes the WELFARE or UTILITY enjoyed by a nation. Unless the foreign price ELASTICITY of supply of a good or service is infinite, it is normally possible for a country to improve its TERMS OF TRADE by imposing a tariff on the import of the good, for the fall in demand for the imported good will cause a fall in the world price of the good. The country imposing the tariff conducts a smaller volume of trade but on more favourable terms. The optimum is where the gain from the better terms of trade is offset by the losses from the smaller volume of trade. A tax on the export of a good from the country has the same effect on welfare, where foreign demand for the good is price inelastic. The major difficulty likely to be encountered in imposing the optimum tariff or export tax is the danger of retaliation.

**option.** A contract allowing the other party to buy or sell COMMODITIES or SECURITIES within a given time period at an agreed PRICE. It represents a type of speculation in that if the price changes significantly, a buyer may well be buying at an agreed price which is well below the current trading price; he will gain if the difference is greater than the cost of the option. A contract to sell is a **PUT OPTION**; to buy, a **CALL OPTION** and to **buy or sell**, a double option. These are often referred to in the abbreviated form of **puts and calls**. (See STOCK EXCHANGE, FUTURES MARKET, FUTURES.)

**option value.** The value to a consumer of retaining the option to consume a good. It is the difference between the maximum payment the consumer is willing to make and the EXPECTED VALUE of actually consuming the good. Another concept of option value has been introduced in the context of decisions which involve irreversible consequences. Quasi option value is the increase in expected net benefits as a result of making a decision after UNCERTAINTY is resolved, instead of making a decision before the uncertainty is resolved.

**ordering.** A listing of events, goods, projects etc. such that the most preferred appears at the top of the list, the next most preferred second, and so on.

**ordinalism.** The doctrine which states that UTILITY levels can only be ranked in ordinal terms. (See ORDINAL UTILITY.)

**ordinal utility.** In any ORDERING of goods etc., that with the highest UTILITY is ranked above the good with the next highest utility and so on. This ranking or ordering is ordinal if it is not possible to say by how much utility differs between the first and second ranked good and, say, the second and third ranked good. Ordinal utility is the cornerstone of neo-classical CONSUMER DEMAND THEORY. (See CARDINAL UTILITY.)

**ordinary least squares (OLS).** The most commonly used method of estimating the parameters in a linear REGRESSION equation. The procedure is to minimize the sum of the squares of the vertical distances between the data points and the estimated regression line (or plane), i.e. to minimize the sum of squared RESIDUALS. This can be shown to result in the general formula (in matrix notation):

\[
\hat{\beta} = (X'X)^{-1} X'Y,
\]

where \(\hat{\beta}\) is the VECTOR of parameter estimates,
$X$ is the MATRIX of observations on the INDEPENDENT VARIABLES, and $Y$ is the vector of observations on the dependent variables.

In the simple two variable case this formula reduces to

$$\beta = \frac{\sum_i x_i y_i}{\sum_i x_i^2}$$

where $x_i$ and $y_i$ are the deviations from the means of the independent and dependent variables respectively. Under certain conditions this procedure can be shown to be the BEST LINEAR UNBIASED ESTIMATOR. (See GAUSS-MARKOV THEOREM, ESTIMATION.)

ordinary share.  
See EQUITIES, FINANCIAL CAPITAL.

ordinate. The value on the vertical (or $Y$) axis of a point on a two dimensional graph.  
(See also ABSCISSA.)

organic composition of capital. The term introduced by MARX for the ratio of CONSTANT CAPITAL to VARIABLE CAPITAL, and which approximates but is not synonymous to the modern concept of the CAPITAL-LABOUR RATIO, since CONSTANT CAPITAL represents just the capital and raw materials used up in the process of production, rather than the total capital and materials available to labour.

organizational slack.  
See X-EFFICIENCY.

Organization for Economic Co-operation and Development (OECD). An intergovernmental organization established in 1961 to replace and extend the ORGANIZATION FOR EUROPEAN ECONOMIC COOPERATION (OEEC) according to the provisions of the convention signed at Paris in 1960 by the original OEEC member countries, Canada, Spain and the US. Current members include Australia, Austria, Belgium, Canada, Denmark, Finland, France, the Federal German Republic, Greece, Iceland, the Irish Republic, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, Turkey, the UK and the US. In addition, Yugoslavia participates in specific activities of the organization with special membership status. The organization's aims are (1) to formulate, coordinate and promote policies designed to encourage economic growth and maintain financial stability in member countries; (2) to stimulate and harmonize its members' efforts regarding the provision of financial and technical aid for developing countries and to contribute to the expansion of multilateral trade conducted on a non-discriminatory basis. The organization is governed by a council composed of representatives from member countries. The activities of organization are carried out by over specialized committees and working parties, in conjunction with an international secretariat, review specific issues and formulate recommendations related to examples, economic development, tech cooperation, international trade, energy and the environment. In addition, the Council established the International Energy Agency in 1974 to encourage cooperation on energy matters and reduce excessive dependence upon oil imports among participating countries. The OECD Nuclear Energy Agency, originally set up as the European Nuclear Energy Agency in 1958, also serves to promote international cooperation among OECD countries on the development of nuclear power for peaceful purposes. In 1962 the Council established the Development Centre which conducts research on the formulation and implementation of general policies of economic development. The organization also attempts to return improve the educational systems of member countries via the work of its Centre for Educational Research and Innovation. The organization publishes a comprehensive collection of statistical reports including surveys of economic activity, trends and forecasts of national development and aid policies. Occasional surveys and 'ad hoc' studies on various topics are also published by the organization on a regular basis.

Organization for European Economic Co-operation (OEEC). In 1947 following initial suggestion by the US Secretary of State, Marshall, for a programme of assistance designed to effect the economic rehabilitation of postwar Europe, 16 European countries set up the Committee...
Organization of Arab Petroleum Exporting Countries

European Economic Cooperation to administer and coordinate the EUROPEAN RECOVERY PROGRAMME. The need for a permanent coordinating agency was soon acknowledged by a convention signed in 1948 which created the Organization for European Economic Cooperation. The organization's members included Austria, Belgium, Denmark, France, Greece, Iceland, the Irish Republic, Italy, Luxembourg, the Netherlands, Norway, Portugal, Sweden, Switzerland, Turkey, the UK and the Anglo-American and French occupation zones of Germany. In 1949 the Federal Republic of Germany joined as a full member whereas in 1950 Canada and the US were accorded associate membership. Although the Organization's initial activities were largely confined to implementing the EUROPEAN RECOVERY PROGRAMME, it subsequently introduced a series of programmes designed to encourage economic cooperation between its member countries regarding trade liberalization and the establishment of a multilateral payments system. The Organization's efforts at restoring currency CONVERTIBILITY led to the establishment of the EUROPEAN PAYMENTS UNION in 1950, and the institution of the EUROPEAN MONETARY AGREEMENT in 1956. A Code of Trade Liberalization was adopted in 1950 which steadily reduced quantitative import restrictions on intra-organization trade. Notwithstanding their eventual failure, the organization also convened negotiations in 1957 between its members and the EUROPEAN ECONOMIC COMMUNITY (EEC) for the establishment of a European free trade area. The organization was replaced in 1961 by the ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT to signify its end as a purely European body, due to the accession of Canada and the US as full members, and its increasing role in providing economic assistance to developing countries.

Organization of Arab Petroleum Exporting Countries (OAPEC). An international commodity organization, created in 1968, which coordinates petroleum economic policies and encourages economic cooperation among Arab petroleum producing countries. The organization enables member countries to develop integrated oil production policies and joint industrial projects in various phases of the oil industry such as oil transport and shipbuilding. Current members include Algeria, Bahrain, Egypt, Iraq, Kuwait, Libya, Qatar, Saudi Arabia, Syria and the UAE. (See also ORGANIZATION OF PETROLEUM EXPORTING COUNTRIES.)

Organization of Petroleum Exporting Countries (OPEC). An international commodity organization which seeks to coordinate petroleum production and pricing policies in member petroleum exporting countries. The organization was formally established in 1960 following a series of initiatives by Venezuela to encourage concerted action among petroleum producing countries. Current members, in addition to the founding members of Iran, Iraq, Kuwait, Libya, Saudi Arabia and Venezuela, include Algeria, Ecuador, Gabon, Indonesia, Nigeria, Qatar and the UAE. The organization's activities have evolved from maintaining export price floors and coordinating production programmes to negotiating petroleum export price and production ceilings and providing financial assistance for developing countries. The supreme authority of the organization is the conference which meets biannually to consider and approve prices and production strategy for members. A long-standing pattern of negotiated uniform price increases was altered in 1976 by the emergence of a dual price structure which formalized internal disagreement regarding pricing policy. Although a single price level was temporarily restored in 1977, the organization's price structure has subsequently tended to reflect the divergent pricing strategies of members, led by Saudi Arabia, who favour price moderation, and members such as Algeria, Iran and Libya who have adopted a more aggressive pricing policy. In addition, the organization provides loans, via the OPEC Special Fund, to finance both balance of payments deficits and development projects in non-OPEC developing countries. The power of OPEC declined sharply in the second half of the 1980s as oil supplies increased from non-OPEC sources and for a period of time from Saudi Arabia. The latter, suffering from a shortage of revenues through playing a passive role as swing producer, increased output to put pressure on other producers to adjust their outputs and to re-establish her position of dominance.
Two VECTORS (or two MATRICES) are said to be orthogonal if their product is the zero vector (or matrix). The property of orthogonality between two variables can consequently be interpreted to mean that there is zero CORRELATION between them, since the sum of their cross products (the product of their respective vectors of observations) which determine their CORRELATION COEFFICIENT is zero. (See PRODUCT MOVEMENT, COVARIANCE.)

A term used to describe a data point which is extraordinarily far away from the majority of observations. Outliers can significantly influence the calculation of PARAMETER estimates in REGRESSION analysis, or summary statistics such as the sample MEAN and VARIANCE, which may consequently take on unrepresentative values. As a result, outliers are usually ignored, or accounted for by DUMMY VARIABLES in regressions, and may justify the use of say the MEDIAN or MODE as measures of central tendency rather than the sample mean.

The end product of transforming INPUTS into GOODS. This transformation process is formalized by saying that output is a function of the various quantities and qualities of inputs used, which is a verbal expression of the PRODUCTION FUNCTION. Output need not coincide with goods that create UTILITY. The output with a negative price would be pollution which is an invariable by-product of the production process. To say it has a negative price simply means that consumers would either pay to be rid of the good (see BAD) or would require to be paid to accept it. Nor need output be a 'tangible' good like machinery, consumer goods etc. Health is an output, as is knowledge, the former coming from the health 'industry' and the latter (again in part) from the educational system.

A system of accounting which classifies costs according to the OUTPUTS in the production of which they are incurred rather than in terms of the INPUTS which are purchased. Thus while a conventional budget for the police force would allocate costs to salaries, raw materials, equipment and so on, an output budget would use headings such as 'crime', 'detection', 'traffic control'. The technique is to improve decision making and resource allocation in organizations, particularly in the realm of PUBLIC TURE where, ideally, expenditure in government departments should be classified by alternative names, Programme and Planning Programming System (PPBS) are sometimes useful where difficulties in identifying output mean that costs are allocated to programmes or policies.

The delay between initiation of a (macroeconomic) policy and its full or total effect. This normally takes the form of a DISTRIBUTED LAG. (See INSIDE MONEY, OUTSIDE MONEY.)

This refers to debts which are backed by assets which do not re-claim on individuals within the economy. Examples are FIAT MONEY, GOLD and EXCHANGE RESERVES. (See INSIDE MONEY, OUTSIDE MONEY.)

A term to describe the situation of the UK MONETARY AUTHORITY in the early 1980s, in selling more government debt to UK non-bank holders in order to cover the PUBLIC SECTOR ING REQUIREMENT in those years. The purpose of doing so was to moderate the rapidly rising bank lending to th sector on sterling M3, in the attempt to keep this quantity more nearly in line with the target rate of growth set for this money under the Conservative government's MEDIUM TERM FINANCIAL STRATEGY.
overidentification.  See IDENTIFICATION PROBLEM.

overnight money.   Money lent in one or other of the MONEY MARKETS, at the very shortest term of recall. From the lender's point of view it is money which he expects to require, if not the next day, then within two or three days at most.

overpopulation.   A subjective term used to describe a situation when the density of population in a defined area is considered too high. This can be for various reasons; in a developing country the reason could be that there is insufficient food for the number of people, or insufficient employment opportunities. Alternatively it could apply on a smaller scale to a city because there is insufficient housing or a lack of health and welfare amenities. Generally overpopulation means that the area or place in question is unable by some criteria to support the level of population wishing to stay there. (See POPULATION, POPULATION EXPLOSION.)

overshooting (of exchange rate).   Under FLOATING EXCHANGE RATES the widely observed phenomenon, in response to a shock, of the actual value of the exchange rate going beyond the new EQUILIBRIUM value, where the latter is defined with reference to fundamentals such as PURCHASING POWER PARITY. The explanation offered usually runs in terms of different speeds of adjustment in goods and capital markets; while the latter adjusts instantaneously the former adjusts only after a lag. If in a two country model country one experiences a monetary expansion which reduces its rate of interest, a capital outflow ensues which causes a depreciation of the exchange rate. In the short-run the depreciation causes a deterioration on current account, as the quantities of imports and exports respond only slowly to changed relative prices, so that the exchange rate depreciates further. In time, however, the quantity of goods exported rises and imports fall and the exchange rate appreciates to its long-run equilibrium value. (See J. CURVE, REGRESSIVE EXPECTATIONS.)

over the counter market.   A market in shares, mostly of smaller companies, distinguished by the fact that the market has no exchange building, the transfer being arranged by telecommunication, though customers can literally buy and sell shares over the counter. The market is highly developed in the USA but it is in its infancy in the UK (See STOCK EXCHANGE, UNLISTED SECURITIES MARKET.)

overtime.   Hours worked in excess of the standard working week. Such hours attract a pay premium. If there were no costs of hiring and training new workers and other fixed costs, employers would always prefer to expand employment rather than pay what is after all a penalty rate. In the postwar interval there has been a tendency toward rising amounts of overtime working. One possible explanation of this phenomenon is that the fixed costs of overtime have risen relative to the overtime premium. From a supply point of view an increase in weekly income via the overtime premium will always cause more hours of work to be offered than an equivalent increase in straight time rates since in the former case there is no INCOME EFFECT, only a pure SUBSTITUTION EFFECT.

overvalued currency.   A currency whose EXCHANGE RATE is fixed above the free market EQUILIBRIUM rate. (See UNDERVALUED CURRENCY.)

owner-controlled firms. Those companies who have an identifiable shareholder interest group owning a sufficiently high proportion of the voting stock, such that they can exert effective control over company policy.
Paasche price index. A current year weighted PRICE INDEX. Expenditure in the current year, 2, is expressed as

\[ \sum_{i=1}^{n} p_{2,i} \cdot q_{2,i} \]

where \( p \) and \( q \) are prices and quantities. For the previous year 1, however, we calculate the original prices but weight them by the current year quantities. That is

\[ \sum_{i=1}^{n} p_{1,i} \cdot q_{2,i} \]

so that the ratio of the two expenditures gives a price index of the form:

\[ \frac{\sum_{i=1}^{n} p_{2,i} \cdot q_{2,i}}{\sum_{i=1}^{n} p_{1,i} \cdot q_{2,i}} \]

(See LASPEYRES PRICE INDEX, PRICE INDEX.)

paid-up capital. That part of the ISSUED CAPITAL of a company which the subscribers have been required to pay. When issuing SECURITIES the issuer may require only part payment of the issue price. The remainder is the uncalled capital, and may be called at any time as the financial needs of the company dictate.

panel data. A type of data in which information about a cross section of individuals is sampled at regular intervals over time. (See SAMPLE.)

Paper money. General term for money in the form of banknotes. Under a GOLD STANDARD these are convertible into gold coin or bullion; otherwise they are inconvertible (though modern Scottish banknotes are convertible into Bank of England notes). The term is occasionally used as a term of disapprobation for the money, in whatever form, of modern, inconvertible systems.

Paper profit. When an asset increases in value in nominal terms, this is called paper profit; for example, if a house would sell now for a larger nominal sum than the price for which it was bought, a paper profit has been made. This may or may not represent a real profit which depends on the rate of inflation. (See MONEY ILLUSION.)

parabola. Usually in economics (though not strictly), the U-shaped, or inverted U-shaped graph of a QUADRATIC EQUATION.

paradox of thrift. In an economy which is not fully employed the more thrifty and frugal households are the lower will be the level of output and employment. This apparent paradox which appears to suggest that SAVING is a 'bad' thing results from the fact that increased savings on the part of households will mean a reduction in CONSUMPTION and hence a decrease in the level of AGGREGATE DEMAND. Since the level of aggregate demand determines the level of output and associated level of employment in the simple INCOME-EXPENDITURE MODEL this will result in a fall in output, and indeed these effects will be magnified by the action of the MULTIPLIER. In this simple model the increase in a WITHDRAWAL, savings, is not offset by a corresponding increase in an INJECTION, INVESTMENT, for investment and savings decisions are divorced in the Simple Keynesian model.

paradox of value. (See USE VALUE, EXCHANGE VALUE.)

paradox of voting. The possibility that the system of simple MAJORITY RULE voting may fail to give an unambiguous choice between alternatives. Consider the table below which illustrates the preferences between issues X, Y and Z of a community composed of A, B and C.

If issues are considered in pairs, a majority vote would choose X above Y and Y above Z but Z above X; this pattern of choice is said to be INTRANSITIVE. If voting is allowed to continue without limit a process of cycling is
generated as one policy defeats another in an unending cycle. If however, some limit is placed on the voting process, the problem of path dependency arises in that the alternative chosen will depend upon the order in which alternatives are considered. In the

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Paradox of voting

above case, for example, if X and Y are first compared Y will be rejected, then X will be compared with Z and Z chosen. However, if we began by comparing Y and Z, Z would be rejected and X would be chosen over Y. It has been demonstrated by Duncan Black (The Theory of Committees and Elections, Cambridge, Cambridge University Press, 1958) that if voters' preferences are single-peaked the problem of cycling does not arise. Preferences are single-peaked if there is some scale along which every individual's preferences can be ranked such that each individual moves to a lower level of preference the further he moves from the best or most preferred alternative. In the diagram below the preferences of A, B and C are shown, the preferences of A and C are single-peaked while Z's preferences are not.

The paradox of voting has led to consideration of alternatives to simple majority rule such as approval voting, the borda count, exhaustive voting and point voting. In a majority rule system the problem of cycling may be overcome by logrolling or vote trading. The paradox was first discussed by the Marquis de Condorcet and lies at the heart of K.J. Arrow's analysis of the impossibility of a Social Welfare Function (See Social Decision Rule.)

Parameter. A quantity which remains constant in a given context. Thus, for instance, in the equation

\[ Y = a + bX \]

where \( X \) and \( Y \) are variables, and \( a \) and \( b \) are constants, \( a \) and \( b \) are the parameters of the equation.

Pareto Liberal, Impossibility of. The name given to a theorem presented by A.K. Sen (The Impossibility of a Pareto Liberal Journal of Political Economy, 1970) which demonstrates that no social decision rule can simultaneously satisfy the Pareto Criterion and allow individuals to make decisions on certain 'personal' matters irrespective of the wishes of others (Personal Liberty). Sen's original argument has been subject to some modification but we can present the basic argument in terms of an example provided by Sen. Consider two individuals, lascivious A and prudish B and a lewd book (Sen suggested Lady Chatterley's Lover, though this now seems a little quaint). The following possibilities exist: (1) A reads the book, B does not, (2) B reads the book, A does not, (3) both read the book, (4) neither reads it. We assume that A's most preferred outcome would involve prudish B reading the book (this would amuse A) while B would be willing to read the book if this prevented A from reading it. Under the rule of liberalism with each making his own decision the outcome (1) emerges. However, both would prefer (2) to outcome (1) (thus (2) is a Pareto Improvement compared with (1)). For the social decision rule, to choose (2) would require dropping the principle of personal liberty, while the adoption of personal liberty involves ignoring a Pareto improvement (the outcome is not Pareto Optimal.). It has been argued that if both individuals prefer (2) to (1) then a voluntary agreement to adopt (2)
will be made by them (see also COASE’S THEOREM), however such agreements may, in practice, be difficult to arrange. Sen himself has argued that personal liberty should take priority over the Pareto rule. The theorem raises problems for the theory of COLLECTIVE CHOICE which have not yet been resolved.

Pareto, Vilfredo (1848-1923). An Italian economist with extensive training in mathematics, physical sciences and engineering. Pareto was the successor of Leon WALRAS to the Chair of Economics at the University of Lausanne in 1892. His interest in the application of mathematics and statistics to economics led him to extend the mathematical conditions for the general equilibrium system of Walras thereby establishing a definite LAUSANNE SCHOOL. In *Cours D’Économique Politique* (1896-9) he set out what he conceived to be the mathematical conditions of a general equilibrium system based on the general interdependence of all economic quantities. In addition to stressing the formal nature of a positive economic science purged of all ethical elements, Pareto also rejected socialism on normative grounds and justified the inequality of income on the basis of a supposed constancy of income distribution across countries and through time (Pareto’s Law).

In the *Manual of Political Economy* (1906) Pareto rejected both the concept of cardinal utility and the usefulness of comparing interpersonal utilities. His examination of the optimum conditions of exchange made use of indifference curves first introduced by F. EDGECORTH. A Pareto optimum is a welfare maximum defined as a position from which it is impossible to improve anyone’s welfare by altering production or exchange without impairing someone else’s welfare. No interpersonal comparisons are needed if there exists only one such optimum. However, if more than one such optimum exists it becomes impossible to evaluate any movement from one equilibrium point to another. Pareto’s analysis formed the basis for WELFARE ECONOMICS and the COMPENSATION TESTS of N. KALDOR and J. HICKS. (See KALDOR-HICKS TEST.)

**Pareto conditions.** A set of rules devised in WELFARE ECONOMICS which if fulfilled will give rise to a PARETO OPTIMUM. Briefly, these rules are that (1) the MARGINAL RATE OF SUBSTITUTION IN CONSUMPTION (the rate at which a consumer can exchange one good for another without being made better or worse off) between any two commodities must be the same for all consumers (2) the MARGINAL RATE OF TECHNICAL SUBSTITUTION (the rate at which one factor can be substituted for another while maintaining output levels) between any two factors of production must be the same wherever those factors are used (3) the MARGINAL RATE OF TRANSFORMATION (the rate at which the economy as a whole must forego the production of any one good to increase output of another) for any two goods must equal the marginal rate of substitution in consumption of those two goods.

**Pareto criterion.**
*See PARETO OPTIMUM.*

**Pareto improvement.** A reallocation of resources which makes at least one person better off without making anyone worse off. (See PARETO OPTIMUM.)

**Pareto non-comparability.** If when choosing between two states of society some individuals prefer one and some the other, the two states are said to be Pareto non-comparable. In order to be able to attempt a ranking of such Pareto non-comparable states some economists introduced the notion of COMPENSATION TESTS.

**Pareto-optimal redistribution.** Transfers of income or wealth from one individual to another which increase the UTILITY or satisfaction of both donor and recipient, thus bringing about a PARETO IMPROVEMENT. Pareto-optimal redistribution is possible if one individual experiences some benefit from giving to another individual - say as a result of humanitarian sentiment. (Donations to charity are an example of this type of redistribution). WELFARE ECONOMICS is traditionally based on the PARETO PRINCIPLE which requires a change to make at least one person better off and no-one worse off before it may be regarded as an improvement. Consequently issues of REDISTRIBUTION, which generally involve one group gaining at the expense of another, have been difficult to analyse in the context of welfare economics. Pareto-optimal redistribution can,
However, be analysed in that framework. Nevertheless, many economists would regard the Pareto-optimal analysis as being far too restrictive an approach to issues of DISTRIBUTIVE JUSTICE.

Pareto optimum. When the economy's resources and output are allocated in such a way that no reallocation can make anyone better off without making at least one other person worse off then a Pareto optimum is said to exist. The concept was proposed by and is named after Vilfredo PARETO. A reallocation of resources which makes at least one person better off while making no-one worse off is said to be a Pareto improvement. Much of WELFARE ECONOMICS is concerned with analysing conditions under which a Pareto optimum may be achieved. Despite its analytical importance, the Pareto criterion is highly restrictive since it provides no guidance to choice between alternatives which involve one person becoming better off at the expense of another. Since almost any economic policy will act to someone's disadvantage, this is a serious restriction. In order to overcome this, some economists have sought to supplement the Pareto criterion with criteria based on DISTRIBUTIONAL EQUITY while others have considered the use of COMPENSATION TESTS.

Pareto-relevant externality. See EXTERNALITIES.

Paris Club. The name given to the forum, where creditor countries negotiate with debtor countries over the rescheduling of official debts. The club has no fixed membership and no institutional structure and is open to all creditors, who accept its practices and procedures.

Parity price system. A system of price supports for US agriculture first established with the Agricultural Adjustment Act of 1933. The intent was to maintain agricultural prices and farm incomes in the same ratio to non-farm prices and incomes as prevailed in the years 1910-1914. As a result, farmers' purchasing power would be stabilized. Various programmes, including agricultural loans, soil bank programmes, and government purchases of agricultural surplus have been used since 1933 in an effort to maintain this parity. (See COMMODITY CREDIT CORPORATION for a discussion of the agency empowered to carry out the programmes.)

Par rate of exchange. The expression of EXCHANGE RATES in terms of GOLD or US dollars. (See INTERNATIONAL MONETARY FUND.)

Partial adjustment. A process by which behaviour is adjusted imperfectly towards some desired level, usually defined by the relationship

\[ X_t - X_{t-1} = l(X^*_t - X_{t-1}) + u_t \]

where \( X_t \) represents the current level of the variable, \( X_{t-1} \) represents its value one period ago, \( X^*_t \) represents the current desired level of the variable, \( u_t \) is a STOCHASTIC disturbance term, and \( l \) is the reaction coefficient, and that \( 0 < l < 1 \).

Note that if \( l \) is close to unity, adjustment is almost perfect, whereas if \( l \) is close to zero, very little adjustment takes place. For econometric purposes, the desired component \( X^*_t \) is usually specified in terms of some observable variable(s), and the equation will contain a lagged ENDOGENOUS VARIABLE. (See also KOYCK TRANSFORMATION.)

Partial derivative. In functions involving two or more INDEPENDENT VARIABLES, the DERIVATIVE with respect to one of the variables, treating all other independent variables as constants. The partial derivative has the same interpretation as the simple derivative, and bears the same MARGINAL to total relationship as the latter. Thus, for instance, the first partial derivative of the PRODUCTION FUNCTION

\[ Q = f(K, L) \]

with respect to capital, is interpreted as the MARGINAL PRODUCT of capital. The partial derivatives of the function

\[ Y = f(X_1, \ldots, X_n) \]

are commonly denoted

\[ \frac{\partial Y}{\partial X_i}, \quad i = 1, \ldots, n \]
There are also the corresponding second and higher order partial derivatives, simply calculated as the partial derivative of the partial derivative etc.

**partial equilibrium.** The study of a market for a commodity in isolation. Given the prices of all other commodities the conditions for EQUILIBRIUM in a single market are examined. This technique used by A. MARSHALL ignores the effects of changes in the price of a commodity on all other related market prices including the prices of FACTORS OF PRODUCTION. These changes may have feedback effects on the original market which can only be analysed in a system of GENERAL EQUILIBRIUM.

**participating preference shares.**
See FINANCIAL CAPITAL.

**participation rate.**
See LABOUR FORCE PARTICIPATION RATE.

**partly rational expectations.** An assumption that people form their expectations of the long-run equilibrium rationally but are uncertain as to the path which the economy will follow to this position, so that expectations will be revised in each period to take account of the discrepancy of the actual value from the expected value. (See ADAPTIVE EXPECTATIONS, RATIONAL EXPECTATIONS, REGRESSIVE EXPECTATIONS, STATIC EXPECTATIONS.)

**par value.** The nominal or face value of a SHARE or SECURITY. A share stands above par if its price on the STOCK EXCHANGE exceeds its nominal value.

**patent rights.** The granting by the Patent Office of the exclusive right to a PROCESS INNOVATION. Patent rights are a source of MONOPOLY power, however. The theoretical case in their favour is that in their absence markets provide insufficient return to the innovator.

**Path independence.** Where a choice between a number of alternatives are compared, the choice is said to be Path Independent when the alternative of independent of the order in which alternatives are considered. (See COL\_CHOICE, PARADOX OF VOTING.)

**pattern bargaining.** Often unions in oligopoly industries will choose a particular firm as a target for negotiations. An agreement reached with that firm is then used as a model for negotiations with the other firms in the industry. Labour agreement with those other firms tend to have very similar terms, particularly in major items such as pattern setting approach is typical in the auto industry, for example. It almost reduces the possibility of industrial strife as the other firms recognize the model agreement or pattern is one to which they will ultimately have to agree. (See GAINING UNIT.)

**pauper labour.** The argument advanced in rich countries that the importation of goods from countries with low wages undermines wage levels and employability in rich countries. The argument may be considered to be refuted by the consideration that low wages are usually the result of low productivity, and that price is the outcome of wage and productivity. The concept of COMPARATIVE COSTS also demonstrates that it is impossible for a country to be uncompetitive in all lines of production. It is possible for a country to be harrased by imports.

**payback period.** A traditional account method for appraising investment projects. It is the time required for an investment to generate sufficient increments of cash to recover the initial capital expenditure. It takes into account the CAPITAL EXPENDITURE on a new project and relates that to the cash flow of that project. Projects are ranked according to the length of the payback period with preference being given to those projects which have the shortest paybacks. The method has been subject to severe criticism by economists. It takes no account of cash flows emanating after the payback period and it does not take account of the pattern of cash flows within that period.

**pay ceiling.** An effective upper limit on the size of pay settlements. A pay cei...
may come to be regarded as the NORM or the going rate.

pay freeze.  
See INCOMES POLICY.

payment-by-results.  (also known as incentive payment systems) Systems of payment under which the worker is paid according to the volume of output he or the work group or plant of which he is part produces.

payments, balance of.  
See BALANCE OF PAYMENTS.

pay-off.  The net benefit that occurs when a particular course of action is taken. The pay-off in a gambling situation is obviously the sum won if the bet pays-off.

payout ratio.  The percentage of the firm's net profit which is paid out as dividends.

payroll tax.  A tax based on the wages and salaries paid by an employer. The most common form occurring in the UK are employers' NATIONAL INSURANCE CONTRIBUTIONS.

peak-load pricing.  The peak-load pricing problem arises where the demand for the output of some public enterprise is subject to considerable variation. Overtime and the storage of the output is impossible or very costly, for example, as in the production of electricity. The solution involves charging different prices during different time periods, the prices depending on the demand or cost conditions pertaining.

peak period labour demand.  The level of demand for labour at its highest point, this term usually refers to agricultural employment, which is cyclical by nature with peaks occurring especially at harvest time. There are various methods of coping with this; one is when harvest time coincides with vacations for students and school-children who can then be employed temporarily. In developing countries where this does not always happen, there are some groups of migrant workers who move about finding work where there is a high demand. However, it is often the case that the rural sector has to support the number of people required by such peaks in demand and although some may have additional occupations as tradesmen or small manufactuers of handicrafts etc., there are many who have little to do for the rest of the year. (See HIDDEN UNEMPLOYMENT.)

pecuniary external economy.  Describes a situation where the profits of a firm depend not only on its own inputs and outputs but also on the inputs and outputs of other firms. These should not be confused with non-pecuniary or TECHNOLOGICAL EXTERNAL EFFECTS which describe interdependencies between production and/or utility functions.

peg.  
See EXCHANGE RATES.

pendulum arbitration.  Arbitration in which the arbitrator is required to choose one of the positions of the parties to a dispute rather than arrive at an intermediate compromise position. Such a procedure is adopted to encourage moderation on the part of the disputants, since it is unlikely that an arbitrator will choose an exaggerated or extreme position.

pension.  Pension schemes are of two broad types; one, the capital-reserve system, involving redistribution over the lifetime of an individual, is based on workers saving to accumulate capital which is then consumed during retirement, and the other, the pay-as-you-go system, involves redistribution at a point in time between individuals so that those still at work support the retired.

pension fund.  With the rapid growth in employees' pension schemes in recent decades, the pension funds of the larger public and private sector employers have become major financial institutions, investing large sums annually. Apart from a minority of highly publicized forays into art collections, the great bulk of the funds' assets are marketable SECURITIES - about half of them company securities and especially EQUITIES - and property. Because of the long-term nature of their obligations pensions funds have a preference for long-term assets, but they deal in all sections of the capital and money markets. Like some other institutions
they engage in sub-underwriting of new issues of securities.

per capita. Per head, e.g. per capita NATIONAL INCOME - the average level of national income for each member of the population.

percentile. A measure of location of sample data or distributions. The nth percentile is that value below which n per cent of the observation on the variable concerned lie. Thus the 40th percentile (also the 4th DECILE) is that value below which 40 per cent of the observations lie. The 50th percentile is also the MEDIAN, while the 25th and 75th percentiles are the lower and upper QUAR- TILES respectively.

perestroika. A term denoting restructuring in the Soviet Union and associated with Mihail Gorbachev. In its first phase from the mid 1980s to 1987 the reforms, largely cosmetic, were focussed on improving the existing command planning system and had unimpressive results. In 1987 attempts were made to move from a centrally planned economy to a market economy but the existing system remained largely unchanged. In 1988 mandatory targets for enterprises were replaced by so-called state orders, and enterprises were given greater freedom to accumulate and use the proceeds of any surplus production. Major distortions like official prices and exchange rates remained unchanged. The partial relaxation of administrative controls and financial constraints at the level of the enterprise combined with a neglect of macroeconomic DEMAND MAN- AGEMENT condemned this experiment to failure. In the third phase from October 1990 to the failed coup of August 1991, which resulted in the disintegration of the Soviet Union, a gradualist approach was adopted. This led not to a revival of the Soviet economy but to increasing chaos, with the authorities unwilling or unable, within the existing constraints, to pursue price liberalization and tight financial policies. Perestroika has so far succeeded only in destroying the old command system without putting anything workable in its place. Perestroika has, however, permitted real market-oriented reforms in other East European economies. Though perestroika has different meanings in different East European countries, its main elements include some combination of liberalization, marketization, PRIVATIZATION, competition, the creation of appropriate institutions (like banks and financial markets), the promotion of incentives, de-monopolization (particularly of foreign trade) and integration into the international economy. (See COMPETITIVE MARKET, MONOPOLY)

perfect competition. A MARKET STRUCTURE is perfectly competitive if the following conditions hold; with an insubstantial share of the MARKET. These firms produce a HOMOGENEOUS PRODUCT using identical production PROCESSES and possess PERFECT INFORMATION.

It is also the case that there is FREE ENTRY to the industry, that is new firms can and will enter the industry if they observe that greater than NORMAL PROFITS are being earned. The effect of this free entry is to push the demand curve facing each firm downwards until each firm earns only normal profits, at which point there is no further incentive for new entrants to come into the industry. Moreover, since each firm produces a homogeneous product, it cannot raise its price without losing all of its market to its competitors. Thus the demand curve facing each firm in the LONG RUN will be horizontal and tangential to the minimum point of the long-run average cost curve < the firm, is shown in the diagram.
Such conditions imply that both MARGINAL REVENUE and AVERAGE REVENUE are equal to price. Thus firms are PRICE TAKERS and can sell as much as they are capable of producing at the prevailing market price. Given u-SHAPED COST CURVES a unique SHORT RUN profit maximizing level of output exists where MARGINAL COST equals marginal revenue with marginal costs increasing at this point. Since the demand curve facing each firm is horizontal this condition implies that marginal cost equals price.

In the short run the profit maximizing condition can be satisfied at an output level such that AVERAGE COST lies above, equal to or below average revenue, so that losses, NORMAL PROFITS or SUPER-NORMAL PROFITS can be achieved. Free entry and exit ensure that the long run EQUILIBRIUM output level is such that each surviving firm earns normal profits, with price equal to the minimum average cost of production. (See PROFIT MAXIMIZATION.)

perfect information. The possession by MARKET participants in a competitive economy of complete knowledge and foresight with regard to the array of present and future prices as well as the location of goods and services. Any divergence from such circumstances can be regarded as a state of imperfect information and is commonly cited as a source of MARKET IMPERFECTION. (See ASYMMETRIC INFORMATION.)

perfect markets. See PERFECT COMPETITION.

permanent consumption. The average level of consumption that the individual or household plans to carry out over a period of years. (See PERMANENT INCOME HYPOTHESIS.)

permanent income. (also known as normal income and average expected income) The average income that the individual or household expects to receive over a period of years while retaining his wealth intact. (See PERMANENT INCOME HYPOTHESIS.)

permanent income hypothesis. The hypothesis that the consumption of the individual (or household) depends on his (or its) PERMANENT INCOME. Permanent income may be thought of as the income an individual expects to derive from his work and his holdings of wealth during his lifetime. The hypothesis suggests that the individual consumes a constant proportion of the present value of the income flow from his work and wealth while maintaining his holdings of wealth intact. It is most significantly in this latter respect that it differs from the LIFE-CYCLE HYPOTHESIS. This theory, proposed by M. FRIEDMAN in A Theory of the Consumption Function (Princeton University Press, Princeton, NJ, 1957), attempts to explain the empirical evidence on the specification of the CONSUMPTION FUNCTION by hypothesizing that individuals consume a constant proportion of their PERMANENT INCOME. In practice it suggests the actual income they receive in any period, their measured income, can differ from this and this discrepancy accounts for the conflicting evidence on the form of the consumption function.

Both measured income and measured consumption, the theory suggests, contain a permanent and a transitory element. Permanent income and consumption constitute the anticipated and planned elements of income and consumption respectively, while the transitory elements are the WINDFALL GAINS or losses of income and the unanticipated changes in consumption. Over the long-run individuals will consume a constant proportion of their permanent income, which the theory suggests is proxied by measured income and this therefore explains the empirical evidence on the specification of the LONG-RUN CONSUMPTION FUNCTION.

In contrast to the long-run a large number of households will be experiencing a negative transitory component of income over the TRADE CYCLE and since their consumption is related to their permanent income their average propensity to consume will increase thus giving rise to the SHORT-RUN CONSUMPTION FUNCTION revealed by the evidence. Similarly cross-section evidence will reveal that among the group with the highest measured incomes there are a greater than average proportion of individuals with positive transitory components and therefore a low average propensity to consume, while conversely at the lowest income levels there will be a greater than average proportion of those with negative transitory incomes. Since individuals seek to consume a constant
proportion of only their permanent incomes the result of a windfall gain or loss is to leave consumption unchanged. Only savings will increase/decrease and there will be as a result a corresponding fall/rise, in their average propensity to consume out of measured income as suggested by evidence on the CROSS-SECTION CONSUMPTION FUNCTION.

Both the notion of consumption and the estimation of values for permanent income and consumption raise severe problems with this approach. The purchase of consumer durables, the theory suggests, represents investment by the household and only the flow of services from these enters consumption. It is of course, extremely difficult to obtain measures of the true value of these services as it is in practice to distinguish between the transitory and permanent components of an individual's income. (See RELATIVE INCOME HYPOTHESIS, LIFE-CYCLE HYPOTHESIS, ABSOLUTE INCOME HYPOTHESIS.)

perpetuity. See ANNUITY.

personal income. The flow of income that accrues to the individual or household. The income may be a result of the sale of his labour and/or his ownership of assets or it may take the form of a TRANSFER INCOME. In the US personal income excludes corporate profits taxes, corporate retained earnings, net interest payments by business, and social insurance taxes since these are parts of NATIONAL INCOME which do not flow to persons. There are also some sources of household income which do not arise from directly productive activity such as government and business transfer payments and personal interest income. These must be added to determine 'personal income'. Some conventions are used to separate national income from personal income. For example, profits of unincorporated businesses (i.e. partnerships and sole proprietorships) are assumed to flow to the owners and are thus treated as personal income even though in practice such profits may be 'retained' and reinvested in the business in the same way that some corporate profits are retained.

Personal loan. Type of loan made by banks and certain other financial institutions to personal (i.e. non-business) borrowers, for the purchase of consumer goods and so on, and regular amounts spread over a period. borrower's account is credited with amounts of the loan at the outset. interest payable is calculated on amount of the loan.

personal rate of substitution. See MARGINAL RATE OF SUBSTITUTION.

personal saving. That part of income which is neither paid out in spent on goods and services (consumption).

defensive migration. Migration of individuals, particularly workers, from relatively good economic performance areas of poorer economic performance. Economists usually explain movement from one area to another in response to improved employment or higher income levels in the areas. However, in reality a certain degree of movement is observed to take place to low income areas and high unemployment areas. This is perverse migration. Such movement is explained in terms of the influence of economic factors such as physical movement. Alternatively, one can argue that perverse migration consists of pointed migrants returning to their areas. This latter movement is a 'return migration'.

PESC See PUBLIC EXPENDITURE SURVEY CO

petroleum revenue tax (PRT). Special tax levied by the UK government on the income from exploiting North Sea oil and gas. It is in addition to the CORPORATION TAX. It is levied on the field when the tax was introduced in the form of capital expenditure available per cent first-year basis. The oil was the value of 10 million tons of field with no more than the value of oil being allowed in any one year. was not allowed as a deduction.
tax was set at 45 per cent and it is levied on a field-by-field basis. Further special allowances are the safeguard and tapering provisions. The first states that in any year when gross profits are less than 30 per cent of accumulated capital expenditure PRT becomes zero. The second states that in any one year the maximum amount of PRT payable is 80 per cent of the excess of gross profit above 30 per cent of accumulated capital expenditure.

Numerous changes have been made to the tax since its introduction. In 1979 the rate was increased to 60 per cent, the capital expenditure allowance reduced to 135 per cent, and the oil allowance cut to 5 million tonnes with no more than a half million tonnes being allowed in any one year. In 1980 the rate was raised to 70 per cent. In 1981 the extra 35 per cent allowance was restricted to expenditure prior to field payback. The safeguard provisions became applicable only with one and a half times the payback period. In 1982 the rate was increased to 75 per cent and an advance PRT introduced. In 1983 exploration relief was permitted against PRT from all fields, and the advance PRT was set to be phased out by the end of 1986. As an incentive to field development the oil allowance was increased to 10 million tonnes on new fields. The tax take is now considerably lower on new fields than on old ones.

In 1988 for new onshore fields and those in the Southern Basin the royalty was abolished and the volume allowance reduced to the equivalent of 2.5 million tonnes with no more than 250,000 tonnes being available in any one year.

Phillips curve. The statistical observation by A.W. Phillips (1958) that there was an inverse relationship between the rate of change of money WAGE RATES and the UNEMPLOYMENT RATE in the UK over the period 1861-1957. That is:

$$AW_i = f(U_i)$$

where $\Delta W$ is the change in money wage rates and $U$ the unemployment rate in period $t$.

Prior to 1948 wages were flexible in both an upward and downward direction and therefore the Phillips curve, illustrated below, intercepted the horizontal axis at a rate of unemployment in excess of 6 per cent. In the postwar period however money and wages proved to be inflexible in a downward direction and as a result the curve for this period lies above the horizontal axis. From the other axis it is clear that there will always be some rate of unemployment whatever the rate of wage inflation.

A theoretical underpinning for this statistical association was later provided by Lipsey (1960) who suggested that the rate of money wage change would be a function of the degree of excess demand in the labour market: the unemployment rate was to be interpreted as a (negative) index of excess demand in the labour market. The Phillips curve was interpreted by many to mean that there was a long-run TRADE-OFF between the rates of WAGE INFLATION and the level of unemployment. Phillips calculations seemed to suggest that stable prices would be ensured by running the economy at an unemployment rate of about 2.5 per cent. At this level of unemployment money wages would rise by 2 per cent per annum but since this would be just offset by the rate of growth of PRODUCTIVITY there would be no inflation of the general price level.

The fundamental weakness of the Phillips curve is seen by many to be its emphasis on money wages. Critics would argue that it is the real wage which is the subject of the wage bargain. Consequently any trade-off between money wages and unemployment
can only be a short-run phenomenon, due either to the costs of adjustment for the parties to the wage bargains, or to the existence of MONEY ILLUSION on the part of wage earners. In the long run money illusion will disappear and no trade-off will exist. (See VERTICAL PHILLIPS CURVE, AUGMENTED PHILIPS CURVE, INSIDER-OUTSIDER MODELS.)

**physiocrats.** A school of economic theory which developed in France in the eighteenth century. Associated principally with the names of F. QUESNAY and Turgot. They criticized the MERCANTILIST belief that wealth was created in exchange and gave production pride of place in its creation. They identified the surplus over the resources used up in production as the source of accumulation. The surplus, or 'produit net' was a surplus of material wealth produced by labour in conjunction with land.

Their analysis was limited by this concentration on agriculture which they identified as the source of all wealth. They were proponents of LAISSEZ-FAIRE and opposed all government intervention in industry especially taxation which was seen as an indirect (and therefore inefficient) tax on land. A single tax on land was the practical policy guide of this school. The chief concept of their system was a belief in the natural order which incorporated NATURAL LAWS embodying the right to enjoy the benefits of freedom to follow self-interest. As a criticism of the Mercantilists and an anticipation of UTILITARIANISM, the physiocrats undoubtedly influenced CLASSICAL ECONOMICS and especially Adam SMITH. (See MERCANTILISM.)

**piece rates.** See COMPENSATION RULES.

**piecework.** A system of payment under which the individual is paid according to the volume of output he produces. It is a specific form of PAYMENT-BY-RESULTS relating specifically to the individual's output. (See INCENTIVE PAYMENT SYSTEMS, COMPENSATION RULES.)

**Pigou, Arthur Cecil** (1877-1959). English economist, he succeeded Alfred MARSHALL to the Chair of Political Economy at Cambridge in 1908. He retired in 1944. Pigou extended the work of Marshall, especially the analysis of increasing and decreasing cost industries. He discarded the doctrine of CONSUMER'S and PRODUCER'S PLUS and analysed the welfare effects of increasing COST INDUSTRIES subsidizing DECREASING COST INDUSTRIES. Such a policy Pigou said would increase fare by ensuring that the marginal cost of producing an increment of consuming would be equalized across industries. Distinction between private and social and his proposed taxation remedy formed the basis for the theory of EXTERNALITIES and his method for their elimination has become known as a PIGOVIAN TAX.

In contrast to the Paretian welfare economics which has become popular, Pigou analyzed interpersonal comparisons of utility to practical policy judgements. Pigou used analysis to justify a transfer of wealth from the rich to the poor. He argued that redistribution would not decrease income, and marginal utility is a decreasing function of income. Transfer of wealth from the rich to the poor would increase total welfare.

His work on monetary theory and national income which includes Theory of Employment (1933) and Employment and Earnings (1941) was essentially a CLAS theory of employment and income. Thus suffered the brunt of J.M. Keynes' attack on this system. Pigou did offer a mechanism for the attainment of full employment even within the Keynesian framework. This is known as the PIGOU EFFECT. Conditions of less than full employment and prices will increase the value of balances held. This causes an increase in demand for commodities and consequently an increase in employment. The significance of this mechanism is even today subject to some debate.

Pigou was a prolific writer and his major works include: Principles of Industrial Peace (1905); V and Welfare (1912); Unemployment (1920); Essai Applied Economics (1923); Industrial Conditions (1927); Economics of Stall States (1935); and Lapses from Full Employment (1945).

**Pigou effect.** See REAL BALANCE EFFECT.

**Pigovian tax.** A tax levied on the pro of an EXTERNALITY in such a way...
after the tax has been introduced the private costs as perceived by the externality-generating party, are equal to the SOCIAL COSTS of the activity.

pivot effect hypothesis. The argument that INCOMES POLICY not only creates SHIFT EFFECTS in the wage adjustment process but may also change the slope of the Phillips curve or, more technically, the magnitude of response of the rate of change in wages to its determinants.

placing. A method of making a new issue of SECURITIES, EQUITIES or DEBENTURES, by which the securities are first acquired by an ISSUING HOUSE, and then 'placed' with, i.e. sold by private arrangement to, institutions, private investors, and also JOBBERS on the London STOCK EXCHANGE. In the case of securities for which a quotation is sought, the STOCK EXCHANGE imposes certain restrictions on placings, e.g. as to maximum size. Unquoted securities may be the subject of 'private placings'. (See NEW ISSUES MARKET.)

planned economy. An economy where crucial economic processes are determined to a large extent not by market forces, but by an economic planning body which implements society's major economic goals. In such a system the greater part of production activity is determined by obligatory input and output targets generated by vertical signals from an administrative hierarchical body. The advantages of such a system over the pure MARKET ECONOMY include the reduction of unco-ordinated economic activity which may lead to an inefficient utilization of available resources and the production of undesirable commodities. A planned economy may be able to solve the problems of unemployment and idle capacity, and reduce the creation of pollution and over-differentiation of products. A planned underdeveloped economy may experience faster growth than would be the case if it were not able to concentrate resources in certain key sectors and insulate itself from world market forces.

On the other hand a centralized planning system may lead to inefficiencies in resource allocation generated by the necessity of coordinating the large number of components of plans in action and the independent decision makers at each level of the economic process. The rigidities and inertia in the system may be exacerbated by the large organizations required and the consequent element of BUREAUCRACY. Manifestations of such tendencies may be the existence of persistent shortages of some goods combined with surpluses of others. Even with proper and efficient co-ordination, planning may still be insensitive to the wishes of consumers.

Various forms of socialist planned economies exist or have existed in the former COMECON countries, China, and elsewhere. They ranged from the highly centralized bureaucratic model of the USSR to a planning model which reduces the role of the planner to determining certain key proportions in the economy. In the latter case the planner may be only concerned with the proportion of national income going to consumption and investment or the distribution of investment between industries. The former model relied on a system of planning and management by directives on physical inputs used and physical outputs produced determined by a national plan based on the BALANCE PRINCIPLE. The more decentralized models use the market mechanism to allocate resources, to a large extent relying on a substantial private sector. Often called MARKET SOCIALISM the state reserves the right to control prices and the level of investment by means of monetary and fiscal policy.

The problem of centralized planning and particularly the satisfaction of consumer preferences resulted in two new approaches to planning in the former COMECON countries. First, the more extensive use of computer aided planning or PLANOMETRICS; and second, the use of decentralized market forces and price signals to allow flexibility into the process while at the same time maintaining the essence of state socialism - control over the means of production and distribution. The revolutions in Eastern Europe in the late 1980s and early 1990s arose partly from a lack of political and other freedoms but also from the dissatisfaction with the failure of the planned systems to deliver goods. The result in most economies has been a move to adopting capitalist institutions and methods so that privatization, the use of the market and prices, deregulation and liberalization have been
accepted in varying degrees. In the mixed market economies in the West the public sector has been cut in size, so that the degree of planning has also been reduced. See Cave, M. and Hare, P., Alternative Approaches to Economic Planning, Macmillan, London (1981). (See CONVERGENCE THESIS, SLACK PLAN, PERESTROIKA.)

planning programming budgeting system (PPBS). See OUTPUT BUDGETING.

planometrics. A branch of economics specifically concerned with the construction of optimal macroeconomic plans. L.V. KANTOROVICH has been one of the pioneers in this area using sophisticated mathematical techniques to demonstrate the possibility of efficient central planning using programming prices of 'objectively determined valuations'. (See PLANNED ECONOMY.)

plant bargaining. COLLECTIVE BARGAINING between a single employer from a single plant and employees' representatives to establish rates of pay and conditions of work in that plant. Such agreements may either be a supplement to or a substitute for NATIONAL BARGAINING. (See COMPANY BARGAINING.)

Plato (427-347 BC). Greek philosopher, who in reaction to the troubled times in which he lived, and for which he held economic growth to be partially responsible, proposed that the ideal state should be a stationary one based on a caste system, with the ruling class practising a communistic way of life. His economic achievements included an analysis of the division of labour and of the role of token money.

plurality rule. A system of COLLECTIVE CHOICE in which the alternative ranked first by the greatest number of voters is chosen. This system is commonly used in government election and other areas of collective choice, but is subject to the criticism that it considers only each individual's 'first' preferences and does not pay attention to individual preferences between all of the alternatives. (See APPROVAL VOTING, BORDA COUNT, CONDORCET CRITERION, MAJORITY RULE, SOCIAL DECISION RULE.)

point elasticity of demand. See PRICE ELASTICITY OF DEMAND.

point estimation. The ESTIMATION of the actual value of a PARAMETER, as distinct from INTERVAL ESTIMATION, which involves the calculation of (usually) CONFIDENCE INTERVALS for the true parameter value.

point of inflexion. A point on a graph, of a function where the rate of change of the slope of the function changes sign (either from positive to negative, or vice versa). This is indicated where the second DERIVATIVE of the function is equal to zero.

point utility possibility curve. A point utility possibility curve may be drawn for each bundle of goods. The curve shows the combinations of individual utility LEVELS by varying the distribution of the bundle of good, between the individuals. The possible distributions of two different bundles of goods i and j are shown in the diagram. (See SITUATION UTILITY POSSIBILITY FRONTIER.)

point voting. A system of COLLECTIVE CHOICE in which each individual begins with an equal number of 'points' which he is free to distribute in any way he chooses between the alternative choices on the various issue;
discussed. Thus an individual might divide his points equally between all of the alternatives he favoured or concentrate his points on some highly important choice. This system bears some resemblance to the system of 'vote trading' known as LOGROLLING. (See APPROVAL VOTING, BORDA COUNT, CONDORCET CRITERION, MAJORITY VOTING, PLURALITY RULE, SOCIAL DECISION RULE.)

**Policy instruments.** Economic and social variables which are manipulated by the government to influence policy variables. Frequently referred to solely as instruments we may distinguish four main economic categories: FISCAL POLICY; MONETARY POLICY; EXCHANGE RATE POLICY and most recently the direct control of PRICES and INCOMES POLICY. It ought also to be noted that governments seek to influence policy variables by attempting social and institutional reforms. For example, they may attempt to reform the institution of wage bargaining believing that this may reduce wage inflation.

**Policy-off.** Periods of 'free collective bargaining'. Periods in which no INCOMES POLICY operates. While conceptually straightforward in practice there is little agreement on precisely which periods in recent UK history may be considered periods of free collective bargaining.

**Policy-on.** Periods in which an INCOMES POLICY is in operation.

**Policy targets.**

See TARGETS.

**Political economy.** Until recent times the common name for the study of the economic process. The term has connotations of the interrelationship between the practical aspects of political action and the pure theory of economics. It is sometimes argued that classical political economy was concerned more with this aspect of the economy and that modern economists have tended to be more restricted in the range of their studies.

**Poll tax.** A lump sum tax whose payment is not related to income or expenditure. It is commonly argued that this type of tax is efficient because it produces no distortive effects on the taxpayer's behaviour. He behaves exactly as he would do if his income were reduced by the amount of the tax through market forces. It is obviously REGRESSIVE and not suitable on EQUITY grounds. It was commonly employed by colonial governments in Africa as a device to collect revenue from Africans. It was also used as a device to force peasants to work on plantations and mines to earn cash income to pay the tax. In this case an incentive effect was at work. The poll tax was transplanted to the American colonies from England in the 17th century. After the American Civil War the tax was largely used by Southern states as a means to allocate voting privilege. Its highly regressive character had a large impact on poor Blacks in the South, greatly reducing their participation in elections. The 24th amendment to the US Constitution in 1964 outlawed the use of the poll tax as a prerequisite for voting in Federal elections. In 1966 the US Supreme Court declared poll taxes in Virginia, Mississippi, Alabama, and Texas unconstitutional as prerequisites for voting in **any** election. A form of poll tax known as the community charge was introduced in the UK in the late 1980s.

**Polluter pays principle.** The idea that the polluter should pay for polluting the environment. As enunciated by the ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, the principle is consistent with (1) a PIGOVIAN TAX, (2) any tax or charge on polluters which encourages them to install measures to abate pollution, whether to the 'optimal' level or not. In narrower terms it is usually thought of as a (Pigovian) tax which is just equal to the MARGINAL DAMAGE COST at the OPTIMAL LEVEL OF POLLUTION. (See INTERNALISATION.)

**Pollution.** An activity which impairs the quality of one or more receiving environments. In biological terms pollution is said to occur when some metabolic change is observed in animal or other populations and which would not have occurred otherwise. In economics, however, pollution is only significant when the UTILITY of one or more individuals is reduced by the pollutants in question.
population policy. The idea that certificates should be issued which give the owner a 'right to pollute' in a given environment, say a river. The object would be for potential polluters (or, for that matter, conservationists) to buy the certificates. This they will do as long as the price of a certificate allowing them to 'emit' a given amount of pollution is less than the ABATEMENT COST for that amount of pollution - i.e. the cost of avoiding the pollution in the first place. The total supply of certificates will be fixed by some authority, say an environmental agency. If the agency wishes to raise the environmental standard it can buy certificates itself, or restrict their supply, thus raising the price and making it more profitable for polluters to install abatement equipment. In the same way, conservationists can buy the certificates, thus restricting supply and raising the price. Again, environmental quality would be improved. For details see J.H. Dales, *Pollution, Property and Prices* (Toronto, 1968).

polynomial. An equation by which, in general, several terms in an INDEPENDENT VARIABLE are raised to various powers. The degree of the polynomial is the highest power to which the independent variable is raised. Thus a third degree polynomial is

\[ Y = a + bX + cX^2 + dX^3 \]

i.e. a CUBIC equation.

polynomial lag. See ALMON LAG.

pooled data. Data of this type are formed when (a) CROSS SECTION and (b) TIME SERIES DATA are merged into the same data set, usually when there is not sufficient data of type (a) or (b) alone, to estimate the PARAMETERS of a model due to insufficient DEGREES OF FREEDOM.

Population.

1. In a statistical sense, the entire set of objects about which we require information, i.e. with which we are dealing. This can include population in the demographic sense, but it can also mean, for instance all of the cars in the UK, or all of the light bulbs in a city. A sample is a subset of its 'parent' Population.

2. The total number of people who live in a specific area, such as a particular country or a town or city.

population explosion. The name given to the ever increasing growth rates of population in the world, especially in DEVELOPING COUNTRIES. Population grew fairly slowly until about 1800 when it has been estimated there were just over 1 billion people in the world as a whole. However, by 1930 it had doubled to 2 billion and projections of 8 billion by the year 2000 were forecast and much publicized, with many expressing doubts as to whether the world could support such a level. In 1988 the world population was calculated to be 5.1 billion with an estimated growth rate of 1.7 per cent per year between 1985-90, a rate lower than that that of the 1970s. The growth rates vary between regions, being greatest in less developed areas and least in developed regions; between 1985 and 1990 while the growth rate was highest in Africa at 3.0 per cent it was least in Western Europe at 0.1 per cent.

Various reasons are advanced to account for the decline in growth rates, including increasing affluence on the one hand and rising costs of living on the other: both may cause people to have smaller families. In addition, the increasing emancipation of women who pursue careers for longer before having children leads them to have smaller families in order to continue with their careers. In less developed countries where growth rates have been highest, family planning programmes are beginning to be successful. The problem remains formidable, however, and is perhaps the most serious obstacle to world economic development. (See POPULATION POLICY.)

population policy. A government may set up a specific policy in respect of the level of the population it governs. This is more common in developing countries where the ratio of population to necessary resources for survival causes much concern. Policy measures which are usually designed to control the increase of the population usually involve education programmes on the subject of birth-control, widespread advertising, marketing and distribution of contraceptives, and offering free sterilization operations. The problem can also be tackled from a social angle, i.e. raising the minimum age of
marriage and raising the economic status of women. However it seems that one of the most effective methods of population control is increasing affluence as birthrates tend to decline as incomes increase. (See POPULATION TRAP.)

**population trap.** (also known as 'low level equilibrium trap') An economy with a very low level of income per head may well find that the rate of growth of population exceeds the rate of growth of real income. If so, this is equivalent to saying that the real income per head will decline. Only where the income growth exceeds the population growth can real incomes per head actually increase. In the diagram, the rate of growth of income is greater than the rate of growth of population up to point \( T \), but after \( T \) the situation is reversed and incomes grow less fast than population. As such the economy moves back to point \( T \) as per capita incomes decline. Efforts to move away from \( T \) as per capita incomes decline. Efforts to move away from \( T \) are thus doomed to failure because of the effect on population growth being more pronounced than the income growth. \( T \) is thus the 'low level equilibrium' or the 'population trap' from which the economy cannot initially escape. Only if it is possible to 'jump' to point \( K \) can the process of raising per capita incomes on a sustained basis be achieved. This suggests either measures of control over birth rates in the developing economy, or a means of shifting the growth of income curve upwards. The latter might be achieved by technical progress. A combination of fertility control and technical change is obviously a safer policy still. Empirical evidence for the existence of population traps is not substantial.

**portfolio.** The set of assets held by an individual or institution. It generally refers to financial (including monetary) assets, but there is in principle no need to regard it as excluding real assets.

**portfolio balance approach.** An approach to monetary analysis which emphasizes the significance of decisions by asset-holders about the composition of their PORTFOLIOS. One major variant of this approach postulates that while all holders require some diversity in their assets, they differ for personal or institutional reasons in their basic preferences between different types of assets - e.g. between long-term and short-term, fixed yield and variable yield assets. However it is assumed that at least some holders can be tempted to substitute some less preferred for some more preferred assets by the incentive of an increased differential return on the former. Expectational effects complicate the analysis, but leaving these aside, such a model offers one explanation of the structure of INTEREST RATES, and provides the monetary authorities with a working hypothesis for operating on interest rates, either to influence capital investment or to control the growth of the money supply. The approach, which descends directly from KEYNES' *General Theory*, has been developed most extensively by the 'Yale School' of economists, led by Professor James Tobin. However, a portfolio balance model is a common theoretical basis of the main competing schools of monetary thought, monetarist and non-monetarist (see MONETARISM.) The differences between them are empirical, e.g. in their assumptions about the substitutability between money and other assets in asset-holders' portfolios.

**portfolio balance approach to the balance of payments/exchange rate.** A variant of the monetary approach to the BALANCE OF PAYMENTS, which assumes that assets are imperfect substitutes. This has important implications for the effectiveness of
MONETARY and FISCAL POLICY. (See INTERNATIONAL MONETARISM.)

portfolio diversification.
See DIVERSIFIER.

positional good. A term introduced by F. Hirsch in *The Social Limits to Growth* (1976) to denote a good which is limited in absolute availability either naturally or through social considerations and which is subject to congestion, if used more extensively. ECONOMIC GROWTH can supply more material goods, but it cannot increase, and may even diminish by its effect on the environment, the quantity of positional goods such as a beautiful view or a fishing beat. Economic growth increases the demand for positional goods, but only raises their relative price. Social considerations also set a limit to positional jobs. There can only be a limited number of top jobs, despite the increase in numbers and qualifications of those contending for such positions. The limited supply of positional goods and jobs often leads to disillusionment with economic growth.

positive economics. That part of economic science which concerns itself with statements that are capable of verification by reference to the facts. In principle, all positive statements should be reducible to some form which is testable by reference to empirical evidence. As a doctrine, positivists would argue that economic science does not and should not encompass statements that involve VALUE JUDGEMENTS, i.e. statements of the form 'X is good (bad)'. Such would be the province of NORMATIVE ECONOMICS and positivists would argue that economists as economists cannot pronounce on normative issues. Critics of the positivist school of thought point to (a) the fact that POSITIVISM as a philosophy is outdated and not widely embraced by modern philosophers; (b) that concepts such as ECONOMIC EFFICIENCY would seem to have no meaning unless it is possible to say what is meant by the 'best' allocation of resources (a normative issue) and (c) that positivism as a doctrine itself requires a normative judgement to the effect that normative judgements should not be made. As an economic philosophy, positivism also tends to be associated with the view that the predictive power of economics is independent of the validity of the assumptions made in the construction of an economic model. I is, if the model predicts accurately it does not matter whether the assumptions thought to be 'true' or 'realistic'.

positivism. The philosophical doctrine declares statements that are not verifiable reference to empirical evidence to be at least inadmissible as part of science or, at an extreme, without meaning. (See POSITIVE ECONOMICS.)

post-Keynesian economics. A loose grouping of economists who regard the insight: J.M. KEYNES and M. KALECKI as the start point for both a critique of conventional equilibrium analysis and a basis for a r macroeconomics.

Among the major figures in this school have been Joan ROBINSON and P. Davidson who stress the dynamic nature an economy which uses money and which is subject to uncertainty. The nature of time such that markets do not always clear. Individuals in those markets do not always receive the correct signals to encourage optimal behaviour.

Post-Keynesian economists emphasise the institutional setting of the economy and social relationships therein. Following the CLASSICAL tradition they provide a theory of investment based on the differing propensities save between the two stylised classes in society determine overall profits. This summed up in Kalecki's epithet 'the capitalist get what they spend, and the worker spend what they get'.

A given level of profit can be obtained by adjusting the mark-up over prime cost of oligopolistic industry and it follows that employment is then not determined by wage levels. Rather the level of aggregate demand determines employment. This is a clear departure from Keynesian thought and is a critique of the neoclassical notion of a lab market with a single price established equilibrium.

Some post-Keynesian writers have placed less stress on short-run dynamics and concentrated on the conditions under which...
economy would achieve steady state growth. Following the lead of P. SRAFFA writers such as Garegnani examine the long run tendencies of a capitalist economy to share the surplus product between labour and capital and the contradictions which that involves. These contradictions create the uncertainty which prevent an economy growing at a steady state with expectations continually fulfilled.

Post-Keynesian economics, although not a complete coherent body of theory, presents a challenge to the orthodox approach to equilibrium theories of price, employment and economic growth.

**posterior distribution.** That probability distribution for a variable or STATISTIC which results from the combination of the PRIOR DISTRIBUTION with sample information in BAYESIAN TECHNIQUES.

**postwar credits.** A form of compulsory saving introduced in the UK during the Second World War, in the 1941 budget. The idea was suggested by KEYNES in his 1940 pamphlet, 'How to Pay for the War'; he saw it as a way of spreading the consumption, inevitably postponed during wartime, equitably among all classes, and as a potential stimulus to expenditure in a postwar slump. But the scheme was introduced on a much smaller scale than Keynes had wanted, and played only a minor part in war finance.

**potential entry.** For a particular industry, the possibility of new competition from firms who are not currently producing competing products. The inducement to entry is the potential profit to be earned subsequent to entry. For established firms potential entry is a threat to their future stream of profits, and this can be expected to influence their conduct over such policy variables as pricing and output. (See LIMIT PRICING.)

**potential national income.**

*See FULL EMPLOYMENT NATIONAL INCOME.*

**potential output.** The maximum feasible output of a firm, industry, sector of an economy or economy as a whole, given its FACTOR ENDOWMENTS. The difference between actual and potential output will therefore be EXCESS CAPACITY.

**potential Pareto improvement.** A potential Pareto improvement exists when the gainers from a change are hypothetically able to compensate those who lose, so that it is possible for no-one to be any worse off after the change and for at least one person to be better off. (See also COMPENSATION TESTS, PARETO IMPROVEMENT.)

**poverty.** Poverty can be viewed as an absolute or a relative concept. The absolute poverty approach defines minimum levels of income required to sustain life: for example, estimating minimum dietary needs and how these can be most cheaply met. The relative poverty approach defines poverty relative to appropriate comparator groups. Thus while an individual may have more than enough income to sustain life, if it is very low compared to the rest of the community the individual would be viewed as being in poverty. As a society grows richer so the income level defining poverty rises.

**poverty trap.** The existence of many important MEANS-TESTED BENEFITS means that the low paid can face an effective marginal tax rate - i.e. the rate of tax on an extra unit of income - far in excess of the 34 per cent rate of INCOME TAX and NATIONAL INSURANCE contributions faced by most employees. As earnings rise entitlement to benefit is either reduced or removed altogether, according to income level and often also family size. Thus it is quite possible for a low paid worker to face an effective marginal tax rate of over 100 per cent, and quite common for him to suffer an overall effective deduction of over 50 per cent of a pay rise. The range of incomes over which this happens defines the 'poverty trap'.

**power function.** A function in which the INDEPENDENT VARIABLE is raised to some power, for instance

\[ Y = aX^n \]

where \(a\) and \(n\) are constants.

**Prais-Winsten.** Prais-Winsten transformation is used in a modified COCHRANE ORCUTT method of estimating the parameters of an equation whose residuals are subject to SERIAL CORRELATION.

With this transformation and first order
autocorrelation the first observation is included even though its partial first difference with the previous observation is unavailable by applying to it the weight
\[\sqrt{1 - \hat{\rho}^2}\]
where \(\hat{\rho}\) is the estimated autocorrelation coefficient. Thus the original number of observations is retained. Including the first observation in this way can have large effects on the estimated parameters of TIME SERIES models.

Prebisch thesis. The proposition that technical progress in the developed countries results in higher wages and improvements in the standard of living for the workforce but not in lower prices for the goods produced (some of which are exported to DEVELOPING COUNTRIES). In developing countries technical progress does not lead to improved real wages but to lower prices. In particular the prices of exported goods declines in relation to the prices of imported goods from the advanced countries: the TERMS OF TRADE move against the developing countries. It is argued that the benefits of technical progress are transferred to the developed countries. Prebisch proposed that developing countries should industrialize via PROTECTION and IMPORT SUBSTITUTION. Prebisch argues that trade unions in developed countries raise wages for their workers while in developing countries they are quite weak. Rapid population growth helps to keep down the growth of wages as well. In the advanced countries there is a comparatively low INCOME-ELASTICITY OF DEMAND for exports of developing countries while in the latter there is a high income-elasticity of demand for products produced in advanced countries. Developing countries are liable to experience continuing BALANCE OF PAYMENTS problems.

Other economists have questioned the basis of the thesis on both theoretical and empirical grounds. Empirically, the choice of the base period is vital in deciding whether the terms of trade have in fact moved against developing countries. Discussions regarding this matter have tended to be inconclusive because of the Problem of choice of base period and the nature of the data. The idea that the gains of technical progress should be distributed equally is a VALUE JUDGEMENT, and it has been pointed out that there are many factors such as economic and political barriers to trade which prevent FACT EQUALIZATION and tendencies to globalization of real wages.

precautionary motive. One of the reasons for holding MONEY, i.e. as a precaution against some unforeseen circumstance occurring which would otherwise necessitate transferring wealth from some other form which may incur high transaction costs or may take too long. (See MONEY, MAND FOR, KEYNES.)

precautionary unemployment. Known as 'wait unemployment') An unemployment that arises when the nature of the job sought is not that of a labour contract previously held, an employee who takes a job taking another job at a higher rate of wages comes along later. Under these circumstances employees may refuse the offer and wait for one at the expected to be offered. (See SPECULATIVE UNEMPLOYMENT, UNEMPLOYMENT.)

predatory pricing. The practice of lowering prices down to unprofitable level in order to weaken or eliminate competitors. The practice would be characteristic of the behavior of large multiproduct and/or multimarket firms that can sustain protracted price cuts in one line of products or in a rigid competition by offsetting the loss of profits expected once rivals have been nated or weakened. (See also LIMIT PRICING.)

prediction. See FORECASTING.

pre-emption rights. Rights given to ordinary shareholders to purchase new ordinary shares on a pro-rata basis. For example, a shareholder may have to purchase one new share for every 4 ordinary shares presently held.

preference. A statement that on the event or project is preferred to one or other goods etc. A preference for then an ORDERING of such preferences...
individual prefers X to Y, we can say that the utility he derives from X is greater than that from Y.

preference revelation. Preference revelation is frequently cited as a problem associated with the provision of public goods. (It can also be a problem with private goods if the number of demanders is very small.) If it is impossible or very costly to practise exclusion, it is not possible to use a price to determine willingness-to-pay for the good. Individuals will have an incentive not to reveal their true preferences for the good. Thus it is generally argued that if the good is to be supplied at all it will require governmental provision. However, the government will have difficulty in determining how much to provide. Conventional use of the political system is unlikely to yield very much information on demand. Economists have recently begun to develop various mechanisms which offer individuals the incentive to engage in accurate preference revelation. (See free-rider.)

preference shares. Shares in a company which rank before the equities but after the debentures, for the payment of dividend. The dividend entitlement is usually a fixed percentage on the nominal value. But there are several varieties of preference shares: some, for example, carry rights to participate in profits when the ordinary shareholders’ dividend reaches a certain level. Preference shares, which normally carry only limited voting rights, were originally designed to appeal to investors looking for a higher return than that offered by debentures, but with more security than equities afford. (See financial capital.)

preferential hiring. An employer giving preference to the hiring of union members although he has not agreed to hire only union members or operate a closed shop. (See agency shop.)

preferred ordinary shares. See financial capital.

premium. Used with various meanings, two of which are:

1. The level above par value of the price of a share.

2. The payments made for an insurance policy, usually on a regular basis, i.e. monthly or annually. (See shares, stock exchange.)

premium savings bonds. A UK savings bond, purchasable at post offices, the return on which is the chance of winning one of a number of money prizes decided by a monthly lottery. The bonds, which were introduced in 1956, are in units of one pound and are redeemable at face value on demand.

present value. The worth of a future stream of returns or costs in terms of their value now. To obtain a present value a discount rate is used to discount these future returns and costs. (See net present value.)

price. The price of a good or input shows what has to be given up in order to obtain a good or service. It is usually denoted in money terms although payment need not be in a monetary form. The relative price is expressed in terms of the quantity of some other good which has to be given up. Thus if all prices increase at the same rate absolute prices will rise but relative prices will remain unchanged.

Price Commission. An independent commission, established by the British government in 1973 to implement the price control policies embodied in the price codes prepared by the treasury and approved by parliament. Until 1979 the commission also had direct anti-trust responsibilities since it considered the promotion of competition and associated questions of market structure and profitability when reviewing proposed price increases. In addition, upon government direction, the commission conducted a series of ‘ad hoc’ studies on, for example, pricing policies in specific industries. The commission was officially abolished in 1980. (See also price control, incomes policy.)

price consumption curve. (also known as an offer curve) The tangency of the consumer’s indifference curve and his budget line determines the consumer’s equilibrium. As the price of one good changes so the budget line ‘pivots’ outwards in commodity space. New equilibria are established.
The locus of such equilibria is the price consumption curve. Typically, the price consumption curve will show the demand for the cheaper good rising as its price falls. If, however, demand falls as a result of the price fall, the price consumption curve will curve back on itself (see diagram). Such a situation will arise if the cheaper good is a GIFFEN GOOD.

![Price consumption curve for Good X if X is a Giffen good](image)

price consumption curves

price control. Generally associated with the fixing of prices by government statutory order. In the UK price controls have been used during wartime where supply difficulties would have led to exceptionally large price increases. By restricting prices considerably below their equilibrium level, a system of rationing becomes necessary. Since the Second World War price controls have been used as part of anti-inflationary policy, though it is widely recognized that these controls are not by themselves a cure for inflationary conditions.

price-cost margin. Empirical measures of the PROFIT MARGIN where accounting data are used and therefore the economic definition of profit cannot be directly observed.

price discrimination. There are two major forms of price discrimination: firstly, the practice employed by firms of charging different prices to different groups of buyers, and secondly, that of charging the same consumer different prices for different units of the same good. In the former, where each group of different price elasticity of demand can, by equalizing the marginal generated by each group, earn a higher price than would be the case if access to the product were to be charged. Precisely the successful operation of this discrimination are (1) the ability to identify different segments of demand, according to price ELASTICITY, and (2) the prevention of resale to those who buy at a lower price. A form of arbitrage would lead to a divergence of prices charged to different buyers.

In the case of the second form of price discrimination, perfect operation involves the firm appropriating the SUMBER SURPLUS that each consumer has got if buying at a constant price would have been achieved by setting the price equal to the maximum amount that the individual would be willing to pay, that individual's demand curve. The firm can discriminate in two ways: (1) the ability to identify different segments of demand, according to price ELASTICITY, and (2) the prevention of reselling to those who buy at a lower price. A form of arbitrage would lead to a divergence of prices charged to different buyers.

Quite clearly, this form of price discrimination requires exact knowledge of the buyer's demand curve and is the employment of anti-inflationary policy, though it is widely recognized that these controls are not by themselves a cure for inflationary conditions.

price/earnings ratio (P/E ratio), of the price of an ORDINARY EARNINGS per ordinary share. Common is the two-part tariff operated by electricity suppliers, where rents only take place after a rent is paid and the right to be supplied. This rent appropriates some of the consumer surplus from intra-marginal consumers.

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taking into account the excess ACT. This is the basis employed by the newspaper the Financial Times.

**price effect.** The change in the demand for a good that comes about because of a change in the price of that good. It is composed of the INCOME EFFECT and the SUBSTITUTION EFFECT. (See SLUTSKY EQUATION.)

**price elasticity of demand.** The responsiveness of the quantity demanded of a good to its own price. To avoid the measure of elasticity being sensitive to the units in which quantities and prices are measured, the elasticity of demand is expressed as the percentage change in demand that occurs in response to a percentage change in price. That is:

\[
\text{Price Elasticity of Demand} = \frac{(\Delta Q_i / Q_i) \cdot 100}{(\Delta P_i / P_i) \cdot 100}
\]

where \( \Delta \) is a symbol for 'change in', \( P_i \) and \( Q_i \) are the price and quantity of good \( i \). If \( \Delta \) is very small the resulting measure is known as the point elasticity of demand. If \( \Delta \) is significantly large the measure obtained is one of the responsiveness of demand to this change in price and is generally known as the arc elasticity of demand. Note that if the LAW OF DEMAND operates, a fall in price will result in a rise in demand, so that \( P_i \) would be negative and \( Q_i \) would be positive. The elasticity estimate would then have a minus in front of it, i.e. a negative sign. In the economic literature this minus sign is often omitted and care should be taken in the event that an elasticity is used in any mathematical manipulation to remember this. Note also that the ratio

\[
\frac{\Delta Q_i}{\Delta P_i}
\]

is the inverse of the slope of the demand curve. The fact that the formula for elasticity has an additional expression indicates that the slope of the demand curve and the elasticity are not the same thing.

**price fixing agreement.** An agreement between two or more producers to sell at predetermined prices, generally for the purpose of exercising market power. In the US, any price fixing agreement that restricts the seller from setting his price individually, or the quantity to be produced, is automatically deemed illegal under the SHERMAN ACT. Price fixing agreements include contracts that:

1. limit output to stabilize prices;
2. set maximum prices to be charged in a market;
3. set uniform discount rates; and
4. set uniform base prices.

(See COLLUSION.)

**price index.** An INDEX NUMBER showing how prices of a ‘bundle’ of goods have changed from one period to the next. Typically, such an index will not be a simple average of prices, but each price will be weighted by the proportion of total expenditure taken up by the good in question. This weighting may vary depending on which period is chosen for the analysis of expenditure. (See PAASCHE PRICE INDEX, LASPEYRES PRICE INDEX.)

**price leadership.** The situation in an industry where one firm takes the initiative in making price changes and the other firms then follow. Three forms of price leadership can be identified: dominant firm, barometric and collusive price leadership. The first, dominant firm price leadership, occurs within industries dominated by one large firm which sets price as a MONOPOLIST after due account is made for supply from the competitive fringe of small firms at each price. This fringe of firms are individually so small as to accept the price set by the dominant firm. Barometric price leadership is distinguished by change in the identity of the leader. Whether or not the price initiative is followed depends upon how closely the change reflects market conditions common to all. Collusive price leadership characterizes oligopolistic markets (see OLIGOPOLY) in which the few established firms have similar market shares as well as demand and cost conditions. With such features price initiatives by any one firm will reflect the wishes of the others, and their implicit acceptance comprises the collusive element of this form of leadership.
price mechanism. Used with reference to the free market system and the way in which prices act as automatic signals which coordinate the actions of individual decision-making units. By means of this role, the price system provides a mechanism whereby changes in demand and supply conditions can affect the ALLOCATIVE EFFICIENCY of resources.

price-push. The name given to a type of INFLATION, similar to cost-push where ENTREPRENEURS are blamed for causing inflation by charging unnecessarily high prices in order to make large PROFITS. (See COST-PUSH INFLATION.)

price revolution. The name given to the influx of gold and silver from the newly discovered countries in America during the fifteenth and sixteenth centuries which caused prices to quadruple. This is considered to be one of the initial causes of the rise of CAPITALISM and beginnings of the industrial revolution in the Western World as these high prices were an incentive for SPECULATION, accumulation of CAPITAL and establishment of new industries.

price setter. A firm operating in a non-competitive market faces a downward-sloping demand curve for its product and thus has some discretion to choose the price at which it sells, rather than having to be a PRICE TAKER.

price specie mechanism. See SPECIE FLOW MECHANISM.

price support scheme. A method of artificially raising the price of a good in the market. This will give rise to a situation in which supply exceeds demand and would therefore normally result in the government agency responsible for the support having to purchase the excess supplies itself. This is the simple explanation for 'commodity mountains', excess supplies of commodities (food, minerals etc.) which result from price support schemes.

price taker. An economic agent whose size is sufficiently insignificant in relation to the size of the market in which it operates, such that its activities can bring no influence to bear on the prevailing market price.

price theory. The theories included in the body of thought can be grouped under three main headings: those concerned with determination of individual prices, those relating to changes in the aggregate price and those applying to the allocation of resources. The price determination theory can be classified by the market structure which they pertain. In a competitive industry, firms act as PRICE TAKERS, i.e. the price at which they can sell their product is determined by the interaction of the marginal DEMAND CURVE and the market SUPPLY curve of which they are an insignificant part. The price mechanism is a large set of theories which apply to competitive markets. These firms' demand curves have a common feature in that they are downward-sloping and thus all firms in principle act as PRICE SETTERS or price makers. The most simple and possibly the most widely used of these is the theory of MONOPOLY, where the profit maximizing monopolist faces the market demand curve. Monopolists are sometimes able to practice PRICE DISCRIMINATION, a variation on the monopoly theme is the case where there is a single buyer - MONOPSONY. When a seller and a single buyer confront another we have a situation of BILATERAL MONOPOLY and the price and output outcome is indeterminate.

There are many hypotheses relating to markets in which there are a small number of firms, termed OLIGOPOLY, of which with two sellers is known as DUOPOLY. The characteristic of oligopolistic markets is that the firms involved recognize mutual interdependence. This can result in the firms forming a collusive oligopoly, by practicing pricing policies such as LIMITING OR ENTRY-FORESTALLING PRICING which are designed to keep other firms out of the market. These industries are frequently characterized by price rigidity, one suggested cause of which is the KINKED DEMAND CURVE. Also, FULL COST PRICING can lead to all firms changing their prices at the same time, when they are faced by common cost increases. In some markets particularly, if there is a dominant firm, PRICE LEADERSHIP emerges. The remaining major market form is that of MONOPOLIST...
COMPETITION where there are many sellers but each seller faces a downward-sloping demand curve for his distinct product. The only macroeconomic aspect of the theory of price is the determination of changes in the aggregate price level. (See INFLATION.)

primary goods. As defined in the theory of justice developed by John Rawls, these goods are the basic rights, freedoms, income and wealth which are available for distribution in a society. Rawls’ concept of DISTRIBUTIVE JUSTICE is framed in terms of the distribution of these goods between individuals. (See RAWLSIAN JUSTICE.)

primary market. Some assets when sold for the first time are not sold in the market in which they are subsequently traded. The latter is called a secondary market, and the former may be termed a primary market. An example is presented by the NEW ISSUES MARKET, which is the primary market, and the STOCK EXCHANGE which is the secondary market for (quoted) SECURITIES.

primary money. Another term for base money or HIGH POWERED MONEY, i.e. the MONEY issued by the monetary authorities.

primary securities. A term introduced by John G. Gurley and Edward S. Shaw in their Money in a Theory of Finance (1960) and signifying all forms of debt, marketable or otherwise, issued by 'ultimate borrowers', i.e. borrowers who require finance to acquire real assets. They are distinguished from 'indirect securities' which are the debt and claims issued by individuals and institutions - notably FINANCIAL INTERMEDIARIES - in order to acquire and hold primary securities.

primary workers. Those individuals who remain in the labour force either as employed or unemployed irrespective of short-run changes in wages and market conditions. Male heads of households are the archetypal primary worker. (See SECONDARY WORKERS.)

principal. The sum of money paid to the holder of a BOND upon MATURITY to extinguish the liability.

principal-agent problem. This refers to the situation in the theory of the firm where the interests of managers and shareholders differ. The principle (i.e. the shareholder) has interests in the performance of the firm but appoints an agent (i.e. the manager) to act in his place. The principal cannot fully control what the agent does; this often leads to the above problem.

prior distribution. The PROBABILITY DISTRIBUTION for a variable or STATISTIC which characterizes the A PRIORI information to be combined with sample information in BAYESIAN TECHNIQUES.

prisoner’s dilemma. This term arises from a consideration of the decision problems of arrested criminals who are the subject of separate interrogation. Each criminal knows that if no-one confesses and informs on his co-partners in crime, he will get off scot-free or at least with a modest sentence. However, if one partner confesses, and the others do not, he will go free while the others receive severe sentences. If all confess, then all will be sentenced but less severely than if only one confesses. The incentive here, for the rational actor, concerned only with his own survival, is to confess and let the others suffer the consequences. But, as all will be motivated to act in this way, they end up with an outcome that is worse for all than if they had been able to make a binding agreement among themselves that no-one confesses. (See GAME THEORY.) This model shows how rational behaviour at the micro-level leads to an apparently irrational macro outcome.

private company. See COMPANY.

private good. A good which displays rivalry (see RIVAL) in consumption and where EXCLUSION may be practised by both producer and consumer. The first condition means that one person’s consumption of the good reduces the quantity available to others. Exclusion by the producer means that the producer can restrict use of the product to those consumers who are willing to pay for it while exclusion by the consumer means that the consumer is not forced to consume the good. Where goods display
these characteristics, free EXCHANGE is possible and MARKETS can operate. In the absence of the possibility of exclusion markets cannot operate while the absence of rival-ness is held to imply that the good should be provided at zero price.

**privatization.** The policy of converting public ownership of an asset to private ownership or of permitting the performance of a certain activity, hitherto carried out by the department of a public organization, by a private sector business. Into the former category come in the UK the sale of local-authority owned houses to the sitting tenants and the issue of more than 50 per cent of the shares in former government-owned companies, e.g. British Telecom, British Gas and the water and electricity companies, while into the latter come the transfer of one-time public sector services such as refuse collection or the laundering of National Health Service linen. The major argument advanced for privatization is that of increased efficiency, but as many of the former nationalized industries are natural monopolies it has been necessary to establish regulators, such as OFWAT, OFTEL and OFGAS to supervise price-setting and commercial policy in respectively the water, telecommunications and gas industries. See Vickers, J. and Yarrow G., *Privatization*, The MIT Press (1988).

**privatization in Eastern Europe.** The shift in activity from the state to the private sector in Eastern Europe in the belief that private ownership and control are more efficient in terms of resource allocation than state ownership. The process has involved as a minimum partial denationalization but has gone as far as the sale of shares in privatized companies to foreign investors. Despite the creation of special ministries to promote privatization, such as the Ministry for Ownership Transformation in Poland and the State Property Agency in Hungary, the process has been slow largely because of a shortage of domestic savings and a lack of proper capital market institutions. East European countries have used several models of privatization. Some small and medium sized companies have simply been sold to private investors. There has also been the free distribution of privatization bonds, amounting to as much as 20 per cent of the value of some enterprises, to employees of large state companies (a 'mercialization', i.e. turned into J companies owned 100 per cent by the government, with two thirds of the employees appointed by the government and the remaining third by workers’ councils.

**probability.** A number lying between 0 and 1 (sometimes expressed as a percentage) which indicates the certainty which an event will occur. A useful interpretation of probability is as the relative frequency as the number of times an event occurs infinite. Thus, for instance, if the number of heads obtained in tossing a coin is divided by the number of times tossed, will approach the proportion of obtaining a head as the number of tosses approaches infinity. (See PROBABILITY DISTRIBUTION, JOINT PROBABILITY DISTRIBUTION, PROBABILITY DENSITY FUNCTION.)

**probability density function.** A mathematical function describing the shape of a PROBABILITY DISTRIBUTION, which when integrated between limits gives the probability that its variable(s) take on values between limits.

**probability distribution.** A summation of a table of numbers or of mathematical relationship which gives the probability that a RANDOM VARIABLE takes values, or falls between certain limits. Sometimes useful to think of a probability distribution as being a relative frequency distribution where the sample size is infinite. Examples include the NORMAL DISTRIBUTION and the CHI-SQUARE DISTRIBUTION.

**probit model.** See LINEAR PROBABILITY MODEL.

**process.** A specific combination which can be altered in scale to higher levels of output. Thus, if it takes 1 unit of capital and 1 of labour to produce 1 unit of good X, the combination defines a point on a process, or...
process innovation sometimes called, an activity ray. The point $4K + 2L$ will then define another such point, and so on. In short, each process reflects a specific capital/labour ratio $\phi$ if the inputs in question are capital and labour. The number of processes available to produce a given output may be limited because of INDIVISIBILITY in the inputs. The diagram below shows a situation in which there are five such processes only. The linear segmented curves joining equal output points are ISO-PRODUCT CURVES although they do not exhibit the familiar 'smoothness' and curvature of the typical textbook curve. This is because such smoothness can only come about by assuming that labour and capital can be substituted for each other in extremely divisible units. Once indivisibility exists the picture will look more like the one shown below. Points between processes and on iso-product curves do have an economic meaning. This is because it is possible to produce, say, the first 500 units of output with process C and the next with process B. This would in fact be illustrated by point G which lies on a 'facet' of the iso-product curve.

This analysis may also be used to indicate why an iso-product curve cannot 'bend outwards'. Suppose it does, as in the second diagram, then, considering only the three processes shown, points D, E and F all indicate combinations that would produce an equal output. But point E is clearly inefficient since we can draw a facet from D to F and observe a point G on process B which uses less labour and capital than point E. Facets will therefore slope down from left to right for cases where some substitution is possible, which establishes a prima facie case for the convexity of iso-product curves.

process innovation. A change in the relationship between factor input proportions used by a firm to produce a given level of output. This can occur in two ways. It may result from a change in relative factor input prices which induce the firm to adopt a new minimum cost technique on its existing isoquant. This form of process innovation involves no research and development expenditure as the technology remains unchanged. Alternatively, isoquants may shift in toward the origin as a consequence of technological change thus leading the firm to adopt a new process of production. Once this innovation has diffused to other firms, it is known as TECHNICAL PROGRESS.

producers' co-operatives. An amalgamation of individual firms who attempt to even out the supply of their common product, in spite of variations in production. The aim is to avoid undue fluctuations in prices and therefore incomes. Producers' co-operatives are common in the agricultural sectors of an economy, where unplanned variations in production can occur as a consequence of factors such as unexpected climatic conditions.
producer's surplus. A surplus accruing to the owners of factors of production owing to an individual generally receiving something which has greater direct or indirect utility to him than the utility of what he gives up. The traditional measure is the area above the product SUPPLY CURVE and below the price. (See ECONOMIC RENT.)

product cycle. This describes the pattern of experience of new products, which subsequently pass through the phases of maturing product and standardized product. New goods tend to be developed for high income, high labour-cost countries, which briefly have a monopoly in their production and export. As markets develop in countries of lower income levels and the technology of production becomes settled, the location of production may move to these countries to take advantage of lower labour costs and to meet the developing demand. When the product has become widely known throughout the world and its technology standardized, the location of production may shift to less developed countries to benefit from the low wage costs and be exported from there to the rest of the world. Such a cycle can be seen in synthetic fibres and semi-conductors.

product differentiation. This exists within an industry when each producer is selling a product whose characteristics are such as to distinguish it from the products of competitors.

product innovation. A change made by a firm in its saleable product and which can arise due to an addition to technology, or a change in relative prices where the latter rosy be a consequence of a change in consumer preferences. Innovation refers to the first producer of a product and when its use is diffused among consumers innovation and diffusion together constitute 'product change'.

Production. The act of transforming the FACTORS OF PRODUCTION into the goods and services that are desired for CONSUMPTION and INVESTMENT.

production frontier. (also known as the production possibility curve or transformation function.)

This curve shows the possibilities open for increasing the output of one good by reducing the output of another. In the diagram, resources are assumed to be limited so that if they are all devoted to the production of $Y$ an amount $Y_{\text{max}}$ could be produced. If they are all devoted to $X$ an amount $X_{\text{max}}$ could be produced. Alternatively, by 'mixing' the allocation of resources to $X$ and $Y$ points such as $A$ and $B$ could be secured. Note that point $D$ and any other point 'outside' the frontier are unobtainable. A point like $C$, 'inside' the frontier, could well be achieved, it would not represent an efficient use of resources however, since the resources available are capable of reaching a point like $A$ at which there is more of both $X$ and $Y$. In short, $C$ could only be achieved by either not using all resources - i.e. there would be unemployment - or by using the available resources inefficiently.

The frontier is shown as being concave to the origin. The rationale is that the removal of resources from producing $X$ will mean their allocation to producing $Y$ and as more and more of $Y$ is produced there will be DIMINISHING RETURNS. In fact, since it is all resources that are being transferred from one commodity to the other the returns in question are RETURNS TO SCALE. Since there is no specific reason for returns to scale to be
production function. The relationship between the OUTPUT of a good and the inputs (FACTORS OF PRODUCTION) required to make that good. In formal notation the production function has the general form:

\[ Q = f(L, K, t, \text{etc.}) \]

where \( Q \) is output, \( L \) is labour, \( K \) is capital, \( t \) is 'technical progress' and where the 'etc.' indicates that other inputs may also be relevant (raw materials, for example). While typically used in the context of the theory of the FIRM, it is possible to speak of a nation's output being dependent upon the various resources used to produce that output. Such a production function is termed an AGGREGATE PRODUCTION FUNCTION, and has the same general form as that indicated above save that \( Q \) would now be the GROSS NATIONAL (or domestic) PRODUCT and \( K, L \) etc. would refer to the whole capital stock of the nation, the entire workforce etc. Whether aggregate production functions are meaningful depends on the view taken on whether it is sensible or not to speak of a measured stock of capital.

Production functions may take many specific algebraic forms. Typically, economists work with homogeneous production functions. A production function is homogeneous of degree \( n \) if when inputs are multiplied by some constant, say, \( k \), the resulting output is a multiple of \( k^n \) times the original output. That is, for a production function:

\[ Q = f(L, K) \]

then if and only if

\[ Q = f(kL, kK) = k^n \cdot f(L, K) \]

is the function homogeneous. The exponent, \( n \), denotes the DEGREE OF HOMOGENEITY. If \( n = 1 \) the production function is said to be homogeneous of degree one or linearly homogeneous (note that this does not mean the equation is linear; it may or may not be). A linearly 'homogeneous production function' is of interest in that it exhibits constant RETURNS TO SCALE. This is easily seen since the expression \( k^n \cdot f(L, K) \) when \( n = 1 \) reduces to \( k \cdot f(L, K) \) so that multiplying inputs by a constant \( k \) simply increases output by the same proportion.

Examples of linearly homogeneous production functions are the COBB-DOUGLAS PRODUCTION FUNCTION and the CONSTANT ELASTICITY OF SUBSTITUTION (CES) PRODUCTION FUNCTION. If \( n \) is greater than 1 the production function exhibits increasing RETURNS TO SCALE. If \( n \) is lower than 1 decreasing RETURNS TO SCALE prevail. (See ISO-PRODUCT CURVE.)

production possibility curve. See PRODUCTION FRONTIER.

production sphere and budgetary sphere. A classification of employment used in socialist countries and (still) in some East European countries. The production sphere includes all employment in agriculture, forestry and fishing, in industry, in construction, in transport, in trade, in the so-called productive services and in the private sector. The budgetary sphere comprises employment in administration, the armed services, the police, courts, state schools, research institutes, the state health services, customs officers etc. The criterion for inclusion in the budgetary sphere is that the employee is paid either from the state, or some form of local authority, budget. (See NET MATERIAL PRODUCT)

productivity. Output per unit of input employed. Increases in productivity come about from increased efficiency on the part of capital or labour. It is essential to measure productivity in terms of real output, but often impossible to separate capital productivity from labour productivity. In common use, the term is generally confined to labour productivity. (See AVERAGE PRODUCT.)

productivity bargaining. Traditionally a buy-out arrangement whereby advantages of one kind or another, such as higher wages or increased leisure, are given to workers in exchange for changes in working practice or in methods or in organization of work that will lead to more efficient working. Productivity bargaining is an attempt to deal with clear lapses from X-EFFICIENCY. Latterly, productivity bargaining agreements have evolved from the one-off buy-
out of restrictive/protective practices into a form that seeks to improve efficiency on an ongoing basis (efficiency agreements). Productivity bargaining has been favoured under various phases of INCOMES POLICY as providing grounds for exceptional wage increases, although the stringency attached to the specification of this option has varied widely.

**Product proliferation.** An entry-forestalling strategy pursued by established firms in an industry which aims to saturate the market with such a large number of different brands, that any new entrant would find it difficult profitably to market a product, with an attribute mix which is distinguishable from the existing brand range.

**Product rule.** A rule for the determination of the DERIVATIVE of a function with respect to a variable, where the function consists of the product of two or more separate functions of the variable. Thus, in the function

\[ Y = u \cdot v \],

where \( u \) and \( v \) are functions of \( X \), the rule states that

\[ \frac{dY}{dX} = \frac{du}{dX} \cdot v + u \cdot \frac{dv}{dX} \].

**Profit, falling rate of.** A tendency for the RATE OF RETURN on capital to fall over time. RICARDO postulated a natural tendency for profits to fall. The reasoning behind such a claim can be attributed to his acceptance of a LABOUR THEORY OF VALUE, a subsistence wage and the determination of rent by the LAW OF DIMINISHING RETURNS to land. As population grows, the demand for food rises. In order to meet this demand, less productive land must be cultivated. Since labour is paid a fixed subsistence bundle and the price of food must rise, the share of wages in total output must also rise. For Ricardo only wages and profits determine the value of output and so diminishing returns to agriculture must imply a falling rate of profit. When the difficulty of growing food has driven the wage share to the level where total wages equal that product (ignoring rent), profit will be reduced to zero and the STATIONARY STATE will have been reached.

MARX accepted and extended Ricardo's theory of the falling rate of profit. For Marx, however, the tendency of the rate of profit to fall was technologically determined by the desire of the capitalist class to replace workers by capital goods in order to maintain profits in the face of competition. The overall effect of these individual actions is to increase the CAPITAL-LABOUR and CAPITAL-OUTPUT RATIOS thus reducing the general rate of profit in the economy. Marx's 'law', while subject to certain countervailing tendencies, formed a major part of his theory of crisis and TRADE CYCLES. Marx's predictions have not come about and his view of TECHNICAL PROGRESS has proved invalid. In recent years a neo-Ricardian notion of falling profits has been based on the role of workers' organizations in increasing labour's share in total output thus reducing the rate of profit.

**Profit centre.** When a corporation is decentralized into smaller units, these are known as profit centres if they are independent enough for a unit-specific return on investment to be calculated. They are common in MULTINATIONAL CORPORATIONS, with small plants in different countries, where, by the use of TRANSFER PRICING, profits can be kept low where profit taxes are high.

**Profit constraint.** A concept commonly used in MANAGERIAL THEORIES OF THE FIRM. It is the minimum profit required to ensure shareholder acquiescence toward company policy. (See SALES MAXIMIZATION HYPOTHESIS.)

**Profit function.** The specified relationship between profit and those variables such as output and advertising which influence its size.

**Profit margin.** PROFIT per unit of output expressed as a percentage of PRICE.

**Profit maximization.** The hypothesis that firms aim to maximize PROFITS. In the diagram profit is defined as the difference between the TOTAL REVENUE received by the firm and the TOTAL COSTS it incurs. The point of maximum difference is seen to correspond to output level \( X^* \) which is thus the profit
profit maximization

maximizing output. At this point the slopes of the two curves are equal. The slope of the total revenue curve is MARGINAL REVENUE ($MR$) and the slope of the total cost curve is MARGINAL COST ($MC$). Thus, profit maximization requires that

$$MC = MR.$$ 

To see why this is so, consider what would happen if $MC > MR$. In this case the costs of producing extra output are greater than the revenue obtained and hence profits are lower than need be. If $MR > MC$ opportunities exist for increasing profits by expanding output. Profit-maximization may not, however, describe the motives of many firms.

(See SALES MAXIMIZATION HYPOTHESIS, MANAGERIAL THEORIES OF THE FIRM.)

profit motive. Is said to pertain where PROFIT provides the spur which conditions firms' organization of production activities. (See PROFIT MAXIMIZATION.)

profit rate. PROFIT expressed as a proportion of the book value of capital assets.

profits. The difference between the revenue generated from the sale of output and the full OPPORTUNITY COSTS of the factors used in the production of that output. Included within costs are the premium charged for risk taking and the costs of using the owner's CAPITAL. These are not included as costs in the accountants' measure of profit which therefore does not correspond to this economic definition of profits. (See NORMAL PROFIT, SUPERNORMAL PROFIT.)

profits-push inflation. A variant of COST-PUSH INFLATION, which attributes the origins of the inflationary process to capitalists who seek an enhanced share of the NATIONAL INCOME. Prices are thus said to be pushed up by oligopolistic producers who have a degree of market power that gives them considerable flexibility in the setting of prices, particularly in the short run. (See OLIGOPOLY.)

programme budgeting.
See OUTPUT BUDGETING.

programming methods. A generic name for a set of optimization techniques, usually involving iterative solution methods. An example is LINEAR PROGRAMMING.

progressive tax. Generally referring to a situation where the proportion of income taken in tax (the tax rate) rises with income or spending power. Most income tax systems in Western countries are progressive. This is achieved by a system of rising MARGINAL RATES OF TAX with increments of income.

It is possible to have a progressive EXPENDITURE TAX where the rate of tax rises with increments to consumption expenditure. There is some empirical evidence that the UK value added tax (VAT) is actually progressive: people with higher incomes tend to increase their spending on items subject to the tax to such an extent that the payments become a bigger proportion of income. Economists and politicians who have an egalitarian philosophy tend to favour progressive taxes.

project appraisal.
See CAPITAL BUDGETING, DISCOUNTED CASH FLOW, NET PRESENT VALUE, RATE OF RETURN.

proletariat. A class of persons which owns little or no property. The distinguishing characteristic of such a group is the necessity for them to sell their labour services in return for wages. In Marxist theory the proletariat are the exploited class which will eventually overthrow the capitalist BOURGEOISIE by social revolution and create a communist economy.
property rights. These rights pertain to the permissible use of resources, goods and services. Ownership of an asset consists of the following rights: to use that asset, to change its form and substance and to transfer all rights through sale. Ownership of an asset is not unfettered because some restrictions are generally imposed by private contract or law.

proportional tax. There are two definitions. First, where the proportion of income taken in tax stays the same as income increases, there is a constant MARGINAL RATE OF TAX which equals the effective or average rate. A second definition is that a tax is proportional if the rate remains constant as the TAX BASE rises. On the latter definition an AD VALOREM sales tax on a commodity would be a proportional tax. Note, however, that the consumption of the commodity and consequently the tax paid may not increase with the income of the taxpayer, so that the ratio of tax paid to income would fall.

propulsive industries. A group of key industries whose interaction and expansion can provide a stimulus to growth in an economy. These industries form the nucleus of the GROWTH POLE concept introduced by the French economist Perroux. Propulsive industries are said to have certain characteristics, principally technological sophistication, strong links with the other industries forming the 'pole' and expanding demand for their products. The development of these industries is held to affect the rest of the economy both by generating demand for the products of other industries as inputs and, through imitation, by stimulating innovation and technical progress.

prospect theory. A theory of decision-making under UNCERTAINTY associated with Kahneman and Tversky. Individuals are assumed initially to transform a problem into a set of simple prospects through a process known as editing and then to assign decision weights to the probabilities attaching to different outcomes. Specifically, most probabilities are underweighted and very low probabilities are overweighted.

protection. See EFFECTIVE RATE OF PROTECTION, TARIFFS, QUOTAS.

proxy variable. A variable used in REGRESSION analysis to replace or 'stand in for' another theoretically more satisfactory variable in cases where either data are not available on the latter, or the latter is unobservable (e.g. 'desired' levels of consumption or PERMANENT INCOME). (See INSTRUMENTAL VARIABLE.)

pseudo-demand schedule. A functional relationship indicating the amount an individual would be willing to pay for successive units of a PUBLIC GOOD or for successive units of consumption of the good by some other individual (as a result of the existence of a beneficial EXTERNALITY.) This type of schedule, when drawn, resembles the normal DEMAND CURVE. However it is not a true demand curve. Whereas private demand for a good can be estimated by observing individuals' purchases in the market, this mechanism is not available in the case of public goods or externalities. Consequently pseudo-demand schedules are drawn on the unrealistic assumption that individuals fully reveal their preferences through political channels such as voting. Although useful in theory, these schedules are extremely difficult to estimate in practice since people may wish to conceal their preferences. (See FREE RIDER.)

public choice. A branch of economics concerned with the application of economics to the analysis of 'non-market' decision making. It may also be regarded as an economic analysis of politics. (See COLLECTIVE CHOICE, ECONOMIC THEORY OF POLITICS, SOCIAL DECISION RULE.)

public company. See COMPANY.

public expenditure. Broadly, expenditure made by local and national government agencies as distinct from those of private individuals, organizations or firms. No single definition of public expenditure can be given since the definitions employed often vary according to the purpose in hand or the intentions of the individual making the definition. On the broadest definition, public expenditure may be said to consist of
Public Expenditure Survey Committee

(1) expenditure by government departments on goods and services either directly or by way of SUBSIDIES; (2) payment by government departments of welfare or social security benefits, interest on government debt, grants and other payments known collectively as TRANSFER PAYMENTS; (3) CAPITAL EXPENDITURES by NATIONALIZED INDUSTRIES. Some economists would argue that only element (1) should be counted as true public expenditure since this represents the level of real resources used by government while (2) merely leads to some redistribution of resources within the private sector and (3) should be regarded as being no different from expenditures by private firms. If, however, one were concerned with issues such as the amount of revenue required by government, one would wish to measure both (1) and (2). Further, given that investments by nationalized industries may result from political as much as commercial decisions it could be argued that (3) should be included to indicate the extent of the area of the economy which government directly influences. Thus a combination of (1), (2) and (3) should be appropriate to the issue being analysed and use of the term public expenditure should be qualified by a statement of which concept is being used.

Public Expenditure Survey Committee.

An interdepartmental committee, chaired by the TREASURY, which attempts to coordinate and control the pattern and overall growth of UK PUBLIC EXPENDITURE. The Committee provides a forum for government departments and the Treasury to evaluate existing and planned public expenditure programmes and their implications for the economy as a whole. In addition, the committee produces an annual report for Ministers which serves as the basis for the subsequent White Paper on Public Expenditure. In an effort to control increasing levels of actual public expenditure a system of departmental cash limits on expenditure targets was introduced by the government in 1976. Since 1982 all public expenditure has been planned in cash (rather than volume) terms. The committee has evolved from a system of public expenditure control to a planning and consultative committee which enables discussion, negotiation and bargaining between departments and the Treasury on patterns of public expenditure growth.

Public finance. The traditional name for the revenue and expenditure activities of government. Conventionally there are at least three functions, namely the ALLOCATION FUNCTION, DISTRIBUTION FUNCTION and STABILIZATION FUNCTION. Public finance is concerned with the economic principles and problems of the PUBLIC SECTOR. The subject matter has been greatly extended with the development of topics such as COST-BENEFIT ANALYSIS and OUTPUT BUDGETING. See Prest, Alan R., Public Finance in Theory and Practice, Weidenfeld and Nicolson, London (1985).

Public good. A commodity or service which if supplied to one person is available to others at no extra cost. It may be contrasted with a PRIVATE GOOD where one person's consumption precludes the consumption of the same unit by another person. A public good is thus said to exhibit NON-RIVAL CONSUMPTION; one person's consumption of the good does not reduce its availability to anyone else. The extreme, or 'polar', case of a 'pure' public good has been defined by Paul A. SAMUELSON as a good which is:

1. non-rival in consumption
2. has the characteristic of NON-EXCLUDABILITY - that is, if the good is provided the producer is unable to prevent anyone from consuming it.

This latter characteristic prevents private markets from functioning since a seller would be unable to ensure that only those individuals who paid for the good could obtain it. Since the good could be obtained without payments no-one would be willing to pay for it. Note that if exclusion is possible the good is still a public good even though it can be provided on a private market. Where exclusion is possible or where consumption is not completely non-rival we have an example of a MIXED GOOD (or impure public good), a phenomenon which is certainly more common than that of the extreme case.

Where consumption of a good is non-rival, the charging of a price for the good or service is, in terms of the PARETO PRINCIPLE, inefficient. This is so because adding an
extra unit of consumption provides a benefit to the consumer without imposing any costs, while the charging of a price would prevent some consumption from taking place - thus causing a net loss of satisfaction or utility. It follows that, even when it is possible, the provision of a public good through a private market will not enable the best or 'optimal' level of output to be produced. As we have seen, in the case of non-excludability, a market cannot operate at all.

The provision of a public good is a matter of COLLECTIVE CHOICE. Generally, we expect to find public goods provided by governments and paid for through compulsory TAXATION. An alternative solution would be for all the members of a community to make a voluntary agreement to provide and pay for the good. The difficulty with this solution is that individuals may conceal their true valuation of the good in order to escape payment - i.e. they may seek to be FREE-RIDERS. The problem of providing public good by voluntary agreement rather than compulsory TAXATION is analysed in the VOLUNTARY EXCHANGE MODEL. The total demand for a public good may be estimated by adding up the demands of the individuals composing the society. However, whereas with a private good we obtain the market DEMAND CURVE by the horizontal addition of individual demand curves (i.e. at each price we sum the amounts demanded by each person), with a public good the total demand curve is obtained through the vertical addition of individual demand curves as illustrated.

Here we illustrated a community with $D_A$ as $A$'s demand, $D_B$ as $B$'s demand curve, and $\Sigma$ the total demand curve. The demand curves are vertically because (given non-rivalry) the unit of the good is available to individuals. Our problem is thus to find a price the community is willing to each unit of the good; this is found from the point where $XD$ meets the MARGINAL COST curve. At that point the costs to the community of one more unit is just equal to the amount the community is willing to pay. It should be noted that the curves are constructed on the assumption that individuals reveal 'true' demands for the good through the political process - that is, these are DEMAND SCHEDULES. Examples of public goods include national defence, stripping, and environmental protection goods which completely accord with Samuelson's criteria.

public sector. That part of the economy which is publicly owned as distinct from privately owned. It thus includes all government departments and agencies and public corporations in the UK such as the coal industry. The public sector is thus defined in terms of ownership - that is, public goods will be provided via the sector. The size of the public sector according to the political ideology of governments. Thus health care provision in the UK is addressed by public sector units.
mainly privately supplied in the USA. The extent of nationalization will also determine the size of the public sector.

**Public Sector Borrowing Requirement** (PSBR). The amount by which the revenue of PUBLIC SECTOR organizations falls short of expenditure. For purposes of the definition of PSBR, the public sector includes central government, local authorities and NATIONALIZED INDUSTRIES. The relevant revenues include taxes, charges to consumers, trading surpluses and rent, interest and dividends. Expenditure includes grants, spending on goods and services, gross capital formation and debt interest. The public sector financial deficit plus any net financial lending gives the PSBR. Where receipts exceed expenditure there is no requirement for the government to borrow and debt is repaid. In these years the PSBR gives way to the PSDR, Public Sector Debt Repayment. Any deficit is financed by sales of securities to the non-bank private sector, increases in currency, borrowing from overseas and bank lending to the public sector. The effects of borrowing are more likely to be inflationary if the financing takes the form of new currency coming into circulation than if 'genuine' borrowing from the non-bank private sector takes place, as the MONEY SUPPLY is obviously increased by the first process but not by the second. Public sector borrowing raises interest rates through the increased sales of bonds and so makes borrowing by companies more expensive with possible adverse effects on investment. This is known as financial CROWDING OUT. There may also be resource crowding out, following from a large PSBR. According to some economists the PSBR determines the BALANCE OF PAYMENTS situation of an economy. This view is the subject of much controversy. (See MEDIUM TERM FINANCIAL STRATEGY.)

**Public Sector Debt Repayment (PSDR).** See PUBLIC SECTOR BORROWING REQUIREMENT.

**public utility.** A COMPANY or enterprise which is the sole supplier of some essential GOOD or SERVICE and is, in consequence, subject to some form of government control. Examples of public utilities include water supply, electricity, gas and telephone services. Control may be exerted through direct government ownership or through legal regulation, which is the practice in the USA and UK.

**public utility regulation.** The control by government regulation of PUBLIC UTILITIES which possess elements of monopoly power, the aim being to harmonize business conduct with the public interest. Regulation can cover the level and structure of prices, the quality of service, exit from and entry into the industry and the financial structure of the regulated firms. Examples of regulatory bodies in the UK are OFGAS for the gas industry and OFTEL for the telecommunications industry. (See AVERCH-JOHNSON EFFECT.)

**pump-priming.** See DEFICIT FINANCING.

**purchasing power parity.** A doctrine which asserts that a unit of CURRENCY should be able to buy the same bundle of goods in all countries. The validity of this proposition depends on several restrictive assumptions: the most important are that all goods are HOMOGENEOUS and traded, there are no TRANSACTIONS COSTS or capital flows or impediments to trade and that there is full employment and price flexibility.

If when the exchange rate is £1 = $2, £1 buys twice as many goods in the UK as it does in the USA, when converted into $2, then UK goods must be cheaper. There will be no demand for US goods from the UK but a demand for UK goods from the US. This pattern of demands will persist until the exchange rate has adjusted to £1 = $4, when the law of one price for all goods in both countries will have re-asserted itself. This, the absolute version of purchasing power parity, has established the equilibrium exchange rate. There also exists a relative version of purchasing power parity, which claims that starting from a base of an equilibrium exchange rate between two currencies, the future of the exchange rate between the two currencies will be determined by the relative movements in the price levels in the two countries. The restrictive assumptions necessary to validate the doctrine suggest that it is unlikely to hold in practice and the empirical evidence on purchasing power parity as a determinant of the long-run
exchange rate is mixed. It has done badly in
the recent era of volatile exchange rates.
Purchasing power parity is often used in
international comparisons of living stan-
dards, for exchange rates, heavily influenced
by capital flows, can distort per capita GNP
figures, when converted into one common
currency. (See BALANCE OF PAYMENTS.) See
Officer, C.H., 'The purchasing power parity
theory of exchange rates: a review article'.
IMF Staff Papers, xxiii (1976), 1-60.

purchase tax. A type of SALES TAX. It
existed in the UK before the introduction of
VALUE-ADDED TAX in 1973. It was an AD
VALOREM tax levied on particular goods at
the wholesale level. The rate can be varied
among products. In the UK so-called luxury
goods were taxed at higher rates than more
basic commodities. It was argued that it was
difficult to extend this type of tax to a very
wide range of consumer expenditure includ-
ing services. This constituted one of the
reasons for the introduction of valug-added
tax.

pure competition. See PERFECT COMPETITION.

pure profit. A residual sum left over when
we have subtracted from the revenue gener-
ated by some activity all of the opportunity
costs of production, the normal PROFIT
required to keep the producer in business.
Economists have debated the issues of
whether pure profit can exist in a state
of PERFECT COMPETITION. F.H. Knight al-
that pure profit would exist because of
certainty concerning the future. Pro-
or ENTREPRENEURS would be forced to
RISKS in making decisions concerning O
earning higher than anticipated returns
'extra' return constituting pure profit.

put option. See OPTIONS.

putty-clay. An aspect of the PRODI
FUNCTION which allows substitution of 1
for capital and vice versa before
investment is carried out but once ma-
are installed the CAPITAL-LABOUR RATI
not be varied. Thus EX ANTE capital is '
but EX POST it becomes hard baked
Putty-clay models are seen as a compr
between perfect substitutability (I
PUTTY) and rigidly FIXED PROPOI
(CLAY-CLAY).

putty-putty. An aspect of the PRODI
FUNCTION in GROWTH THEORY which i
capital to be continuously reshaped bo-
fore (EX ANTE) and after (EX POST) i
ment has taken place. Thus capital is so
'putty' both before and after actual i
ment such that the CAPITAL-LABOUR
may be continuously varied. (See 1
CLAY, CLAY-CLAY.)

pyramiding. See HOLDING COMPANY.
quadratic equation. An equation which involves the square of a variable as the highest power.

quadratic utility function. A UTILITY FUNCTION whose algebraic form is that of a QUADRATIC EQUATION. Most typically applied to PORTFOLIO analysis in which such a function is required if the investor in a portfolio is to be assumed to be influenced only by the MEAN and VARIANCE of the PROBABILITY DISTRIBUTION of returns.

qualitative choice models. These are models developed to deal with discrete response data, such as the decision whether or not to buy a car, to change jobs, or to go to university, for example. They are usually formulated in terms of the REGRESSION MODEL where the dependent variable is discrete (i.e. equals unity if the consumer buys a car, equals zero otherwise). They are widely applied in labour economics, consumer theory and in financial models.

quantity theory of money. A theory of the DEMAND FOR MONEY which formed the most important component of macroeconomic analysis before Keynes’ General Theory of Employment, Interest and Money (1936). This same theory is now enjoying a revival in more sophisticated forms.

Before the Keynesian revolution the quantity theory had two main forms, each summarized as follows:


This analysis started with a simple IDENTIT Y, the equation of exchange

\[
M^s V = PT
\]  

where \( M^s \) is the quantity of money

\( V \) is the velocity of circulation of each unit of money

\( P \) is the price level

\( T \) is the volume of transactions.

According to Fisher \( M^s \) is determined independently of the other three variables, \( T \) is given, while \( V \) is considered to have a constant EQUILIBRIUM value to which it will return after any shock or disturbance. The price level \( P \) is then determined by the interaction of the other three.

In particular if it is hypothesized that \( T^* \) and the equilibrium value of \( V^* \) are constants then the equilibrium price level is determined by the quantity of money, yielding the quantity theory of money

\[
M^s V^* = PT^* \tag{2}
\]

The demand for money \( (M^d) \) will be a constant fraction \( (k) \) of the value of transactions

\[
M^d = kP \cdot T \tag{3}
\]

and assuming demand equals supply

\[
M^d = M^s \tag{4}
\]

it is possible to obtain

\[
M^s \frac{1}{k} = M^s V^* = PT^* \tag{5}
\]

Such a view implies that the economy will always tend to FULL EMPLOYMENT NATIONAL INCOME and the STABILITY of \( V^* \) arises from the technological and institutional framework.

(B) CAMBRIDGE CASH BALANCE APPROACH. This approach is much associated with MARSHALL and PIGOU (in particular A.C. Pigou 'The Value of Money' Quarterly Journal of Economics, 1917). Starting with the same equation as Fisher (see (1)) the Cambridge economists took a rather different theoretical route to a similar form of the demand for money function (3). Fisher was concerned with the quantity of money an economy needs to carry out a given volume of transactions while the Cambridge economists were concerned with what volume of money an individual would wish to hold given that transactions must be carried out. The Fisher approach was therefore macroeconomic
while the Marshall-Pigou model was microeconomic in flavour. The microeconomic analysis emphasized the convenience of money, the larger the number of transactions an individual incurs the more money he will want to hold as MONEY BALANCES. In the Fisherian model the individual ended up holding money balances which he required because of the institutional and technological nature of the economy. In other words the Fisherian individual would not choose to hold money for its own sake, it merely has current net value.

Pigou in particular after assuming that the individual's WEALTH, transactions and income are stably related to one another in the short run, argued that the NOMINAL demand for money \((M^d)\) is a constant proportion \((k)\) of the nominal income of that individual

\[
M^d = kPY
\]

and assuming equilibrium

\[
M^s = M^d.
\]

Comparing (3) with (6) it can be seen that after aggregation over all individuals in the economy in the Cambridge case

\[
M^s = M^d = \frac{1}{k} = M^V = PY
\]

where \(V\) represents the INCOME VELOCITY OF CIRCULATION. The Fisher approach emphasized the role of the institutional framework while the Cambridge economists were more concerned with the RATE OF INTEREST and expectations of its future value.

Keynes in 1936 developed the ideas of Marshall and Pigou in his LIQUIDITY PREFERENCE schedule and SPECULATIVE DEMAND for money. Marshall and Pigou had an implicit role for the interest rate while Keynes made it explicit. With the Fisher model it is easier to conclude that the interest rate has no role to play in the demand for money.

Milton FRIEDMAN (in 'The Quantity Theory of Money, A Restatement' in M. Friedman (ed), Studies in the Quantity Theory of Money, Chicago, 1956) saw monetary theory as an extension of the general theory of demand much in the line of the Cambridge School. Taking as given the fact that individuals do hold money (i.e. he did not explain why they hold it in the first place) he proceeded to analyse the factors which determined how much money they held.

To Friedman, money is an asset yielding a flow of money services to the holder. He assumes a diminishing MARGINAL RATE OF SUBSTITUTION between money and goods. Thus the more money an individual has in relation to a fixed bundle of goods the more likely he is to spend some money on further goods to equate the MARGINAL UTILITIES rendered.

This hypothesis has very important implications as it suggests substitution between money and goods and thus a very large direct impact on AGGREGATE DEMAND for excessive growth (or decline) in money balances, unlike the Keynesian notion that IDLE BALANCES will be spent on financial assets not commodities. This may be stated as

\[
M_d = f \left( W, r', p', \frac{W_H}{W} \right) P
\]

where \(W\) is total wealth, \(W_H\) is human wealth (for he considered this a very illiquid form of wealth), \(r\) is the interest rate, \(p\) is the price level, and \(M_d\) is nominal balances. The superscript 'e' indicates EXPECTATIONS. Friedman actually considers three interest rates - the expected rate of return on money, the expected rate of return on fixed value SECURITIES and the expected RATE OF RETURN ON EQUITIES.

The sophisticated quantity theory, now surrounded by a battery of related hypotheses (see RATIONAL EXPECTATIONS, NATURAL RATE OF UNEMPLOYMENT), has become important for macroeconomic policy makers.

In this approach any category of expenditures is considered as a substitute for money, such that any change in the MONEY SUPPLY (especially any expansion) will bring about DISEQUILIBRIUM in money markets \((M^e \neq M^d)\) at current prices, with disequilibrating spillover effects on demand and prices in almost any market. There are also important implications for FISCAL POLICY, in particular an expansionary policy will raise either the money supply or the supply of government securities or both. This will raise the level of wealth and thus increase the demand for money reducing the MULTIPLIER effect of the original fiscal changes. (See MONETARISM.)
quasi-option value

see OPTION VALUE.

quasi-rent. The income of a seller of a good or service over and above its OPPORTUNITY COST when the good is temporarily in fixed supply. The concept was applied by Alfred MARSHALL to the determination of the price of capital in the short run when the supply of capital is fixed. The owners of capital receive a payment which differs from the opportunity cost of using that resource by the amount of quasi-rent. In the long run when the factor can be augmented or depleted the equilibrium price will reflect the cost of alternative uses. Quasi-rent exists because prices in the short run are not in EQUILIBRIUM. Marshall used this concept as an element in his explanation of the rate of PROFIT.

Quenay, François (1694-1774). The major figure in the group of eighteenth century French economists known as the PHYSIOCRATS. A surgeon by profession, his writings on economics appeared in the Encyclopédie in 1756 and 1757, the Journal de l'agriculture de commerce et des finances in 1765 and 1767, and the Tableau économique (1758). An opponent of the MERCANTILIST school of thought, he was an early exponent of the virtues of free competition in industry. The Tableau set out a scheme of exchange between three classes of society: landowners, agricultural workers and the so-called 'sterile class'. Only agriculture was capable of producing a surplus over consumption requirements and was therefore the driving force of the economy. The Tableau set out an INPUT-OUTPUT model of the economy showing how the surplus or 'produit-net' is distributed between the three classes. As such it is a forerunner of Karl MARX'S reproduction scheme and the more sophisticated model of Wassily LEONTIEF. Quesnay suggested that since agriculture is the eventual source of wealth, PUBLIC FINANCES would be greatly simplified by a single tax (l'impôt unique) on agriculture. His advocacy of free trade and unrestricted competition had an influence on the British CLASSICAL ECONOMICS and especially ADAM SMITH.

quick assets ratio. This is the ratio of liquid assets to current liabilities. Liquid assets are cash, most term investments which can be quickly realized and accounts receivable where an allowance is made for bad debts. Stock is not included as it may not be readily realizable. This concept is a refinement on the WORKING CAPITAL RATIO but still does not present an entirely up-to-date picture of the current situation. It also ignores the inflows and outflows of cash which are of great importance to the liquidity of a company.

quits. Employees who voluntarily leave their current employment either to change jobs or to leave the labour force. In the UK employees who quit employment are ineligible for unemployment compensation in the weeks that follow and, therefore, they are unlikely to appear among the REGISTERED UNEMPLOYED. They may however enter HIDDEN UNEMPLOYMENT, if the new job they expected fails to materialize. Quits are the largest single component in labour turnover.

quota. An imposed limit on the quantity of goods produced or purchased. Import quotas can be used to restrict the purchase of goods from foreign origins, while export quotas have been used to stabilize the export earnings of countries producing primary products by restricting supply, and thereby sustaining prices. Quotas may also refer to the minimum required level of production, particularly in the context of PLANNED ECONOMIES.

quoted companies. Those companies whose share capital can be freely dealt in on the STOCK EXCHANGE. In London, the acquisition of such a status requires the issue of a quotation by the Stock Exchange Quotations Committee.

quotient rule. A rule for the determination of the DERIVATIVE of a function with
respect to a variable, where the function consists of the quotient (i.e., ratio) of two separate functions of that variable. Thus, in

\[ y = \frac{u}{v}, \]

where \( u \) and \( v \) are separate functions of \( X \), the rule states that

\[ \frac{dY}{dX} = \frac{v \frac{du}{dX} - u \frac{dv}{dX}}{v^2} \]
Radcliffe Committee. The 'Committee on the Working of the Monetary System' set up in 1957 under the chairmanship of a lawyer, Lord Radcliffe, and which reported in 1959 (Report, Cmnd. 827). The Committee, which included two distinguished economists, Professor (now Sir) Alec Cairncross and Professor R.S. Sayers, produced a wide-ranging and authoritative survey of the money and financial system. Its approach and findings reflected the trend of thought, in the ascendant at that time, that the monetary system - including its core institutions, the banks - had to be viewed within the wider setting of financial institutions and markets. The Committee rejected the traditional view of the banks as occupying a unique position as creators of money, and they concluded that the object of monetary policy should be to influence or control not the 'supply of money' but the 'state of liquidity' of the economy, a broad concept taking in both the amounts of liquid assets available and the operation and expectations of the markets and institutions which created or handled them. In the Committee's view the 'centrepiece' of monetary policy should be the structure of interest rates, not the supply of money; but in any case they saw monetary measures as forming only one, by no means dominant, part of a general policy that included fiscal policy and direct controls. The Committee's recommendations were influential in the early 1960s and while the increasing emphasis on controlling money supply since the late 1960s cuts across the Radcliffe philosophy, the practical operation of monetary policy in the UK has departed much less from the Radcliffe view than appears on the surface. (See 'NEW VIEW OF MONEY SUPPLY.)

radical economics. The generic name for writing in a socialist or Marxist tradition, relating in the main to MARXISM but adopting and using other sources of ideas such as anarchism and libertarianism. The writers are often referred to as 'The New Left'.

Radical thought is of very diverse nature but has certain common tenets, namely the belief that most economic and social problems stem from the private CAPITALIST economy, that this economy must be destroyed before amelioration of the human condition will be possible on a large scale, and that orthodox economic theory is inadequate for explaining social reality and is no more than an apologia for capitalism. Radical writing is interdisciplinary in approach and refrains from the use of advanced techniques so that it can be understood by the intelligent layman.

Several topics are extensively treated and recur in radical writing. One of the most common is inequality of income, capital and power. The analysis of inequality is extended beyond that between capitalist and worker to the proliferating intra-class differentials, which run in a continuous spectrum from the unskilled to the managerial elite. It is argued that while inequality may be a necessary consequence of scarcity, in advanced economies there is no longer any reason for scarcity, which is a manufacture of advanced capitalism, e.g. through advertising, so that there is no longer any need for excessive inequality. Radical economists argue for a reasonable minimum income for all, often as an entitlement without the need for work, and for a substantial number of necessities free of charge.

According to radical economics all forms of alienation have a common root in the SOCIAL RELATIONS OF PRODUCTION under capitalism. The worker not only loses control of what he produces, but what he produces comes to gain control of him. The massive forces of industry, which he as an individual helps to build, come to dominate his life. SPECIALIZATION and DIVISION OF LABOUR render work boring, so that instead of reaffirming himself in his work the worker mortifies his mind and body. Human beings become estranged from each other in work and in
their social organization. Despite growth in material production the quality of life is held to deteriorate, since production and society are so organized that man is unable to fulfill himself. This frustration is a potential source of social conflict. Orthodox economics it is argued takes too limited a view of man.

Two rival explanations are offered for the possible breakdown of capitalism. One views capitalism as generating such a potential surplus of output over necessary consumption that it will prove impossible to absorb all the surplus. Surplus which cannot be absorbed will not be produced, so that long run depression is regarded as inevitable. Military expenditure has played a crucial role in the absorption of surplus so far, and hence it is regarded as doubtful whether capitalism can maintain a high level of employment without this prop. The other hypothesis is that the profitability of modern capitalism is being undermined as organized labour succeeds in increasing its share of output, so that the incentive to invest may diminish with consequent large scale unemployment.

Radical economics also concerns itself with the development problems of poor countries, whose failure to develop is explained in terms of economic IMPERIALISM and neo-colonialism, in which the MULTINATIONAL CORPORATION plays a crucial role. The development of a dual economy with the multinational corporation making little positive impact on the traditional economy, the failure to train local personnel, the repatriation of profits and the exhaustion in many cases of the underdeveloped country's natural resources, all leave the underdeveloped country worse-off after the event, so that there is the development of underdevelopment. It is also maintained that resources are misallocated under capitalism: too many are devoted to goods for consumption by the upper and middle classes and to military goods and too few to PUBLIC GOODS. SOCIAL COSTS are also ignored, so that there is pollution, congestion, over-population and resource exhaustion. There is clearly a case for state intervention, but the radical theory of the state suggests that there will only be intervention where the end result defends or facilitates the operation of the capitalist state and promotes the interests of the bourgeoisie. Only those external diseconomies, the removal of which would help big business, will be dealt with and not those whose treatment would harm big business. Any action which appears to be directed against business such as anti-monopoly policy is to be interpreted as insignificant in relation to the problem or as a subterfuge to throw people off their guard. Likewise in its stabilizing role the state will absorb surplus in a politically feasible manner, military expenditure being particularly appropriate since its level, and the rate of profit on contracts can be concealed. In its redistributive role, state social expenditures will be set at the level which does not blunt incentives in the economy and which is the minimum necessary to prevent unrest.

Radical economists regard orthodox economists as unscientific, since the latter use aggregates which do not directly refer to people and their actions in macroeconomics, while in microeconomics the social origins of utilities and preferences are ignored because class analysis is entirely absent. If the analysis were scientific it would be possible, for example, to identify directly the causes of inflation or unemployment, which orthodox economists find difficulty in doing. See Sawyer, Malcolm C, The Challenge of Radical Political Economy, Harvester Wheatsheaf, London (1989).

raider firm. A company which has the potential to establish itself as a TAKEOVER threat to another company.

Ramsey pricing. Widely used in the theory of environmental EXTERNALITIES, a rule which it may be necessary to apply to all prices in an economy, when at least one good is a non-depletable PUBLIC GOOD. Where the provision of such a good cannot be financed through taxation because the amount is too great to be raised by lump-sum taxes, all prices are required to depart from underlying MARGINAL COSTS under conditions of optimality. See Baumol, W.J. and Oates, W.E., The Theory of Environmental Policy, 2nd edition, Cambridge University Press (1988).

R and D. See RESEARCH AND DEVELOPMENT.
random coefficient models.
See VARIABLE PARAMETER MODELS.

random sample. A sample, whose membership is determined by pure chance and where one observation in the sample is observed independently of all other observations (or measures) in the sample.

random variable. A variable which takes on values according to its PROBABILITY DISTRIBUTION. Thus, for instance, a normally distributed random variable will take on values in a certain range with the probability given as the integral (or area) under the NORMAL DISTRIBUTION curve lying between the limits of that range.

random walk. An example of a TIME SERIES model in which the current value of a variable is equal to its most recent value plus a random element. (See MARKOV-PROCESS.)

range. A measure of the degree of dispersion of a sample of observations, or of a distribution, calculated as the difference between the highest and lowest values of the variable. (See INTERQUARTILE RANGE.)

range (of a good). In regional or spatial economics, the maximum distance which people will travel for the purpose of buying a particular good. The range defines the outer limit of the area (known as the market area) within which a particular good will be provided from a given location. The range concept is used, as part of CENTRAL PLACE THEORY, in explaining patterns of location of retail and service centres.

rank correlation. A measure of the degree to which two variables are associated with each other, not necessarily in value, but in rank (or ordering). The measure involves the assigning of a rank to each of the observations on each of the variables according to decreasing value. Thus the highest observation for each variable would be assigned the number 1, the second highest 2 etc. The calculation of the rank correlation coefficient (sometimes called Spearman's rank correlation coefficient) involves computing

\[ r_s = 1 - \frac{6 \sum_{i=1}^{N} D_i^2}{N(N^2 - 1)} \]

where \( D_i \) is the difference between the ranks assigned to the ith observation on each of the variables and \( N \) is the sample size.

This coefficient, in just the same way as the PRODUCT MOMENT CORRELATION COEFFICIENT, will take on values between plus and minus one, indicating strength and direction of association. The measure is particularly useful for problems in which only the order of variables is important, rather than their values, and is an example of a non-parametric statistic.

ranking of projects.
See MUTUALLY EXCLUSIVE, PROJECTS, CAPITAL RATIONING.

rank of a matrix. The maximum number of LINEARLY INDEPENDENT ROWS or columns of the MATRIX. Thus, if there are no LINEAR DEPENDENT rows or columns in a matrix of order \( m \times n \), then the rank of the matrix is either \( m \) or \( n \), whichever is the lower. A square matrix of order \( n \) is said to have full rank if its rank is \( n \) (i.e. there are no linearly dependent rows or columns). If it has less than full rank its DETERMINANT will be zero, and it is a SINGULAR matrix. The rank of the matrix of cross products and sums of squares of independent variables in a REGRESSION analysis must have full rank in order for LEAST SQUARES estimates of the parameters to be obtainable. Similarly, the matrix of coefficients of a set of linear SIMULTANEOUS EQUATIONS must have full rank for a unique solution to exist.

rank-tournament compensation rule. A rule according to which the payment to the agent by the principal depends on the agent's rank in the contest. Payments to the agents depend on their performance relative to others in the same contest and constitute one type of compensation rule. Examples of rank-tournament compensation rules are numerous in professional sport, but this same rule has been employed to explain chief executives' compensation. Large salary differences between the chief executive, the winner of the tournament, and those immediately below induce those below to work hard competing for that position.
ratchet effect.  
See RELATIVE INCOME HYPOTHESIS.

rate capping. A procedure whereby the UK Secretary of State for the Environment limits the rates increases of individual local authorities. It can be viewed as an alternative to more traditional methods of controlling local authority spending, such as the manipulation of the RATE SUPPORT GRANT.

rate of commodity substitution.  
See MARGINAL RATE OF SUBSTITUTION.

rate of interest. The price of money services. While financial markets exhibit a range of rates of interest the theory of the rate of interest explains the determinants of the 'pure' rate of interest which is the price that would have to be paid to borrow money in order to undertake a completely riskless enterprise. KEYNES argued that the rate of interest was a monetary phenomenon reflecting the supply and DEMAND FOR MONEY. Supply was determined EXOGENOUSLY while the demand for money reflected the speculative, precautionary and transaction demands for money. Money acted as a store of wealth but the OPPORTUNITY COST of holding wealth in this form was the rate of return that could be earned on other financial assets. ARBITRAGE in financial markets ensured that the RATES OF RETURN across all financial assets tended to equality and the unique rate thus established represented the market rate of interest.

In contrast to Keynes, classical economists had regarded the rate of interest as a real phenomenon. The rate of interest was determined by the forces of productivity - the demand for funds for investment purposes - and thrift, the supply of savings. A positive rate of TIME PREFERENCE described an upward sloping savings schedule and a diminishing marginal product of capital described a downward sloping investment demand schedule. The intersection of those two schedules determined the rate of interest, and thus the interest rate could be regarded as a real phenomenon.

In the classical system the rates of return on physical and financial assets would tend to equality and establish a unique market rate of interest. In contrast Keynes argued that speculation in the BOND market would tend to stabilize the interest rate and that the rate thus established could differ from the rate of return on physical assets. In turn this might lead to a shortfall in investment and deficiency in aggregate demand. In this manner Keynes integrated the real and monetary sectors of the economy in contrast to the CLASSICAL DICHOTOMY. Later HICKS established via the IS-LM DIAGRAM that the rate of interest was both a real and monetary phenomenon. Most recently MONETARIST have argued, once again, that the rate of interest is a real phenomenon and, in common with classical economists, that the rate of return on physical and financial assets would tend to equality in the long run.

rate of return. A general concept referring to the EARNINGS from the INVESTMENT CAPITAL, where the earnings are expressed as a proportion of the outlay. The term is applied to a wide variety of situations in economics. It can refer to the earnings from the investment of physical capital, money capital and also to the return to investment in HUMAN CAPITAL. The term is most frequent applied to the rewards from capital expenditure by businesses. The definition employed unfortunately varies among users. Accountants and businessmen have traditionally had a different definition compared to economists, but there is now a tendency for the economist's definition to become more widely accepted. The traditional approach of businessmen and accountants is to define the term as the ratio of PROFIT to capital employed. Profits have been defined in various ways for this purpose, but the most sensible is net profit after TAXATION and DEPRECIATION. Profits refer to the initial year's profits or to an average over the lifetime of the project. The initial year's profits may be quite unreliable and average profit is clearly more sensible. Capital has been defined as either the initial capital expenditure on a project including working capital, or average capital employed over the project's lifetime. The latter definition is superior. The profits in a year expressed as a percentage of the capital figure gives the rate of return on capital employed. It is compared with the firm's COST OF CAPITAL.

Economists do not find the above concept very helpful in assessing the rewards
rate of surplus value. In the Marxian scheme the ratio which SURPLUS VALUE bears to VARIABLE CAPITAL. Marx regarded this as an expression for the degree of exploitation of labour by capital, for the rate of surplus value indicates how many hours the worker labours creating profit for the capitalist for every hour he labours creating the value equivalent of his own subsistence.

rate of time preference.
See TIME PREFERENCE.

rates. A TAX based on the rateable value of land and buildings which was replaced in the UK in the late 1980s by the community charge. Rateable values were based on annual rental values. The amount of rates which a taxpayer had to pay was determined by multiplying the rateable value of the property by the 'rate poundage'. This was determined by the local authority. It was calculated by dividing the yield of a 'penny rate' (i.e. the yield of one penny in each pound of total rateable value) in the area into the total amount required. If the expenditure to be met from rates was £300,000 and the yield of a penny rate was £6000 then the rate poundage would be 50p.

A number of reliefs were available from rates. Agriculture had been derated for a long time. Rate rebates were later introduced for households. The amount of rebate was related to the ratepayer's income and his family commitments. The cost of these was largely covered by the RATE SUPPORT GRANT. The existence of rebates made the system less regressive.

The LAYFIELD REPORT on Local Government Finance recommended that capital values replace rental values as the basis for rates. The Layfield Committee also recommended that local income from rates be supplemented by a local income tax but successive UK Governments have had no sympathy with this idea.

When the COMMUNITY CHARGE was introduced for persons a uniform business rate was introduced for businesses. Whereas previously the rate poundage paid by firms varied from one local authority to another, the uniform rate means that all firms in the country pay the same rate poundage, though this varies between Scotland and England and Wales.

rate support grant. A mechanism for transferring funds from the national government to local authorities in the UK. This inter-governmental grant now forms the main source of income for British local governments. The amount of grant allocated to
a local authority is calculated on three main elements.

1. The resources element provides additional income to those local authorities in which an extra penny on the RATES yields less revenue per head than some national standard. Thus if the national standard for an extra penny on the rates is £x and a one penny rate increase in some local authority yields less, say £y, the resources element provides the local authority with £x — y for every penny of rate levied. In this way the Rate Support Grant functions as an EQUALIZATION GRANT, though it does not achieve full equity since funds are not removed from areas where each penny of rates yields above the national standard.

2. The needs element aims to meet particular costs imposed on local authorities by such factors as the age structure of the population or the physical nature of the area. It is calculated on the basis of an analysis of past expenditure patterns and thus runs the risk of being influenced by service standards or the degree of local government efficiency rather than real needs.

3. The remainder of the grant is simply provided in proportion to the population of the area.

The Rate Support Grant may be spent in any way an authority chooses - it is thus a general grant. So far as the actual amount paid to a local authority under the resources element is determined by the rates levied by that authority, the grant is in part a 'matching grant'. Rate support grant has gradually come to replace many grants which were provided to local authorities for specific services. (See LAYFIELD REPORT.)

rational expectations. The application of the principal of rational maximizing behaviour to the acquisition and processing of information for the purpose of forming a view about the future. It suggests that individuals do not make systematic forecasting errors; on the contrary that their guesses about the future are on average correct. Thus the theory suggests that individuals use all the available and relevant information when taking a view about the future and at a minimum use information up to the point at which the marginal costs of acquiring and processing information equal the marginal benefits derived from this activity. In the extreme where information is complete and there is no uncertainty this hypothesis reduces to one of perfect foresight.

Rational expectations together with efficient market clearing constitute the two central tenets of the NEW CLASSICAL MACROECONOMICS which purports to show that any attempt to stabilize the level of output and unemployment in the short run is ineffectual. (See ADAPTIVE EXPECTATIONS; PARTLY RATIONAL EXPECTATIONS.) See Sheffrin, S.M., Rational Expectations, Cambridge University Press, London (1983).
	rationality. Behaviour by an economic agent (consumer, producer, government etc.) which is consistent with a set of rules governing PREFERENCES. In CONSUME DEMAND THEORY, for example, the rules, or axioms, would include the AXIOMS OF COMPLETENESS, TRANSITIVITY and SELECTION. Additional axioms are necessary to establish a testable theory of rational economic behaviour. (See AXIOMS OF PREFERENCE, ECONOMIC MAN.)
	rational lags. A DISTRIBUTED LAG formulation in which the weights on successive values of the lagged variable are determined by the ratio of two POLYNOMIAL lag schemes. This gives greater flexibility of lag structure than the simple use of the latter.
	rationing. Any method of allocating scarce product or service other than by means of the PRICE MECHANISM. Rationing in some form must occur if, within a market price is artificially maintained at a level below equilibrium; hence, during the Second World War PRICE CONTROLS in the UK were accompanied by government regulations rationing, with coupons distributed according to explicit criteria.

Rawlsian justice. An approach to the issues of a just society, and in particular DISTRIBUTIVE JUSTICE, which has been proposed by the Harvard University philosopher John Rawls. In his book, A Theory of Justice (Oxford University Press, 1972), Rawls argues that a just arrangement of society is that which individuals would choose if they were uninfluenced by their own pure personal vested interests. As a metaphor for this disinterested state, individuals a
imagined to enter into an agreement, or SOCIAL CONTRACT, about the nature of society while behind a 'veil of ignorance' which prevents them from knowing what position (in terms of sex, race, ability and so on) they will occupy in that society. Rawls argues that if placed in this 'original position' individuals would choose a set of institutions for the society with the following characteristics:

1. Each individual would enjoy equal rights to the maximum amount of personal freedom compatible with the freedoms of other individuals.

2. All inequalities in society would (a) be derived from positions open to free competition; (b) be justified only in so far as the inequalities operated to everyone's advantage.

It is the second characteristic, which Rawls calls the 'difference principle' which has been of greatest interest to economists. Under the difference principle, inequalities would only be acceptable to the extent that they provided incentives to work and produce. Further, the difference principle also imposes the requirement that the inequalities must enable the least well-off person in society to be made as well-off as possible. Note that Rawls considers the terms 'well-off, 'better-off and inequality in terms not of UTILITY but of PRIMARY GOODS which can be defined as rights, freedoms, opportunities, income and wealth.

The adoption of the difference principle by individuals in the original position may be explained in terms of the MAXIMIN strategy in GAME THEORY; adoption of the principle ensures each individual of the greatest protection possible against the risk of being the poorest member of society.

**R, D and D.** Research, Development and Demonstration. (See RESEARCH AND DEVELOPMENT.)

**reaction functions.** Specifies for any one firm the optimum value for a choice variable given the value chosen by competitors. Reaction functions are commonly used in oligopoly theory: for instance, in a duopoly within which each firm chooses that output level which maximizes profit, and assumes the output level of the other to remain constant in response to that choice, the reaction function of the two firms allows us to trace the output path of the industry.

**real balance effect.** Generally employed to describe the situation where there is a change in the demand for commodities as a result of a change in the quantity of REAL MONEY BALANCES. More accurately the direct real balance effect as detailed by Patinkin, and earlier known as the PIGOU EFFECT, is the increase in the demand for commodities for consumption as a result of portfolio adjustments by individuals following a change in real money balances. This results in a shift in the IS curve in the IS-LM DIAGRAM. This direct real balance effect should not be confused with the indirect KEYNES EFFECT which shifts the LM curve, although in practice the term real balance effect is often used to describe both effects. (See WEALTH EFFECT.)

**real cost approach to international trade.** The Ricardian theory of COMPARATIVE ADVANTAGE is based on a real cost approach. Real cost was initially the exertion of labour in making a commodity, but it was subsequently extended to the use of capital, since the formation of capital involves abstinence from present consumption. The approach maintains that it is in differences in real costs that comparative advantage lies. Land, however, enters into the production of traded goods, but it is not possible to regard the use of land as involving a real cost. Because of this deficiency the real cost approach has been largely superseded by the OPPORTUNITY COST APPROACH TO INTERNATIONAL TRADE.

**real money balances.** The value of money holdings measured in terms of the quantity of goods and services they command.

**real national output.** The value of total output - NATIONAL INCOME - measured in 'constant prices' - i.e. with the general rate of INFLATION deducted so as to record the real command over resources.

**real wages.** Wage rates or wage earnings that are measured in terms of the goods and services they can buy. Theoretically they are measured by the slope of the BUDGET CONSTRAINT relating hours of leisure to the
amounts of market goods for which hours can be exchanged in the market. In practice, they are obtained by dividing, or 'deflating', nominal wage rates or wage earnings by the RETAIL PRICE INDEX.

receiver. A receiver is a person appointed to take over the property of a debtor, and to receive the income from that property with a view to paying off the debt. Receivers are often appointed in respect of the property of LIMITED COMPANIES. They are usually appointed by a secured creditor of the company, or the court, on the request of such a creditor. A secured creditor is someone who is owed money by the company which is in debt and he has taken a security over all or part of the company's assets in order to protect his own interests. Although receivers originally simply collected rents and profits, it is now usually for a person to be appointed receiver and manager and it is his function to realize the assets comprised within the creditor's security with a view to paying off the secured creditor and thereafter returning any surplus to the company.

recession. The CONTRACTIONARY PHASE of the TRADE CYCLE which follows a peak and ends with the trough. The term recession is generally reserved for the mild version of this phase, unlike the SLUMP which is a severe version. If the underlying growth rate of output (or income) is sufficiently positive, a recession may be marked by a fall in the growth rate with no absolute fall in output.

reciprocal. A quantity raised to the power of minus one. Thus, the reciprocal of 2 is $\frac{1}{2}$, and that of $x$ is $\frac{1}{x}$.

reciprocal demand. The demand by one country, in terms of its own goods offered, for the goods of another. The concept was introduced by J.S. MILL to explain how the exact international TERMS OF TRADE would be established between the two CLOSED ECONOMY equilibrium price ratios between two commodities by means of the strength of reciprocal demand in each country. This situation Mill described as the equation of international demand.

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**Reciprocal Trade Agreements Act of 1930 (RTA).** The Smoot-Hawley Tariffs 1930 imposed such high import duties that US international trade was virtually eliminated. The President and the Congr recognised the connection between high import TARIFFS and reduced ability to export and pushed for lower tariff rates. The RTA reduced tariffs by 50 per cent across the board. It also provided for bilateral agreements to further reduce rates, using unconditional most favoured nation form; Prior to the RTA, average import duties the US were 51.4 per cent. By 1962, action under the RTA had reduced average tariff rates to 11.1 per cent. By 1990 industri tariffs averaged 5 per cent.

recognition lag. The period which elapses between the time a potentially destabilizing disturbance occurs and the time it is recognized as such by policy makers. Also a component of INSIDE LAG.

recontract. An arrangement by which buyers or sellers can change the amount of offer if that particular set of prices does not clear the market; the amounts will then be changed according to whether there is an excess-demand or excess-supply situation (See TATONNEMENT.)

recursive model. A model in which the current values of one set of variables determine the current value of another, whereas previous (or lagged) values of the latter determine the current values of the former. A simple example of a recursive model is

$$Y_t = a + bX_t$$

$$X_t = c + dY_{t-1}$$

where $X$ and $Y$ are variables and $a, b, c$ and $d$ are constants. The COBWEB model in price theory is a recursive model.

recursive residuals. See KALMAN FILTERING.

redeemable loan stock. See FINANCIAL CAPITAL.

redeemable preference shares. See FINANCIAL CAPITAL.
redeemable securities. This can mean either SECURITIES that will be redeemed - repaid - at a certain date, or securities that can be redeemed at the option of the borrower.

redemption date. The date at or by which securities which are redeemable, but not at the borrower's option, must be repaid.

redemption yield. An investor who buys a dated stock at a price below its nominal value will if he holds to redemption make a capital gain, in addition to the annual interest payable on the stock. The redemption yield, which may be calculated gross or net of CAPITAL GAINS TAX, is therefore the yield on the current value of the stock adjusted upwards to take account of the discounted value of the ultimate capital gain.

redistribution. The process of altering the existing distribution of (usually) income or wealth in a society. Redistribution may be the result of a deliberate policy to transfer income between individuals or may be an 'accidental' effect of a policy. Examples of deliberately redistributive policy include high levels of INCOME TAX on high earners and INCOME MAINTENANCE policies which provide payments to the poor. Such policies may be said to represent an attempt to achieve DISTRIBUTIVE JUSTICE or to attain the 'best' or 'optimal' distribution of income. On the other hand, a policy such as providing free university education may have unintended effects on the distribution of wealth. In general we may distinguish between redistribution 'in-cash' where individuals have money taken from or given to them and IN-KIND REDISTRIBUTION where individuals are provided with goods and services free or at a subsidized price. Economists have analysed redistribution in a POSITIVE sense - analysing the effects of various distributive policies - and in a NORMATIVE sense - considering the problem of distributive justice. The last-mentioned area remains extremely controversial involving, as it does, many VALUE JUDGEMENTS.

reduced form (RF). The form of a set of SIMULTANEOUS EQUATIONS in which the ENDOGENOUS VARIABLES are expressed as functions of only EXOGENOUS VARIABLES, i.e. no endo-
genous variables appear on the right hand side of the equations. (See STRUCTURAL FORM, INDIRECT LEAST SQUARES.)

redundancies. Involuntary job losses due to a reduction in manpower requirements on the part of firms. Such reductions may involve either the complete closure of plants or the scaling down of the size of the workforce in a plant. While some employees will have been declared redundant through no fault or choice of their own, where substantial SEVERANCE PAY is offered some employees may elect to be declared redundant. Redundancies are one element in DISCHARGES.

redundancy payments. See SEVERANCE PAY.

re-export. A good imported from one country, which is not consumed within the importing country but is instead sent to a third country.

regional development grant. Payments formerly made by the British government to firms undertaking new manufacturing INVESTMENT in those regions designated as DEVELOPMENT AREAS and SPECIAL DEVELOPMENT AREAS. This grant was introduced in the Industry Act 1972 and was available for expenditure on plant, machinery and buildings. Unlike pre-existing forms of assistance it was available to all manufacturing firms undertaking new investment and not only to those firms in the process of moving into an area. Regional development grants were phased out from March 1988. (See ASSISTED AREAS, REGIONAL POLICY.)

regional economics. Regional economics is that branch of economic analysis which is concerned with the spatial distribution of economic activity and spatial variation in levels of economic performance. The subject can be split in the usual way into macroeconomic and microeconomic topics. In regional macroeconomics, the analysis is usually carried out in terms of the comparative economic performance of a number of regions within a national economy but each region is regarded as being, in economic terms, homogeneous - that is no attention is given to variations within each region.
Topics dealt with in regional macroeconomics include the comparative economic growth of regions within a nation, variations in unemployment levels between regions and the movement of FACTORS OF PRODUCTION (labour and capital) between regions. Some ECONOMETRIC MODELS of regional economies have been constructed; these are essentially similar to models of national economies but must take particular account of interrelationships between regions.

Regional microeconomics is much more concerned with the location and interaction of particular economic activities. It considers the influence of space and distance on economic activity in an explicit fashion and does not treat regions as homogeneous entities. The topics of regional microeconomics are generally dealt with in LOCATION THEORY. The term Spatial Economics is sometimes used as a synonym for Regional Economics though the emphasis on the importance of space and distance is characteristic of regional microeconomics rather than regional macroeconomics. Where the topics of Regional Economics are considered with specific reference to towns and cities, the term URBAN ECONOMICS is applied.

Regional economics, especially the macroeconomic aspects, has developed largely as an applied analysis and its growth owes much to a political concern with regional variation in prosperity and economic performance. A useful introduction to the subject is to be found in E.M. Hoover, An Introduction to Regional Economics, Knopf, New York (1971).

regional employment premium. A SUBSIDY which was paid to manufacturing firms in DEVELOPMENT AREAS and SPECIAL DEVELOPMENT AREAS in the UK between 1967 and 1977 on the basis of the number of workers employed by the firm, originally at £1.50 per worker and later at £3 per worker. As the payment was directly related to employment it was hoped that the subsidy would encourage firms in high unemployment areas to recruit more labour. The payment was also seen as a way of reducing the costs of production to firms in DEPRESSED AREAS, and as a balance to the various subsidies available for CAPITAL EXPENDITURE in development areas.

regional multiplier. A version of the MU TIPLIER which is employed in the analysis of regional economies. The regional multiplier is used to predict the change in total income or employment in a region which will result from an increase in some element of AUTOMATIC EXPENDITURES. The regional multiplier is essentially similar to the usual multiplier employed in macroeconomics in that an initial increase in demand is said to lead to an even greater expansion of regional income as the income received from the initial injection of demand is spent and re-spent in successive "rounds" of expenditure the process coming to an end when the demand increase is offset by leakage through saving, taxation and imports. The regional multiplier is thus open to the same criticisms as the general multiplier concept, in particular its reliance for its operation on the existence of unemployed resource which enable output to expand as demand rises. In general we would expect estimate of the regional multiplier to be lower than those for a national economy since a region will be much more "open" than a nation - that is a relatively large amount of demand will "leak" away into imports in the case of a region. Different versions of the regional multiplier are employed depending upon the type of initial demand change which is being considered. The simplest case is when we know the increase in incomes resulting directly from the demand increase - the normal income multiplier is simply applied to this figure. When we are given only the increase in demand for the products of a particular industry it is necessary to begin by applying an "input multiplier" (also called a 'matrix multiplier') which calculates the increased demand for inputs from the region which arises from the increased demand for output. In general the increased demand for inputs from the region will be less than the increase in output demand since some inputs such as raw materials or machinery may have to be imported. When the demand for inputs has been estimated, the initial increase in incomes may be calculated and the normal multiplier applied. Where the calculation is carried out in terms of employment changes rather than income changes we speak of regional employment multipliers. The term 'local multiplier' is also used though this is generally understood to refer to...
to an area smaller than one to which the term region would be applied.

As an alternative to the Keynesian approach of estimating injections and withdrawals, the economic base multiplier calculates the expansion in total employment resulting from an expansion in employment in basic industries on the grounds that a fixed relation exists between basic and total employment. Estimates of base multipliers often produce results rather greater than those of Keynesian multipliers but it should be borne in mind that the base multiplier is concerned with changes over fairly long periods while the Keynesian multiplier is concerned with short-run changes.

The regional multiplier may be further extended by including the possible effects of a growth in regional income on investment (as in the accelerator model) and on movement of new firms. Inclusion of these effects yields what has been termed the 'supermultiplier'.

**regional policy.** A form of government economic policy which is aimed at altering the regional pattern of economic activity or economic performance. Policies will be influenced by what policy-makers consider to be the desirable pattern of regional economic performance and what they consider to be the most effective way of altering that pattern. Most generally regional policy has been directed to improving the economic performance and status of depressed areas and narrowing the gap in performance between regions. While economic performance can be measured by various indices such as growth or income levels, British Regional Policy can be seen as mainly a response to differences in unemployment rates between regions. The main forms which such policy takes include encouraging the movement of industry into areas of high unemployment, encouraging the movement of workers out of these areas, supporting firms operating in depressed areas and generating income by raising public expenditure in depressed areas. Substantial controversy surrounds the question of the effectiveness of such policies. For a review of the issues see H. Armstrong and J. Taylor, *Regional Economic Policy,* Philip Allan, Oxford (1978).

**regional wage differentials.** Differences in the average levels of pay of groups of workers classified according to the region in which they are employed. The pure regional money wage differential which remains after all adjustments for the different occupational, industrial, sexual and racial mix of different regions may be due to differences in the cost-of-living between regions or to disequilibrium phenomena such as relative shortages or surpluses of labour and capital in various regions. Barriers to mobility may result in substantial regional differences in the short run but in the long run these should disappear. (See regional wage structure and wage differentials.)

**regional wage structure.** The ranking of the average levels of pay of groups of workers classified according to the region in which they are employed. (See wage structure, regional wage differentials.)

**registered unemployed.** Also known as the claimant count, the total in the UK of all persons who are registered as claiming benefit at Unemployment Offices. This information is available cheaply and quickly as a by-product of administrative procedures. Turnover on the register is extremely high. At a time when unemployment in the UK was around 1.4 million almost 0.4 million joined or re-joined the register every month. Since the total number on the register at this time remained roughly constant it is clear that a similar number left the register each month. The pool of registered unemployed may therefore increase either as a result of more people joining the register or because fewer people leave. If the outflow falls the average duration of unemployment will correspondingly rise.

This method of counting the unemployed is only one approach and it suffers from the disadvantage that it fails to capture all those unemployed who have no entitlement to benefit. The alternative approach of a sample survey of households to discover all those unemployed but actively seeking work is also used in the UK and is the principal method used in the US. (See also unemployment, hard-core unemployed.)

**recessand.** The dependent variable in a regression analysis.

**regression.** An analysis involving the fitting of a regression equation (or mathematical model) to a sample of data so as to approximate the dependence of one variable (the regressand) on one or more independent variables (the regressors).
niatical relationship) to a set of data points, usually by the method of ORDINARY LEAST SQUARES, for the purposes of establishing quantitative economic relationships (estimating the values of parameters), or testing economic hypotheses. Simple linear regression refers to the fitting of a LINEAR FUNCTION between two variables. Multiple linear regression involves the fitting of a linear function containing two or more INDEPENDENT VARIABLES. (See ESTIMATION, ECONOMETRICS.)

regressive expectations. The expectation that the departure of the actual value of a variable from its equilibrium value, often a new one, will be followed by a return to the equilibrium value. The assumption is used in the literature on exchange rate determination, usually in connection with OVER-SHOOTING. (See ADAPTIVE EXPECTATIONS, RATIONAL EXPECTATIONS, PARTLY-RATIONAL EXPECTATIONS, STATIC EXPECTATIONS.)

regressive tax. A situation where the average rate of tax falls as income rises. Most INDIRECT TAXES are generally held to be regressive. With EXCISE DUTIES the same amount of tax is paid per unit purchased. This represents a lower proportion of income the higher the latter becomes. POLL TAXES are also regressive.

regressor. An INDEPENDENT VARIABLE in a REGRESSION analysis.

regret matrix. See MINIMAX REGRET.

Regulation Q. A US regulation by the FEDERAL RESERVE SYSTEM set in 1933 on interest rates payable by banks on small deposits. The stringency of the regulation has been gradually relaxed since the mid-1960s, because it was seen as a primary cause of distortions in the banking system in times of tight money, such as massive Euro-dollar borrowings by US banks to replace the lost deposits. Regulation Q has functioned, de facto, to protect SAVINGS AND LOAN ASSOCIATIONS (which are permitted to pay more for time deposits than are commercial banks) and to prevent large commercial banks from excessively vigorous acquisition of funds for expansion of credit. However, incr DISINTERMEDIATION in 1973-4 and 19 led to a phasing out of regulation Q the terms of the Depository Institut Deregulation and Monetary Control Act 1980.

reintermediation. See DISINTERMEDIATION.

relative deprivation. A concept born by institutional economists from soci to provide a micro-behavioural foun of the allegedly non-market process w by wages are determined (see SPIL HYPOTHESIS). Relative deprivation is feeling which is said to arise when ii dual/group i observes another group i referent group) experiencing some\l such as a higher wage than i currently and which i is also desirous of obtainin considers feasible. Perception of re depr is intimately related to the cess of reference group comparisons an choice of comparisons will dictate the m tude of relative deprivation experient i. Changes in this magnitude, resulting changes in reference group and wage \r within the reference group, will affect wage change sought by i. Thus, it is at that some composite measure of re depr should enter aggregate inflation equations as an independent a ble. Relative deprivation is attribute inequalities in the social system.

relative income hypothesis. The i thesis that individual and/or household sumption is a function both of inc relative to that of other households or viduals and to the level of income in immediately preceding periods. This part theory was suggested by J. Duesen (1949) to explain the conflicting long and short-run cross-section evidence or specification of the CONSUMPTION FUNCTION.

The first part suggests that the fractic income consumed by a household, its A AGE PROPENSITY TO CONSUME, is determ by its relative income, i.e. by its positic the INCOME DISTRIBUTION. Therefore i incomes double its position in the inc distribution is unchanged and it will cont to consume the same proportion of inc
its average propensity to consume will remain unchanged. It can therefore be shown that if the income distribution remains unchanged in the long run the average propensity to consume will remain constant as income increases. This aspect of the theory explains the evidence on the form of the LONG-RUN CONSUMPTION FUNCTION. Further as we move up the income distribution we find a lower average propensity to consume at higher levels of income as suggested by the CROSS-SECTION evidence. Effectively therefore a series of cross-section consumption functions, one for each period of time, is shifting upwards producing a single long-run consumption function with a constant average propensity to consume.

The second part of the hypothesis explains the specification of the SHORT-RUN CONSUMPTION FUNCTION. It suggests that households find it easier to adjust to rising incomes than falling incomes; there is a 'ratchet effect'. Therefore as incomes decline in the recession households seek to maintain their standard of living and their consumption falls by less than their income. It follows that at lower levels of income, during the recessionary phase of the TRADE CYCLE, the average propensity to consume rises, as the evidence on the short-run consumption function suggests.

Thus the relative income hypothesis reconciles the conflicting evidence on the form of the consumption function. However it suggests that:
1. increases in the full employment level of income always produce a proportional increase in consumption. This is unlikely with exceptionally large or unexpected increases in income; and
2. consumer behaviour is irreversible. Thus a fall in income will lead to dissaving as consumption is maintained, regardless of the duration of the fall in income. In fact consumption is slowly reversible over time. Indeed empirical evidence has revealed recessions in which consumption actually rose.

These shortcomings of the relative income hypothesis are taken account of in the subsequent LIFE-CYCLE HYPOTHESIS and PERMANENT INCOME HYPOTHESIS. (See ABSOLUTE INCOME HYPOTHESIS.)

**relative price.**

*See* PRICE.

**relative price.** The term used to describe the differences between the average levels of pay of groups of workers in the same occupation, who are covered by different pay negotiating groups. While frequently considered distinct from WAGE DIFFERENTIALS they are essentially a specific sub-group of these.

**renewable resource.** Any resource which is capable of being replenished, in part or whole, by 'natural' means. Examples would be fish, timber, animal populations. However, replenishment may be difficult if the resource is subject to a long gestation period (30-50 years for trees) or if persistent over-exploitation is practised (as with many species of whales). In short, renewability does not imply that the resource cannot be exterminated.

**rent.**

*See* ECONOMIC RENT.

**rent gradient.** A relationship employed in URBAN ECONOMICS which expresses the rent paid for use of a unit of land as a function of distance from some reference point - usually the city or town centre. Most, though not all, analyses of urban location patterns indicate that a negative rent gradient will exist - i.e. rents will fall as we move away from the central point. The rent gradient is usually seen as the outcome of competitive bidding by the alternative users of each site. (See BID-RENT FUNCTION, ACCESS/SPACE TRADE-OFF MODEL.)

**rentiers.** Owners of capital who derive all or most of their income from this source, but who choose to exert no effective control over its use.

**rent seeking.** The use of real resources in an attempt to appropriate a surplus in the form of a rent. An industry may use resources to lobby a government to impose a restriction such as a TARIFF on an imported good, so that the factors of productions in the industry earn payments in excess of their TRANSFER EARNINGS as a result of the higher market price for the good, which they produce. Consumers suffer two losses
from rent seeking; the loss of CONSUMERS' SURPLUS from the higher price and the loss of output from the resources devoted to rent-seeking. Resources may subsequently be devoted to rent protection. In international economics a related, though different, concept has been developed with the name, directly unproductive profit-seeking (DUP). See Rowley, C.K., Tollison, R.D. and Tullock, G., *The Political Economy of Rent-Seeking*, Kluwer Academic Publishers, Boston (1988).

replacement cost.  
See HISTORICAL COST.

replacement cost accounting. A method of accounting which adjusts for price changes by calculating profit as the difference between the selling price of a good and its replacement cost on date of sale.

replacement investment. The amount necessary for replacing that part of the CAPITAL STOCK which is used up in the process of production. (See DEPRECIATION.)

replacement ratio. The ratio of total net income (income plus benefits net of tax and housing outlays, allowing for rent and rate rebates) when unemployed to that when working. This ratio has been shown to exceed unity in certain cases and this has led to a great deal of popular speculation about the disincentive effects of unemployment and other benefits on the desire to work.

representative firm. A firm characteristic of the industry or sector of the economy being analysed.

repressed inflation. A situation where a price freeze is controlling the rate of change of prices without affecting the underlying inflationary tendencies. (See INCOMES POLICY, INFLATION.)

required reserves. In US banking, depository institutions are required to maintain a certain percentage of the liabilities they issue (basically, chequing, saving, and certificate of deposit accounts) as idle balances. For institutions which belong to the FEDERAL RESERVE SYSTEM, such balances may be held on deposit with the Federal Reserve or in the form of vault cash. Non-member institutions keep their reserves in the form of deposits with member banks or in vault cash. (In 1980, 38 per cent of all commercial banks were members of the Federal Reserve System, but they held 70 per cent of all bank assets). The Deregulation and Monetary Control Act of 1980 and the Garn-St Germain Depository Institutions Act of 1982 have mandated that all depository institutions, whether or not they belong to the Federal Reserve system, are subject to the same reserve requirements. As of August 1991, institutions with deposits of $41.1 million or less must hold 3 per cent of their chequeable accounts in reserve and those with over $41.1 million must hold 12 per cent of their chequeable accounts in reserve. (See EXCESS RESERVES, FREE RESERVES, RESERVE RATIOS.

resale price maintenance. Agreement whereby manufacturers independently or collectively specify minimum prices at which their products could be resold by wholesalers and retailers.

Resale Prices Act 1964. UK legislation which prohibited resale price maintenance by an individual firm. The Restrictive Practices Court can exempt certain classes of goods from prohibition if the agreement is deemed to have beneficial effects for consumer welfare. (See RESTRICTIVE TRADE PRACTICES ACT 1956.)

research and development (R and D). Activity devoted to increasing scientific or technical knowledge and applying that knowledge to the creation of new products and means of production as well as to the improvement of existing products and production processes. When research and development is extended to the manufacture of a prototype commercial product the term 'research development and demonstration' is used to describe the whole sequence. R and D is important both to FIRMS and to governments - in the latter case particularly for military purposes. Economists are particularly interested in R and D as a cause of TECHNICAL PROGRESS, INNOVATION and ECONOMIC GROWTH. (See PROCESS INNOVATION, PRODUCT INNOVATION.)
reservation wage. The worker searching the LABOUR MARKET for a job will have some idea of the wage he desires or merits, based on his previous wage and wage offers that are known in some expectational sense. He can thus be viewed as setting a minimum standard for jobs he will find acceptable. This is known as the reservation wage. His OPTIMAL strategy is to accept any job that pays above this critical value and reject all offers below this value. It may well be the case that the reservation wage is set at too high a level, say during a cyclical down turn, and in this case it is likely gradually to be revised downwards as the search process lengthens, so as to be more consistent with offers received.

reserve assets ratio. The minimum ratio which, between 1971 and 1981, all BANKS operating in the UK, as well as the larger FINANCE HOUSES, had to maintain between defined 'eligible assets' and similarly defined 'eligible liabilities'. This ratio, originally termed the 'eligible assets ratio', and set at 12.5 per cent for the banks and 10 per cent for the finance houses, was introduced in September 1971 under the revised credit control arrangements proposed in the BANK OF ENGLAND’S consultative document, 'Competition and Credit Control' of May 1971. 'Eligible assets' comprised a variety of short-term assets, including TREASURY BILLS and similar ELIGIBLE PAPER, MONEY AT CALL and GILT-EDGED securities with one year or less to run. 'Eligible liabilities' were, broadly, all deposits denominated in sterling with a maturity of two years or less, minus certain offsets, e.g. a proportion of cheques in course of collection. The* reserve assets ratio, which replaced the CASH and LIQUIDITY RATIO requirements applicable under previous monetary control arrangements, was itself discontinued in August 1981, under the revised arrangements introduced then. Under the new arrangements all banks and LICENSED DEPOSIT TAKERS are required to maintain a non-operational balance of deposits at the Bank of England equal to 0.5 per cent of a slightly redefined 'eligible liabilities' total; above that they are free to determine their holdings of all types of reserves by their own prudential criteria. (See MONETARY MANAGEMENT, MONETARY POLICY.)

reserve base. The quantity in the financial system of those assets which, either practically or legally, may constitute the reserves of the banking system, and which in the traditional theory of the CREDIT MULTIPLIER form the multiplicand on which that multiplier operates to determine the total quantity of bank deposit money. (See HIGH-POWERED MONEY.)

reserve currency. The name given to a foreign CURRENCY which a government is prepared to hold as part of its foreign exchange reserves; this is used to finance international trade. There are four necessary attributes that such a currency must possess. First, it must have a stable value; second, it must belong to a country which plays a significant part in world trade; third, there must be a viable FOREIGN EXCHANGE MARKET in which the currency can be exchanged; and finally, it must have free CONVERTIBILITY. The dollar, and the pound, although less used more recently due to speculation about their long term stability, and the Deutsche-mark and Swiss franc, are often used as reserve currencies. (See FOREIGN EXCHANGE MARKET, INTERNATIONAL LIQUIDITY, STERLING AREA.)

reserve ratio. The ratio of an asset, or group of assets, held as a reserve, to some total of liabilities or commitments, and that is in some degree an object of operating policy of the institutions concerned. The term arises commonly in regard to banks and other deposit-taking institutions which, because of the LIQUIDITY of their deposit liabilities have long recognized the need to maintain a part of their asset portfolios in similarly liquid assets. In banking this came to be expressed in certain working rules of ratios between liquid assets - e.g. CASH, BILLS, MONEY AT CALL - and outstanding deposits. Later, CENTRAL BANKS came to recognize the importance of the banks maintaining predictable reserve ratios, partly to ensure soundness, but more especially to enhance the effectiveness of OPEN MARKET OPERATIONS as instruments of MONETARY POLICY. In most systems the banks and other financial institutions are required by law to observe specified minimum reserve ratios. (See CASH RATIO, ELIGIBLE ASSETS RATIO, LIQUIDITY RATIO.)
residual. The difference between an actual data point and the value indicated by an estimated equation. Thus the residual for any observation is given by

$$e_i = Y_i - \hat{Y}_i$$

where $Y_i$ is the actual value of the dependent variable, and $\hat{Y}_i$ is the estimated value of the dependent variable from the regression equation, given the actual values of the independent variables.

The method of least squares is an estimation technique which 'chooses' the parameter values so as to minimize the sum of the squared values of the residuals (residual sum of squares).

restricted least squares (RLS). A method of estimating the parameters of an equation in which a priori information is taken into account. For instance, in a Cobb-Douglas production function we may wish to impose the restriction of constant returns to scale by constraining the sums of the estimates of the exponents of the factor inputs to be equal to one. The procedure is based on ordinary least squares, but results in better estimates in the sense that their variances are smaller than those which would be obtained by unrestricted techniques. (See Bayesian technique)

Restrictive Practices Court.
See restrictive trade practices act 1956.

Restrictive Trade Practices Act 1956. UK legislation which declared illegal the enforcement of resale price maintenance by manufacturing firms acting collectively. The Act further required a wide range of restrictive agreements, covering for example, prices, quotas, restrictions on capacity, to be registered with the Registrar of Restrictive Trade Practices, and established the Restrictive Practices Court. The Registrar was responsible for initiating procedures on individual agreements in the Restrictive Practices Court. The Act requires the Court to proceed on the assumption that the agreement operates against the public interest. It is then the responsibility of the defenders, i.e. the members of the agreement, to justify the maintenance of the agreement.

Restrictive Trade Practices Act 1968. The major feature of this legislation was a provision relaxing the compulsory registration of agreements required by the Restrictive Trade Practices Act 1956. This provision empowered the Board of Trade to exempt agreements designed to improve efficiency or to create productive capacity, as long as the agreement is on balance in the national interest.

reswitching (also known as double switching). In the capital controversy the notion that a technique of production abandoned when the rate of profit is low may be introduced when the rate of profit rises to much higher levels, with an alternative more profitable technique (or techniques) being used in the interim. It is a problem which arises from heterogeneous capital. When the capital to output ratios in each technique are not equal the factor price frontiers exhibit varying degrees of curvature. This can be illustrated for two techniques with associated factor price frontiers $T_a$ and $T_b$. For rates of profit $r$ less than $r_1$, $T_a$ is more profitable. For $r_1 < r < r_2$, $T_b$ is more profitable, but for $r > r_2$, it
more profitable to readopt $T_a$, which amounts to switching back to the technique abandoned when the rate of profit first rose above $r_p$. Hence the name 'reswitching'. The possibility of reswitching raises serious theoretical problems for wide areas of neoclassical economics, in particular the AGGREGATE PRODUCTION FUNCTION and the MARGINAL PRODUCTIVITY theory of distribution.

**retail.** The final stage in the chain of distribution from manufacturer to consumer. The outlet for goods and services purchased by consumers.

**retail banking.** The term applied to the traditional banking operations conducted by the CLEARING BANKS and increasingly by others, through their branch systems, with the general public. As implied, retail banking involves large numbers of transactions - deposits and withdrawals of cash, cheque payments, grants of overdrafts and loans - the bulk of which are small-scale. (See WHOLESALE BANKING.)

**Retail Price Index (RPI).** An INDEX NUMBER of prices of goods which is often referred to as the 'cost of living index'. It measures relative changes in the prices of a specified set of consumer goods which would be bought by the average household on a regular basis. The weights are based on information from the government's survey of family expenditure to ensure that it relates to present day buying patterns. Goods representing larger proportions of expenditure will then be given more significant weights in the index. (See LASPEYRES PRICE INDEX, PAASCHE PRICE INDEX.)

**retained earnings.** See INTERNAL FINANCE.

**retention ratio.** The proportion of net profits accounted for by RETAINED EARNINGS.

**retentions.** The name given to retained earnings or undistributed PROFITS.

**return on capital employed.** See RRRATE OF RETURN.

**returns to scale.** The rate at which output changes as the quantities of all inputs are varied. If, for example, inputs are multiplied by a factor of 2 and output goes up by the same multiple, constant returns to scale exist. If output goes up by less than a factor of 2 decreasing returns to scale prevail, and if by more than a factor of 2 increasing returns to scale prevail. The term 'scale' is useful in reminding us that all inputs are being varied. This should be carefully distinguished from the situation in which only one input is varied in which case the LAW OF DIMINISHING RETURNS will eventually come into play. There are however no such 'laws' about the behaviour of returns to scale. It is an empirical issue as to whether they are constant, increasing or decreasing.

The diagram above shows ISO-PRODUCT curves and illustrates all three types of returns to scale. Let the ISO-PRODUCT CURVES $a$, $b$, $c$ and $d$ represent output levels of 100, 200, 300 and 400, then section AB illustrates increasing returns, BC constant returns and CD decreasing returns.

**revaluation.** An upward change in the parity for a currency under a fixed exchange rate system. (See DEVALUATION, CURRENCY APPRECIATION, EXCHANGE RATES, BALANCE OF PAYMENTS.)

**revealed preference.** An approach to demand theory introduced by P. SAMUELSON ('Consumption Theory in Terms of
Ricardo, David

Revealed Preference’, *Economica*, 1948) which is based solely on observations of how consumers react to changes in prices and income. The approach is similar to the approach based on AXIOMS OF PREFERENCE, but the axioms are expressed in terms of what consumers choose rather than what they prefer. Terminology varies according to the text used but the axioms may be summarized as:

1. Each consumer is faced by a situation in which he has some income and there exists some set of prices which he cannot personally influence.
2. The consumer chooses some combination of goods from those available to him.
3. The consumer spends all his income.
4. For any combination of goods facing the consumer, say combination X, there exists some set of prices and income which would result in the consumer choosing X.
5. If combination X is chosen rather than Y we must not be able to observe a situation in which Y is chosen if X is available. To put it another way, if Y is chosen X must not be available. This is sometimes known as the 'weak axiom of revealed preference'.
6. It is possible that we still cannot derive a DEMAND CURVE from axioms 1-5 since the following 'paradox' may arise. This is that, for any two combinations of goods, X and Y, we cannot say X is chosen rather than Y since Y is not available, nor can we say Y is chosen rather than X since X is not available. X and Y are simply 'not comparable'. To secure comparability of X and Y requires the sixth axiom, the so-called 'strong axiom of revealed preference' which permits X and Y to be compared through an indirect sequence of choices linking X to another combination, say $X_1, X_1$ to $X_2$ and so on until some link with Y is established.

**Revenue maximization.** See SALES MAXIMIZATION HYPOTHESIS.

**Reverse dumping.** The practice of selling a good abroad at a price higher than that charged for the same good in the domestic market to take advantage of a MONOPOLY Position.

**Reverse yield gap.** See YIELD GAP.

**Ricardian equivalence theorem** (also known as the Ricardo-Barro equivalence theorem) A theorem developed in 1974 by the neomodist, Barro, and previously considered to be of dubious validity by Ricardo, that taxation and the issue of government debt as a means of financing current government expenditure are equivalent in effects on the economy. At its simple argument asserts that informed citizens will respond to the financing of government expenditure involving either taxes today or taxes tomorrow (to service, or to service and amass the debt) with both having the same present value. The argument depends on several assumptions, of which the most crucial are infinite planning horizons, full anticipation of the future tax burden implied by the debt issue and all taxes are lump sum. See Buchanan, J.M., Rowley, C.K. and Tollison, R.D., *Deficits*, Blackwell, (1987).

**Ricardo, David** (1772-1823). English economist who is best remembered for his theory of RENT and his theory of COST. He entered upon a business at the age of 14 (first as a broker and then as a jobber and operator on the exchange). By 42 he had amassed a sufficient fortune to allow him to retire from business and devote his time to literary pursuits, in particular economics in particular. In 1819 he was elected to the House of Commons.

His interest in economics was a product of his reading of Smith’s *Wealth of Nations* in 1799 and his first written work was a paper article of 1809, which became the basis of his tract *The High Price of Life* (1810), in which he argued that the Inflation was due to the Bank of England’s failure to restrict the supply of currency. His conclusion similar to that reached by the official committee in 1811.

His major work was *The Principles of Political Economy and Taxation* where he argued that political economy should be studied within the laws which determine the division of the produce of industry to the classes who concur in its format. The process of explaining this division constructed a model which demonstrated that sooner or later growth would be ended because of a scarcity of resources. At the heart of this model was the Ricardian equivalence theorem. He thought political economy should be studied within the laws which determine the division of the produce of industry to the classes who concur in its format. The process of explaining this division constructed a model which demonstrated that sooner or later growth would be ended because of a scarcity of resources. At the heart of this model was the Ricardian equivalence theorem.
right-to-work laws

the LAW OF DIMINISHING RETURNS and the differential fertility of agricultural land. Ricardo accepted a MALTHUSIAN view of population so that an unlimited supply of labour would be forthcoming at the subsistence wage. As the population increased more food had to be found to sustain it. This implied extending cultivation to less fertile land where the MARGINAL PRODUCT of labour and capital was lower than on present agricultural land, and the more intensive cultivation of currently used land. The marginal land coming into cultivation was a free gift of nature and required no rent payment. Superior land, since it was more productive would confer an advantage on any farmer, so that competition for such land resulted in the payment of rent to landlords. Profit was the residue of product after paying rent, which would vary differentially according to the fertility of land, and the fixed, subsistence wage. As population grew the use of even less fertile land would lead to no surplus after paying the wage, and rent plus wages would exhaust the product on intra-marginal land. In the absence of profits accumulation would cease. An involved argument on rather special assumptions also ensured zero profits in manufacturing.

The short-run solution to the dilemma lay in foreign trade and the import of cheap, foreign grain. This led Ricardo to argue against the CORN LAWS and to develop his doctrine of COMPARATIVE COSTS to demonstrate that FREE TRADE would benefit all countries party to it. Although the argument was conducted in terms of goods, Ricardo saw the implications of the doctrine for wage and price levels, namely that if foreign payments were to be in long-run balance, the more efficient country would need to have higher money and real wages.

Ricardo devoted much of his energies to an unsuccessful search for an invariable measure of value, which he hoped to find in the LABOUR THEORY. This problem has been treated afresh by SRAFFA. In the end Ricardo was said to be a proponent of no more than an empirical labour theory of value, for he saw the logical difficulties in explaining value in terms of labour inputs but he nevertheless used it to explain value on the grounds that labour costs were quantitatively the major proportion of costs and prices.

Ricardo is remembered as much for his success in creating an 'engine of analysis' and for his method of procedure as for his substantive conclusions, for he was the first to use the technique of building simple analytical models on heroic assumptions for direct application to significant problems.

right-to-work laws. In the US, where the term originated, the CLOSED SHOP is illegal and individual states are free to prohibit the enforcement of a UNION SHOP clause. This prohibition is known as a right-to-work law. Such laws have nothing to do with the right to a job; rather, they deal with the right not to join unions as a condition of employment. In the US some 19 states currently have right-to-work laws. Crude estimates indicate that unions presently under a union shop arrangement would lose from 6 to 15 per cent of their membership if a right-to-work law were passed.

rights issue. An issue of shares offered, usually on favourable terms, to existing shareholders of a COMPANY on a proportionate basis. Shareholders who do not wish to take up the offer can normally sell the right at a price related to the premium value of the offer.

risk. A context in which an event occurs with some PROBABILITY or where the size of the event has a PROBABILITY DISTRIBUTION. Thus, the return on an investment may be 'risky' in that it has a 1 in 10 (0.1 probability) chance of being a loss, a 5 in 10 chance of being of a particular size and a 4 in 10 chance of being larger still. Risk should not, however, be confused with probability since it is an amalgam of both this probability and the size of the event. If the 1 in 10 chance of a loss is one of making a very big loss indeed, this can be a more risky event than one where the probable gains are exactly the same but the risk of loss, while still 1 in 10, is much smaller. Attitudes to risk vary, depending very much on the psychological make-up of the risk-taker and the probable outcomes. (See RISK-AVERSION.)

risk aversion. The expectation of investors of a higher expected return as compensation for an increase in risk. A risk averter can be a DIVERSIFIER and spread his PORTFOLIO over different assets or a 'plunger' and invest
wholly in BONDS or money. A 'risk lover', however, accepts a higher level of risk for a given expected return. If an individual is 'risk neutral' he would be indifferent between whether or not he accepted 'fair' INSURANCE. Most individuals are generally held to be risk averters. (See MONEY, THE DEMAND FOR.)

**risk capital.** Traditionally this refers to the capital invested in a business where the owner accepts the risk that the company may go bankrupt. Companies may have several types of FINANCIAL CAPITAL of varying degrees of risk. Debenture holders have a prior claim and accept the least risk. Preference shareholders have the next claim and ordinary shareholders the last claim and so the greatest risk. If profits grow the ordinary shareholders make corresponding gains as they have claim to the residual income after the fixed interest and preference share dividends have been paid. Capital invested in government securities was traditionally regarded as being a riskless investment, but rapid inflation has introduced a different form of risk to such investment. (See FINANCIAL CAPITAL.)

**risk premium.**

1. An addition to the 'pure' DISCOUNT RATE in order to take account of the uncertainty associated with the future benefits or revenue from a project. Its use implies that the risks involved increase at a compound rate with time, which is unlikely to be the case. Only if risk consists solely of the possibility that the project may fail at any time, the probability of failure in different periods being equal and naturally independent, is a risk premium appropriate.

2. In an uncertain world, that part of the return to CAPITAL which compensates the owners of capital for the risk involved in its use in business ventures.

**risk-spreading.**

See INSURANCE.

**rival.** Where one individual's consumption of a good reduces the quantity available to others then that good is said to display rivalry or to be rival in consumption. Rivalness is a characteristic of PRIVATE GOODS which are thus scarce and require a process of allocation. Examples of goods which are non-rival include the use of knowledge and sunshine. It is frequently argued, notably in WELFARE ECONOMICS and the theorems of PARETO OPTIMALITY that goods which are non-rival in consumption should be provided at zero price. (See PUBLIC GOOD.)

Robbins, Lionel (1898-1984). British economist and influential figure, Lionel Robbins was Professor of Economics at London School of Economics from 1931 until 1961. During this period Robbins had major influence on both students and government. Robbins was the leader of a revival in 'liberal' economic thought. He stressed the necessity for a conceptual and practical separation of NORMATIVE and POSITIVE ECONOMICS. Economists in Robbins' view ought not to make value judgements in economic analysis.

In *An Essay on the Nature and Significance of Economic Science* (1932) Robbins stressed the aspect of scarcity in economic behaviour. The dominant characteristic of human behaviour which is relevant for the economist is that of decision making subject to constraints. Robbins' famous maxim summarizes this view and has become a standard definition of the scope of economics: 'The science which studies human behaviour as a relationship between ends and scarce means which have alternative uses.'


Robinson, Joan V. (1903-1983). British economist and one of the most influential economic theorists of the post-Keynesian period. Professor Robinson taught at the University of Cambridge from 1931. Her first major contribution was a critical and reformulation of the traditional theory of value based on the notion of PER...
COMPETITION. In The Economics of Imperfect Competition (1933), she integrated the early work of Piero Sraffa with the traditional theory of price formation to develop an analysis of IMPERFECT COMPETITION between producers each with an element of MONOPOLY power created by PRODUCT DIFFERENTIATION. A very similar theory was developed independently by E.H. Chamberlin. Her later work moved away from the Marshallian partial equilibrium approach towards a Keynesian and classical analysis of dynamic macroeconomic problems, particularly growth and distribution. She was greatly influenced by both Marx and Keynes and was a consistent critic of Laissez-faire economic theory and the direction which the Keynesian revolution has taken. Her major contribution to the theory of economic growth, The Accumulation of Capital (1956), presents a model which owes more to J.M. Keynes, R.F. Harrod, Karl Marx and David Ricardo than to the more mathematically sophisticated Neo-Classical Economics. Robinson was a major protagonist in the heated debates over the meaning of capital in the 1950s and 1960s. Her articles and books on this subject attacked the neo-classical theory of income distribution based on marginal productivity analysis. Drawing heavily on Sraffa, Robinson became the leader of the Cambridge School of economists which has developed macroeconomic theories of growth and distribution based on a particular view of the Keynesian revolution drawing on the works of M. Kalecki, and using a mode of analysis which bears a close resemblance to Classical Economics. Her works include: An Essay on Marxian Economics (1942); Essays on the Theory of Economic Growth (1963); Economic Philosophy (1962); Collected Economic Papers (5 vols, 1951–79); Economics: an Awkward Corner (1966); Freedom and Necessity (1970); and Economic Heresies (1971).

Robinson-Patman Act. A 1936 amendment to Section 2 of the US Clayton Act. Its major provision is the prohibition of the charging of different prices to different customers for goods that are essentially similar in grade and quality, where the effect would be a substantial lessening of competition or a tendency towards a monopoly. However, such PRICE DISCRIMINATION is legal if it can be proved:

1. that it is based on cost differences;
2. that it meets competition in good faith; or
3. that it is based on the perishability or obsolescence of a product. (See also Predatory Pricing.)

Roosa effect. Term formerly used for what is now more commonly called the 'Locking in Effect'. It was named after Robert V. Roosa, a US banker and economist who was an early proponent of its significance.

roots. The roots of a function are those values of the INDEPENDENT VARIABLE for which the DEPENDENT VARIABLE is equal to zero. In general, for an equation which is an nth degree POLYNOMIAL, there will be n roots.

Also, the square root of a number is that quantity which, when squared (multiplied by itself) is equal to that number. The square root of, say X is usually denoted \( \sqrt{X} \) or \( X^{1/2} \).

Similarly, the cube root, is that quantity which when cubed is equal to that number, usually denoted \( 3\sqrt{X} \) or \( X^{1/3} \).

In general the nth root of X is that number which when raised to the power of n is equal to X, and is denoted as \( n\sqrt{X} \) or \( X^{1/n} \).


1. The traditional society - about which Rostow says very little - is defined as one which is based on pre-Newtonian science and technology; usually having a large agricultural sector and hierarchical social structure.
2. The pre-conditions for take-off - these relate to the application of modern science to agriculture; Europe at the end of the seventeenth century is given as an example; there must be entrepreneurs present in the society and investors who are...
prepared to give financial support to new ideas.

3. **The take-off** - this stage is characterized by growth as the normal, steady state, rather than only appearing in short bursts of sudden activity. In general, the ratio of SAVINGS and INVESTMENT to NATIONAL INCOME will rise to at least ten per cent during this stage. As well as this growth, there are two more characteristics of the third stage. There has to be at least one significant manufacturing sector with a high growth rate; and a framework, either political or social, which will support the expansion of the modern sector. Rostow also defined the take-off as an industrial revolution.

4. **The drive to maturity** - this is the stage between take-off and maturity which is basically a long period of continued progress, with the level of investment rising as high as 20 per cent of national income. In general this stage lasts 60 years.

5. **The stage of high mass consumption** - this stage is the longest. Rostow considers that it took the USA about 100 years to move from maturity to the level of this final stage. It is characterized by an affluent population and by mass production of sophisticated consumer goods and services.

**Roundaboutness.** The term used to define more time-consuming and usually more productive methods of production. Fish can be caught directly but inefficiently by hand. If a fisherman were to spend some time constructing a rod, he would be more successful in catching fish as a result of this roundabout process. A still greater time spent making a net, a yet more roundabout process, would lead to even greater catches. An increase in roundaboutness is also described as a lengthening of the period of production.

The notion of, and the greater productivity of, roundaboutness is a central tenet of the Austrian School in its discussion of capital. This notion or its synonym, the average period of production, is criticized on the grounds that since it involves measuring capital as an amalgam of magnitude of input and duration of input, it is not possible to obtain a unique measure for roundaboutness. Furthermore it is not empirically necessary that every increase in roundaboutness, if it could be measured, should lead to increased productivity, or that productivity can only be raised by increasing the level of roundaboutness.

**Royalty.** In the UK a tax paid to the Government by organizations exploiting minerals as all mineral rights are vested in the Crown. For North Sea oil it was levied at a rate of 12.5 per cent of the wellhead. The first four licensing rounds gave a 12.5 per cent of the landed or tax value of the fifth round onwards. Royalties abolished for new oil fields in the Central and Northern sectors of the North Sea in 1983 and for onshore fields and those in the Southern Gas Basin in 1988.

Traditionally a royalty is the share a landlord takes from the exploitation of a resource in his property. In the USA mineral rights are often vested in private hands and the royalty is thus not thought of as a tool to extract economic rents from the exploitation of a resource. Being based on gross output values it takes no account of depletion and so its presence could make the exploitation of a mineral uneconomic. Similar marginal costs are likely to rise over time in a reservoir or mine as more deposits are exploited, an orthodox royalty could lead to oil fields or mines being prematurely abandoned. In many countries more sophisticated forms of taxation usually based on profits are becoming more important as devices for taxing natural resources.

**Royalties.** See Compensations Rules.

**RPI.** See Retail Price Index.

**Rule-of-thumb.** A simple formula or procedure which provides the basis for decision making by economic agents. It can be argued that under conditions of imperfect information and uncertainty resort to fixed and ready rules is unavoidable. (See Fixed Cost Pricing, Average Cost Pricing.)

**Rybczynski theorem**. Theorem, developed by the economist of that name, to the effect that if in the Heckscher-Ohlin framework one of the two factors of production increased, to maintain constant commodity and factor prices it is necessary for the output of the good intensive in the use of 1
increased factor to expand and for the output of the other good, intensive in the use of the constant factor, to decrease. The reasoning runs as follows. For commodity prices to remain constant, factor prices must remain constant. Factor prices can remain constant only if the ratio in which factors are used in the two industries, remains constant. This can be done in the face of the expansion of one factor by increasing the output of the industry using the factor intensively and by contracting the output of the other industry, which releases the constant factor in a higher proportion, making it available for use with the increased factor in the expanding industry.
sackings. DISCHARGES from employment for cause. Employees who have lost their job through some fault of their own. One element in LABOUR TURNOVER.

St Louis model. A small linear econometric model of the US Economy developed at the Federal Reserve Bank of St Louis to counter the trend to larger and more non-linear models developed elsewhere from the original Tinbergen and Klein-Goldberger models of the US economy (such as the Brookings model, the Wharton model, etc.).

St Petersburg paradox. See BERNOULLI HYPOTHESIS.

salary. The remuneration of almost all non-manual and some manual employees in exchange for the supply of labour services. Frequently payment is made at intervals of one month and, in contrast to manual workers' wages, does not vary with the number of hours worked or the intensity of effort during those hours provided some minimal contractual obligation is honoured.

sales maximization hypothesis. Due to W.J. Baumol (Business Behaviour, Value and Growth, New York, Macmillan, 1959) the hypothesis is in the spirit of MANAGERIAL THEORIES OF THE FIRM. Baumol's model considers the maximization of total sales REVENUE subject to a profit constraint as typical of an oligopoly. The profit constraint is specified as that minimum profit level necessary to secure shareholder acquiescence. If this CONSTRAINED MAXIMIZATION problem is to be solved by choice of output level alone, then it can be shown that with increasing MARGINAL COSTS, price will be lower and output higher than would otherwise be the case if the firm chose a profit maximizing level of output. Once ADVERTISING is also included as a CHOICE VARIABLE either advertising or output must be higher than profit maximizing levels, but not necessarily both.

sales tax. A tax levied on a market transaction. There are many types of sales tax but they may be divided between those which apply to a large range of expenditure and those which apply to the sale of specific good or service. Thus a VALUE-ADDED TAX, a retail sales tax, a TURNOVER TAX and an comprehensive EXPENDITURE TAX are examples of general sales taxes. CUSTOMS, EXCISE and PROTECTIVE DUTIES are examples of taxes on specific goods. (See INDIRECT TAXES.)

salvage value (also known as scrap value). When considering CAPITAL BUDGETING, the value of the capital assets at the end of the project life has to be taken into account.

sample. Any set of observations or measurements of a particular variable, which does not include all possible observations. (See RANDOM SAMPLE)

Samuelson, Paul A. (1915- ). American economist, professor at the Massachusetts Institute of Technology, and winner of the Nobel Prize in Economics in 1970 for raising the general analytical and methodological level of economic science with the aid of mathematical tools.

Samuelson's work, which encompasses almost the entire field of economics, has appeared mostly in article form in journals. In DYNAMIC ECONOMICS he has investigated how an economic system behaves outside EQUILIBRIUM and how an economy develops from period to period in a chain of development phases. He has specified the conditions under which an economic system is stable, conditions which often coincide with the requirements for static stability. The intimate, formal dependence between comparative statics and dynamics Samuelson called the Correspondence Principle. In his 'Interaction between the Multiplier Analysis and the Principle of Acceleration' (Review of Economic Statistics, 1939) he analysed the process, which has become a mainstay of
TRADE CYCLE analysis. In the debate on capital and growth in the 1960s with Cambridge, England, he upheld the NEO-CLASSICAL concept of capital but without complete success as became evident in the controversy over RESWITCHING. Samuelson has also elaborated the conditions for economic efficiency over time, in particular in his TURNPIKE theorem, which defines conditions for maximal growth.

In CONSUMER DEMAND THEORY his approach has been the opposite to that most commonly adopted, i.e. the development of theorems about consumer behaviour based on deductive methods, for he has defined preferences on the basis of observed behaviour or 'REVEALED PREFERENCES' as they are called. In WELFARE ECONOMICS he has established the SAMUELSON TESTS as criteria for judging whether welfare will be improved by some change; all other criteria are but special cases of his tests.

In INTERNATIONAL ECONOMICS Samuelson has made many definitive contributions. With Stolper he developed the theorem which bears their name and which states that FREE TRADE reduces the income of the scarce factor of production. He has gone on from this to elucidate in a HECKSCHER-Ohlin framework the conditions necessary for FACTOR PRICE EQUALIZATION. His treatment of the TRANSFER PROBLEM and of the GAINS FROM TRADE are both rigorous and classic statements of the current position.

In PUBLIC FINANCE his pure theory of public expenditure, which attempts to determine the optimal allocation of resources in the presence of both PRIVATE and PUBLIC GOODS, is a seminal work.

Despite being a prolific writer Samuelson has written, as opposed to edited, just two books, which are The Foundations of Economic Analysis (1948) and a very successful introductory text, Economics (1945), now in its fourteenth edition.

**Samuelson test.** According to this test one situation is potentially superior in welfare terms to another if for every distribution of the commodity bundle in the first situation there exists some distribution of the second commodity bundle in which at least one person is better-off and nobody is worse-off. This implies that the POINT UTILITY POSSIBILITY CURVE for the second bundle lies entirely outwith that of the first.

**satisfaction** (also known as saturation). The phenomenon of 'having enough' of a GOOD. More formally, the UTILITY attached to an extra unit of the good beyond its satiation level is zero or negative, i.e. it creates zero utility or DISUTILITY.

**satisficing behaviour.** Conduct aimed at achieving satisfactory ASPIRATION LEVELS of the objectives of decision-making and which may not therefore involve maximizing anything (e.g. profits). The concept of satisficing behaviour is an integral feature of BEHAVIOURAL THEORIES OF THE FIRM.

**savings.** All income not spent on goods and services which are used for current consumption. Both firms and households save. (See PERSONAL SAVINGS, COMPANY SAVINGS.)

**savings and loan associations.** Corporations organized either as mutual or capital stock institutions to accept savings from the public and to invest their funds primarily in mortgages. (See FEDERAL HOME LOAN BANK SYSTEM.)

**savings function.** The schedule detailing the relationship between aggregate savings (S) and income (Y) i.e. $S = S(Y)$. Savings may be related to either NATIONAL or DISPOSABLE INCOME. The precise properties of the savings function are the inverse of those of the CONSUMPTION FUNCTION, since $Y = C + S$.

**savings-investment approach to the balance of payments.** The savings-investment approach to BALANCE OF PAYMENTS equilibrium concentrates on the KEYNESIAN relationship between SAVINGS and INVESTMENT to explain the position of the current account of the balance of payments, for the difference between the exports of goods and services, $X$, and imports of goods and services, $M$, is the counterpart of the difference between aggregate domestic savings, $S$, and aggregate domestic investment, $I$, i.e. $X - M = S - I$. For the current balance to improve $S$ must rise in relation to $I$.

**Say, Jean-Baptiste** (1767-1832). French businessman turned economist, Say was
appointed to the Chair of Industrial Economy at the Conservatoire National des Arts et Métiers in 1819 and became professor of Political Economy at the Collège de France 1831. The importance of his work lies in his rejection of the British classical THEORY OF VALUE based on labour value. Say was the first economist to attempt to replace the labour theory of value with a subjective value theory based on UTILITY. The idea that value depended purely on utility and not on the productivity of labour removed from political economy the need to search for a theory of distribution based on a division of surplus physical product. Say distinguished three factors of production whose price determined their relative shares of total product. The price of a factor was determined by the price of the commodity which it produced and thus ultimately on the demand for that commodity. An antagonistic theory of distribution was replaced by a neutral division of the product based on utility and scarcity. (See Alfred MARSHALL.)

In this respect and in his methodological position Say was a forerunner of the NEO-CLASSICAL SCHOOL and their EQUILIBRIUM analysis. Economics for Say was a pure science whose abstractions were atemporal and ahistorical and need offer no practical policy guide to statesmen.

Say is best known for his theory of markets which he developed in his Trait d'économie politique (1803). The theory is based on the simple concept that exchange between two parties involves both a purchase and a sale. Say extended this interdependency of supply and demand from the barter economy where every sale involves a demand of equal value and no excess demand or supply can exist and no commodity will be produced without a corresponding level of demand for its consumption, to a general theory of markets.

Say denied that there could ever be a general glut of commodities. Say's Law of Markets, as this theory is called, was accepted and clarified by David RICARDO and J.S. MILL. The interpretation of Say's Law which has become popular is that supply creates its own demand. Prices are assumed to be such that the value of commodities produced is just equal to the value of expenditure on commodities as a whole. This argument and particularly its application to the CAPITAL MARKET was severely criticized by J.M. KEYNES as an error which pervaded economics and ironically economic policy from the classical period until the middle of the twentieth century. Say's other main work was Cours complet d'économiquepolitique pratique (1829).

scarcity. In economics, usually reserved for situations in which the resources available for producing output are insufficient to satisfy wants. This is different to saying that they are insufficient to satisfy DEMAND since demand relates to an expression of want backed by money. This concept of relative scarcity in relation to wants is widely held to define the raison d'etre of economics since, otherwise, there would be no need to think about the 'best' allocation of resources.

In affluent societies, however, it may be that wants are all met in some sections of the community. If so, SATIATION is said to exist. The likely outcome of such a situation is that wants will be 'created' by advertisements, social pressures etc. (See J.K., GALBRAITH.)

More recently, economists have also been obliged to deal with the concept of absolute scarcity - i.e. the fact that the absolute size of resources is fixed in quantity and, once used, may often not be used again. This is particularly so with fossil fuels.

scarce currency. Another name for HARD CURRENCY.

scatter (also known as scatter diagram). A graphical representation of data in which the observed values of one variable are plotted against those of another, without joining the points with intervening lines. A scatter diagram can give useful pictorial information on the degree to which variables are correlated with each other, and on the sort of mathematical relationship (LINEAR, NON-LINEAR, ETC.) which may exist between them.

schooling functions. The functional relationship between levels of education, or 'schooling', and their determinants. The important determinants in question appear to be parental education, the individual's ability, family size and family income. These variables reflect the benefits and costs of education. Thus parental
education, particularly that of the mother, may be said to increase the ability to learn and possibly also increase the 'taste' for education. Greater ability increases the demand for education, ceteris paribus. Family size and family income enter on the costs side; the larger the family size and the smaller the family income, the greater are the costs of education, ceteris paribus. Interestingly, differences in educational levels among males appear to be largely a function of demand factors whereas for females cost constraints appear more important. For further reading see Mincer, J, (1979) Schooling, Experience and Earnings, NBER, New York.

Schultz, Theodore W. (1902- ). American economist and professor at the University of Chicago, he was joint winner of the 1979 Nobel Prize in Economics. His major work has been in the field of agricultural economics but he is also known as a pioneer in the field of HUMAN CAPITAL.

Schumpeter, Joseph A. (1883-1950). Born and educated in Vienna, Schumpeter was more a disciple of WALRAS than of the AUSTRIAN SCHOOL. Though at times during his life he had been a lawyer, a finance minister and a banker, he is best known as an academic scholar of very wide interests in the social sciences. His major chairs were at Bonn and at Harvard from 1932 until his death.

He was a pioneer of TRADE CYCLE analysis (Business Cycles, 1939) and of ECONOMIC DEVELOPMENT (Theory of Economic Development, 1912), in both of which the entrepreneur plays the leading role. The entrepreneur is responsible for the innovation, which may be, for example, a new product, a new technique, a new market or a new method of organization. His action is then imitated, so that innovations come in clusters and cause the boom: the depression is a process of adaptation to changed conditions introduced in the boom. Schumpeter is also remembered for his theory of interest, for he argued that the rate of interest would be zero in the absence of systematic TIME PREFERENCE and a dynamic mechanism in the economy.

A writer of great vision, he argued in his Capitalism, Socialism and Democracy (1947), that capitalism would give way to socialism not because of its failures (as MARX argued) but because of its success. The capitalist unit of production will become extremely large, will be run by de facto bureaucrats, divorced from the owners and with no interest in the ownership, will lose its raison d'etre and its apologists, and will be taken over by the state. His final work, incomplete at the time of his death was a monumental and outstanding History of Economic Analysis (1954).

scientific tariff. A TARIFF or tariff structure, which achieves the policy ends, often non-economic such as national independence or military preparedness, at minimum cost to society. This is done by minimizing the cost of achieving each amount of benefit by adjusting the structure of tariff rates in order to equalize the ratio of marginal benefit to marginal cost in each industry protected and of maximizing the benefits of protection by selecting the general level of protection at which the marginal value of benefit equals the marginal cost of protection.

Scitovsky paradox. The paradox arises if a move from allocation A to allocation B represents a POTENTIAL PARETO IMPROVEMENT but that those who do lose in the move would gain sufficiently from a return to A to enable them to bribe the gainers to move back to the original allocation. The underlying cause of the paradox is that the relative valuations of a bundle of goods will depend on the way in which the bundle is distributed. (See also SCITOVSKY REVERSAL CRITERION.)

Scitovsky reversal criterion. Scitovsky noted that the application of the KALDOR-HICKS TEST might lead one to view state B as preferred to state A but once in state B, application of the test might show A to be better than B. In order to avoid this possibility Scitovsky introduced his reversal criterion which essentially requires the move to B to pass the Kaldor-Hicks test but the move back to A to fail the test.

screening hypothesis. The argument that education has little direct productivity-increasing effect; rather, education acts primarily as a filter, or screening device, to identify pre-existing talents of intelligence,
perseverance and motivation that employers find attractive. Thus the function of education is not viewed as conferring skill and therefore productivity and higher wages on the worker, but rather to certify his 'trainability', productivity being almost exclusively acquired on-the-job. On this view, the social returns to education lie considerably below the private returns.

**scrip issue.** See BONUS ISSUE.

**SDR.** Special Drawing Right. (See INTERNATIONAL MONETARY FUND.)

**search costs.** See JOB SEARCH.

**search unemployment.** See JOB SEARCH.

**seasonal adjustment.** A name of any procedure by which seasonal influences are taken into account, or (more usually) removed from data. The most common method is the calculation of MOVING AVERAGES. (See FILTER, DUMMY VARIABLE)

**seasonal unemployment.** Unemployment that results from the seasonal pattern of work in certain industries. The agricultural, construction and tourist industries have all traditionally exhibited a marked seasonal pattern in employment - an element of STRUCTURAL UNEMPLOYMENT.

**secondary banks.** A term applied to a large group of deposit-taking financial institutions, many of them subsidiaries of, or associated with, CLEARING, MERCHANT and foreign BANKS, which grew very rapidly in the 1960s and early 1970s aided by the quantitative restrictions then applying to the clearing banks. They competed vigorously for deposits, but also took up large sums in the newly developed MONEY MARKETS. They engaged in ordinary bank lending business, but also in the longer-term finance of expanding companies, frequently taking some equity interest. However many of them became heavily involved in lending for property development, and the property boom of the early 1970s. With tightening monetary conditions in 1973, and the collapse of the property boom in 1974, a number of these institutions got into difficulties. In this phase, known as the 'secondary banking crisis', some houses collapsed, others were propped up by the 'LIFEBOAT' operation initiated by the BANK OF ENGLAND. It should be noted that the term 'secondary bank' was used differently to denote all regionalized banks, other than the clearing savings banks, operating in the UK.

**secondary market.** See PRIMARY MARKET.

**secondary workers.** Those groups with attachment to the labour force is less persistent than those of PRIMARY WORKERS. They include married women, teenagers and older workers (65 years of age or above). Such groups are likely to have highly-valued options outside of the labour market relative to the wage they can earn in market work. Thus married women with children tend to have high-valued options in the home; managers have the alternative of educational activities; and older workers may place high value on leisure.

**second-best.** The second-best theorem formulated by R.G. Lipsey and Lancaster, states that if one of the conditions for PARETO OPTIMALITY cannot be fulfilled, then the best attainable situation (second-best optimum) can, in general, only be achieved by departing from all the other Paretian conditions.

**second order condition.** The sign of the second derivative(s) of the objective function with respect to the choice variable indicates whether the extreme value is a maximum or a minimum. A negative sign denotes the former and a positive sign the latter. (See FIRST ORDER CONDITION.)

**secular supply curve.** The concept supply underpinning this construct is conventionally taken to be the aggregate LABOUR FORCE PARTICIPATION RATE. The secular supply curve relates changing levels of labour force participation to the phases of economic development; the latter variable being proxied by the real wage. The resulting curve evinces an inverse elongated 'J' configuration. At very low real wage rates...
the curve can be viewed as horizontal. In this 'Malthusian' range (see IRON LAW OF WAGES), each member of the population must work to live. As countries begin to industrialize the curve bends backward; within this real income range consumption patterns tend not to change so that the family need send fewer of its members to market-place to achieve customary consumption levels. The curve next enters a forward rising zone as expectations are revised upward with further industrial development. In the penultimate stage, the supply curve appears more or less vertical. Earlier retirement and greater access to full-time education depress participation rates but this movement is almost exactly offset by rising levels of female participation, reflecting a decline in the amount of time it is economical for the wife to devote to the production of home goods.

Finally the curve is assumed to bend backward again to reflect the leisure revolution attendant upon major technological advances. We do not appear yet to have entered this segment of the secular supply curve, which might thus be termed the 'nirvana' zone.


**secular trend** (also known as the TREND.)
The word 'secular' indicates that it is the trend computed for a long run of DATA.

**secured loan stock.**
*See* FINANCIAL CAPITAL.

**securities.** A loose term embracing a wide range of financial ASSETS, e.g. gilt-edged stock, EQUITIES and DEBENTURES. Short-term assets like bills are sometimes included, but the word tends to refer to longer-term assets.

**Securities and Exchange Commission (SEC).** An independent agency of the US government set up in 1934 which acts as the chief regulator of the SECURITIES industry. There are five commissioners, usually securities law specialists, and a staff of about 1500. Before an issue of securities may be offered for public sale, the SEC examines a required registration statement giving complete information on the securities and on the financial and managerial conditions of the issuing company. Brokers, dealers, and stock exchanges are also required to register with the SEC. In addition to regulatory powers, the SEC influences the securities industry by investigations, both of specific improprieties (e.g., trading based on confidential information) and of general practices in which no impropriety is involved (e.g., commission charges). The investigations and consequent publicity impel more efficient self-regulation on market organizations such as the New York Stock Exchange.

**Securities and Investment Board (SIB)**
*See* BIG BANG.

**securitization.** An alternative term to DISINTERMEDIATION, it describes the direct financing of a company's monetary needs via the capital market and the use of instruments such as BILLS OF EXCHANGE, ACCEPTANCES and bond issues in the place of borrowing from commercial banks. While the original stimulus to disintermediation was to avoid monetary regulation, the more recent forces include the world-wide liberalization and deregulation of financial services and the availability of sophisticated electronic processing, which has made it possible to introduce and monitor complicated new financial transactions. Though commercial banks have lost on-balance sheet business, they have increased their off-balance sheet business by acting more like merchant or investment banks.

The term has also acquired a more specific meaning, particularly in the USA, where it describes the sale by banks of poorly performing debt, especially that of developing debtor countries, for whatever can be obtained in the market. A bank loan is transformed into a security.

**seignorage.** Historically, and as applied to money, this was a levy on metals brought to a MINT for coining, to cover the cost of minting and provide a revenue to the ruler who claimed it as a prerogative. In recent monetary literature the term has been revived and applied to the net revenue derived by any money-issuing body, e.g. a note-issuing authority. It is applied more especially to a country whose currency is held by foreigners for trading or reserve purposes. In this case the seignorage amounts to the return on the extra assets, real or financial, which the country is enabled to acquire because of the
external holdings of its currency, less the interest paid on the assets in which the foreigners invest their holdings, and less any extra administrative costs arising from the international role of its money.

**self-liquidating.** A loan or other financial transaction which has a low risk and a built-in procedure for ending the loan and clearing the debt, for example, **HIRE PURCHASE** or bridging loans given by banks to enable an individual to purchase a new house while in the process of selling the previous one.

**self-liquidating advances.** A traditional precept of British banking has been that 'self-liquidating' forms of credit are the safest type of lending for a banker. These are advances (including bills discounted) made to finance trading and production operations which, in the normal course of business, will result in sales and hence produce the means of repaying the advances. The doctrine contains a fallacy of composition: the self-liquidating character of one advance usually depends on the making of a further advance at a later point in the chain of production or distribution. Thus the totality of such credit cannot be self-liquidating.

**self-regulating organizations** (SROs) *See BIG BANG.*

**semi log.** A method of illustrating economic variables which change over time. For example, if income growth is constant, data may be plotted as a straight line on graph paper which has the logarithm of income on the vertical scale and time on the horizontal scale.

Senior, Nassau W. (1790-1864). An English economist, Senior was twice Drummond Professor of Political Economy at Oxford. He was both an academic and a public servant. Senior modified the Malthusian theory of population. Population growth could occur without reducing the population to subsistence level since each generation had a desire to improve its standard of living. The desire to move up the scale of consumption from what Senior called 'necessities' through 'decencies' to 'luxuries' would allow income growth, and there was no need for 'moral restraint' on the part of the working populace. Malthus had claimed. A rise in living standards provides an automatic check on growth of population as each generation proves its living standards at the expense of child-rearing.

Senior was an exponent of the subjective theory of value and attempted to reconcile Ricardian value theory with utility analysis. He adopted a cost of production theory of value which included the cost of creating new capital. Saving is necessary for this creation, but saving is only made possible by abstention from current consumption of income. The cost of such abstention contributes to the value of a commodity. Interest is seen as the reward for abstaining from that consumption. Senior's major work in economics was *An Outline of the Science of Political Economy* (1836).

**seniority practices.** Methods of regulating promotion, demotion and lay-off within a unit of a firm according to the seniority of the worker. Seniority rights can be viewed as beneficial to management and not simply as a protection of workers. The interests of the parties conflict only to the extent that seniority and ability are uncorrelated. And cause experience with an employer valuable, the correlation is often high. This is then to some extent a natural seniority system built on profit maximization. Moreover, the use of 'objective', negotiable decision rules reduces uncertainty in industrial relations and lessens strike frequency.

**sensitivity analysis.** Sensitivity analysis involves changing the PARAMETERS of a decision problem and studying how this affects the outcome. It is particularly associated with COST-BENEFIT ANALYSIS, where the most common form is the use of alternative discount rates. The purpose of the analysis is to identify the important assumptions upon which the analysis is based - those to which the outcome is sensitive.

**separability of preferences.** In consumer theory the partitioning of commodities into number of groups such that consumer preferences within each group can be treated independently of the other groups.
For example if four commodities $x_1, x_2, x_3$ and $x_4$ are arguments in the utility function but $x_1$ and $x_2$ are separable from $x_3$ and $x_4$ then the utility function can be written as

\[ u = u(x_1, x_2, x_3, x_4) \]

This is called weak separability. The number of goods in each group may vary and some may contain one or many goods. Separability allows two-stage budgeting where the consumer initially allocates expenditure to groups of goods (i.e. heating, food, transport) before deciding at the second stage what kind of heating or what foods to buy. Linked to weak separability is the notion of implicit or quasi separability where the prices in the corresponding cost function are separated into groups instead of the quantities in the direct utility function as above.

An empirically useful assumption is that of strong or additive separability. Then the function (1) above is written as the ADDITIVE UTILITY FUNCTION.

\[ v[u_1(x_1, x_2), u_2(x_3, x_4)] \]

These notions are used in the derivation of the LINEAR EXPENDITURE SYSTEM but the implicit assumptions are so restrictive that severe distortion of estimated ELASTICITIES can result. Some econometricians regard strong separability and additivity as too strong to be used in empirical work in spite of their usefulness.

separation of ownership from control. This occurs in large joint stock companies where the voting shares of the companies are dispersed amongst a large number of shareholders. This dispersion can prevent any individual shareholder or group of shareholders exerting control over company policy. Control is therefore pre-empted by the management of the company. (See MANAGERIAL THEORIES OF THE FIRM.)

serial correlation. (also known as autocorrelation). An econometric problem in which the current value of the error term in an equation is correlated with its own past values, normally indicating that some systematic influence has been omitted from the equation. Nth order serial correlation is the correlation of the current value of the RESIDUAL with its value $N$ periods ago. First order serial correlation therefore implies that the residual follows a first order MARKOV PROCESS of the form

\[ e_t = \rho e_{t-1} + v_t, \]

where $e_t$ is the residual

$v_t$ is a STOCHASTIC disturbance, and $\rho$ is the autocorrelation coefficient.

The term autocorrelation usually denotes the version of the problem which occurs in CROSS-SECTION rather than TIME-SERIES data, in which the residual for one observation is correlated with those for other observations.

The major consequence of the problem is that the ORDINARY LEAST SQUARES estimator is not the BEST LINEAR UNBIASED ESTIMATOR in that it does not yield estimates with minimum VARIANCE. The estimates of the parameter variances will also be biased downwards. If serial correlation is found to exist, therefore, special econometric procedures should be employed to correct for the problem. (See also DURBIN-WATSON, DURBIN H-TEST, VON NEUMANN RATIO, GENERALIZED LEAST SQUARES.)

service of debt. The payment of the interest due on a debt.

debts. In an economic sense, services are any functions or tasks that are performed, for which there is a DEMAND and hence a PRICE determined in the relevant MARKET. They are sometimes referred to as intangible GOODS; one of their characteristics being that in general they are 'consumed' at the point of PRODUCTION. They are usually non-transferable, thus preventing ARBITRAGE, in the sense that the service cannot be purchased and then resold at a different price.

severance pay. Also known as redundancy pay in the UK, a contractual method of ameliorating the economic costs of permanent layoff by providing compensation to workers made redundant. The aim of severance pay is to make job protection less necessary for the workers concerned and thereby to accommodate the process of economic change. Whether the workers
should be compensated in this manner is arguable because earnings levels in the various occupations should reflect differences in job security. (See EQUALIZING OCCUPATIONAL DIFFERENTIALS.)

In the UK there exists a generalized system of severance pay under the Redundancy Payments Act of 1965 which established a termination or redundancy fund, funded by a levy on all employers. Eligible workers receive a lump sum payment from the fund in the event of being made redundant.

**shadow economy.** That part of an economy whose OUTPUT is not included in the NATIONAL INCOME statistics, because it is hidden from the authorities. This sector arises for two main reasons. In MARKET ECONOMIES it arises from an attempt to evade taxes, primarily taxes such as INCOME TAX and VALUE ADDED TAX. In PLANNED ECONOMIES it has developed outside the official or regulated sector to supply goods, which the planned sector either does not produce or produces in too small a quantity. Estimates of the size of the shadow economy as a share of GDP range from 7 per cent in the USA, 15 per cent in Italy, 20 per cent in Hungary, 22 per cent in Poland to 30 per cent in the Soviet Union. The shadow economy is alternatively known by a variety of names such as the informal sector, the black economy, the parallel economy or the secondary economy.

**shadow price.** An imputed valuation of a commodity or service which has no market price. Shadow prices are used in COST-BENEFIT ANALYSIS and in the application of mathematical programming to a PLANNED ECONOMY. They represent the PLANNED OPPORTUNITY COST of producing or consuming a commodity which is generally not traded in the economy. Even in a market economy certain outputs such as health, education and environmental quality do not attract a market price. A set of shadow prices representing consumers' MARGINAL RATES OF SUBSTITUTION or producers' MARGINAL RATES OF TRANSFORMATION between such commodities may be calculated reflecting the marginal costs of production or the marginal value of their use as inputs. To the extent that market prices do not reflect opportunity costs cost-benefit analysis may substitute shadow prices.

**shadow wage rate.** The SHADOW PRICE of labour.

**share.** See EQUITIES.

**share economy.** An economy in which workers' compensation is tied by a formula to either the revenues or profits of the firm in which they work. This notion, recently revived by Weitzmann, M.L. The Share Economy: Conquering Stagflation, Harvard UP (1984), proposes that in each firm the size of the 'pool' out of which workers are paid is related to either the profits or revenues of their employers with the result that cyclical variations in economic activity will vary the size of the pool available to pay workers. In a recession the fall in earnings or profits will result in a smaller pool and a cut in earnings, if the same number of workers remain employed. Although some workers may wish to leave their firms under such conditions, if the recession and these arrangements are economy-wide there will be few other employment opportunities open to workers and they are therefore likely to stay in their jobs and accept the pay cut. In this manner employment will be stabilised but wages will vary in a procyclical manner. The essence of this type of compensation rule is that the marginal cost of labour to the employer is less than the average cost. This is a feature of such schemes as sharecropping, sliding-scale arrangements, the Japanese system of profit sharing as reflected in the payment of annual bonuses, and the constant wage fund of classical economists.

**share price.** The prevailing market price of a unit of a company's equity capital. In perfectly competitive capital markets a share's price \( s_p \) will equal the net present value of the expected future dividend stream. Assuming a constant expected annual dividend sum \( D \) and a discount rate \( i \) this can be written as

\[
s_p = \frac{D}{1 + i} + \frac{D}{(1 + i)^2} + \ldots + \frac{D}{(1 + i)^t}
\]
As \( t \) approaches infinity this geometric progression converges to

\[
sp = \frac{D}{i},
\]

With STEADY-STATE growth conditions the dividend will grow at a constant rate \( gD \). This can be treated as a negative discount rate and thus the share price expression is

\[
sp = \frac{D}{i-gD}.
\]

(See VALUATION RATIO.)

Sharpe, William F. (1934– ). An American economist, who was joint winner (with H. MARKOWITZ and M. MILLER) of the 1990 Nobel Prize in Economics. Sharpe was one of several researchers, whose work in the 1960s on the market analysis of the price formation for financial assets, led to the development of the CAPITAL ASSET PRICING MODEL (CAPM), whose basis is that an individual investor can choose his or her exposure to risk through a combination of lending or borrowing and a suitably structured portfolio of risky securities. The CAPM is the backbone of modern price theory for financial markets and is widely applied in practice to use systematically and efficiently the large existing quantities of financial, statistical data.


Sherman Act. One of the major foundations of ANTI-TRUST law in the US, enacted in 1890. It was a response to public perceptions of earlier abuses by increasingly concentrated industries. The act forbids contracts, combinations and conspiracies in restraint of trade. In addition, monopolization and attempts to monopolize were prohibited. The maximum fine in cases brought by the government, originally $5000, was raised to $50,000 in 1955 and to $1,000,000 for corporations in 1974.

shift effect hypothesis. The argument that INCOMES POLICY might have the effect of shifting the PHILLIPS CURVE to the left, thus generating a lower rate of wage and/or price inflation for given values of their determinants - principally the level of unemployment. Tests of the hypothesis conventionally use a SIMULATION approach or shift DUMMY VARIABLES.

shift-share analysis. A technique employed in the analysis of regional economic growth which attempts to separate out that part of a region's growth which can be 'explained' by the mix of industries in the region (its industrial structure) and that part which is to be explained in terms of particularly 'regional' influences.

The region's actual growth rate is compared with that rate which would have been observed if each industry in the region grew at the national growth rate of that industry. If we refer to the region's actual growth rate as \( G_r \), the growth rate one would observe if each of the region's industries grew at its 'national' rate as \( G_E \) and the growth rate of the national economy as \( G_N \), the 'components' of regional growth can be calculated. The structural component, \( G_E - G_N \), indicates the difference which we would expect the region's industrial structure to make to its growth performance. If the region contains a disproportionate number of industries which are growing at an above average rate nationally, we would expect this component to be positive. Alternatively if the region contained many industries which were growing slowly or in decline nationally, we would expect this component to be negative. The component \( G_r - G_E \) is sometimes called the residual component. If it is positive, the region is growing faster than its industrial structure would predict; if it is negative the converse holds. Essentially, this component is the 'unexplained' part of growth and if it is significantly positive or negative this suggests that we need to investigate for particularly 'regional' influences on growth.

Shift-share analysis is criticized on three main grounds. First, it is argued that the calculation of the structural component
takes no account of linkages between the industries of a region and that, for example, a fast growing industry may promote growth in other industries in the region which supply inputs to it. Second, it must be recognized that industrial classifications are to some degree arbitrary and we cannot be sure that the industry which we have called A in one region is identical to what we have called A in the nation at large. Third, shift-share analysis offers no explanation of the 'residual' or 'unexplained' fraction of growth.

shirking model.  
See EFFICIENCY WAGE THEORY.

shock effect.  An argument analogous to that employed in the ECONOMY OF HIGH WAGES. In this case, it is argued that a sudden increase in wages will increase the productivity of management by eliminating sources of slack or X-EFFICIENCY that are said to exist in most companies. Faced by a threat to the organization, management will improve its utilization of labour input and, as a result of innovations in technique or organizational method, labour's MARGINAL PHYSICAL PRODUCT will increase. However, managerial slack is likely to be a function of market power, and here the incentive to increase the efficiency of input utilization is arguably much reduced. Moreover, although the shock effect is much espoused by union bargainers, the argument requires there to be repeated waves of improved methods consequent upon annual wage increases.

shop steward.  An appointed or elected representative of a workgroup who furthers the interests of employees in a plant or shop in matters such as pay and conditions of employment. Usually the task is unpaid although itself conducted during working hours without loss of pay. In most cases shop stewards are official representatives of the union although their exact status and duties are often ill-defined.

short-dated securities.  Debt securities, e.g. DEBENTURES or GILT-EDGED, which have only a short period to run, usually not more than five years, to their REDEMPTION DATES. Such securities may have been issued with a near maturity date, or they may have become short-dated simply with the passage of time.

short run.  The time period in the production process during which the fixed FACTORS OF PRODUCTION cannot be changed, but the level of utilization of variable factors can be altered. The concept was introduced by Alfred MARSHALL.

short-run average cost.  
See AVERAGE COST.

short-run consumption function.  The functional relationship between consumption and income over the period of the TRADE CYCLE. Studies of year on year changes in income and consumption for periods of up to 10 years or so found a close relation between the two. Generally years with lower than average levels of income tended to be years of lower than average consumption and vice versa. These studies found:
1. MARGINAL PROPENSITY TO CONSUME < 1, but typically greater than that found in cross section studies;
2. marginal propensity to consume < average propensity to consume and therefore an average propensity to consume which declines as income rises;
3. the marginal propensity to consume was a constant.

These suggested a straight-line CONSUMPTION FUNCTION with a positive intercept, that is

\[ C = a + bY \]

These findings support all but one of the propositions of Keynes' ABSOLUTE INCOME HYPOTHESIS on the shape of the consumption function - they do not reveal a declining marginal propensity to consume with rising income. (See CONSUMPTION FUNCTION, LONG-RUN CONSUMPTION FUNCTION, CROSS-SECTION CONSUMPTION FUNCTION.)

short-run marginal cost.  
See MARGINAL COST.

short-time working.  Refers to workers who are working fewer hours than the STANDARD WORKING WEEK specified in their labour contract. (See GUARANTEED WEEK.)
SIC.
See STANDARD INDUSTRIAL CLASSIFICATION.

side payments. Those exchanges between individuals in a group made in order to induce allegiance to some common goal(s). For example, in a CARTEL where the individuals are pursuing, as a group, JOINT PROFIT MAXIMIZATION, high profit earners make some payment to low profit earners to induce them to stay in the cartel.

sight deposits. Deposits held in banks and similar deposit-taking institutions which are transferable by cheque or withdrawable in cash without notice. Following a revision of the statistical returns required from banks operating in the UK, in 1976, it replaced the term 'current account' and as an aggregate includes MONEY AT CALL and OVERNIGHT MONEY.


The conventional theory of the firm is still based on the assumption of a single, omniscient, rational, profit-maximizing ENTREPRENEUR. In reality the firm is now a large unit, run by a team of managers, with a divorce between ownership and control and with competition in non-price forms. It is the latter organizational structure, which Simon analyses in Administrative Behaviour (1947).

He replaces the classical entrepreneur with a number of co-operating decision-makers, whose capacities for rational action are limited by a lack of knowledge of the total consequences of their decisions and by personal and social ties. Since these decision-makers cannot choose the best alternative, they have to be content with a satisfactory alternative. Individual firms therefore strive not to maximize profits but to find acceptable solutions to acute problems. Simon's theories and observations on decision-making in organizations apply well to the techniques of planning, budgeting and control, which are used in business and public administration and provide a useful foundation for empirical research. His work on complex decision-making situations has led him into fields other than economics and to use techniques from other disciplines, e.g. psychology.

simplex algorithm. See LINEAR PROGRAMMING.

simulation. A form of forecasting which generates a range of alternative projections based on differing assumptions about future situations, specifically to answer the question 'what would happen if?', rather than 'what will happen?'. In practice, this is usually achieved through alterations to the values of EXOGENOUS variables and perhaps the PARAMETERS of economic models, and is often used to assess the likely impacts of various economic policies.

simultaneous equation bias. A BIAS in ORDINARY LEAST SQUARES estimates which results from feedback effects between equations when the model to be estimated consists of a set of SIMULTANEOUS EQUATIONS.

simultaneous equations. A set of two or more equations which have variables in common, whose values must satisfy all of the equations simultaneously. An example is a simple supply/demand system in which there are two equations, both involving quantity and price, i.e.

$$Q^s = f(P)$$
$$Q^d = f(P)$$.

The solution to the set of simultaneous equations is the set of values of the ENDOGENOUS VARIABLES, which results in all equations being satisfied simultaneously. In the simple example cited, the solution would be the values of price and quantity at which the supply and demand equations both hold together. (See CRAMER'S RULE, RANK OF MATRIX, REDUCED FORM, STRUCTURAL FORM, ENDOGENOUS VARIABLE, EXOGENOUS VARIABLE.)

Simultaneous equations pose two problems for econometric work. First, there is the IDENTIFICATION PROBLEM, and second, the problem of SIMULTANEOUS EQUATION BIAS, which occurs as a result of correlation between the error term of an equation, and any explanatory endogenous variables the equation may include. The consequence of this is that ORDINARY LEAST SQUARES cannot
be used to gain UNBIASED estimates of the parameters of a simultaneous equation (see BEST LINEAR UNBIASED ESTIMATOR), and special econometric procedures must be employed. (See INDIRECT LEAST SQUARES, TWO STAGE LEAST SQUARES, THREE STAGE LEAST SQUARES, FULL INFORMATION MAXIMUM LIKELIHOOD.)

**single equation estimator (SE).** An ESTIMATOR which is used to gain parameter estimates of only one equation at a time in a SIMULTANEOUS EQUATION system, and which effectively ignores the CORRELATION of RESIDUALS between equations. An example is TWO STAGE LEAST SQUARES. (See LIMITED INFORMATION, SYSTEMS ESTIMATOR.)

**Single European Act (SEA).** This agreement within the framework of the EUROPEAN COMMUNITY (EC) became operative on 1st July 1987. The SEA intended that policy development within the EC should have the objective of a single market in place by the end of 1992, with the free movement of capital, labour, services and goods replacing the unco-ordinated arrangements existing up to 1987. The SEA also strengthened areas of policy and introduced others, in particular environmental issues, health and safety at work and economic and social cohesion with the aims of ensuring the full participation of the weaker members. Foreign policy cooperation was also included with a special secretariat in Brussels. Majority voting will facilitate decisions on the internal market and the other issues covered but unanimous voting has been retained for some areas of decision-making. The SEA means that the institutions of the EC will become increasingly involved in matters regarded with some sensitivity by member states, but the expectation is that the benefits of a full internal market will outweigh any costs.

**sinking fund.** The regular setting aside of funds with the purpose of repaying debt. The sinking fund method of depreciation ensures that the full capital invested in a project is recovered at the end of a project’s life. The aggregate annual provisions are less than the total amount of initial CAPITAL EXPENDITURE to be recovered since the annual provisions can be invested in the periods between being set aside and the end of the project’s life.

**Sismondi, Jean** (1773-1842). Swiss-born economist. In his first work, De la richesse commerciale (1803), he showed himself to be a follower of Adam SMITH, stressing the harmony of interests, the necessity of LAISSEZ-FAIRE and the folly of government interference. Sixteen years later in Nouveaux principes d’ économie politique (1819), he had become disillusioned with laissez-faire for he stressed the evils which flowed from unrestrained competition, especially the overproduction of goods and services, which he attributed directly to DIVISION OF LABOUR and large scale production. He argued that when working for himself a man knows when enough has been produced: when working for others he cannot know this. Laissez-faire leads to suffering, so that government intervention must take place to regulate and moderate the pace of the pursuit of wealth. Sismondi attacked inventions which displaced existing processes of production and supported only those which catered for an extended demand. His work represented less a body of doctrine than a voice of protest, which influenced later socialist writers.

**situation utility possibility frontier.** The envelope of a set of POINT UTILITY POSSIBILITY CURVES. Sometimes known as the welfare frontier, it is the locus of overall PARETO OPTIMA and shows the maximum possible level of utility for one individual for different given utility levels for other individuals.

**size distribution of firms.** A FREQUENCY DISTRIBUTION where firms belonging to one industry or sector of the economy are classified according to size. Size can be measured using a variety of indicators including sales, VALUE-ADDED, total assets and employment.
skewed distribution. A distribution which is not symmetric around its MEAN value. A distribution which has a short left tail, and a long right one is said to be skewed to the right, while a long left tail, and a short right one implies that the distribution is skewed to the left. The degree of skewness can be calculated as the third MOMENT of the sample or distribution about the mean.

skill differentials. Differences in the average levels of pay of groups of workers classified initially according to occupations, which are subsequently assigned to broad skill groups. Most frequently attention is concentrated on the differential between the pay of skilled and unskilled manual workers. The pure differential, once all other influences have been controlled for, represents the return to a particular type of investment in HUMAN CAPITAL. Conventionally this differential is found by expressing the skilled wage as a proportion of the unskilled wage where the latter is set equal to 100. The proportional differential may be compared to the RATES OF RETURN on other assets. It has been argued that the return to training should be measured in absolute and not percentage terms but it is now generally agreed that as with other assets the proportionate rate is the appropriate measure.

Slutsky, Eugen (1880-1948). Russian economist and econometrician. Professor at Kiev University (1918-26) and the Mathematics Institute of the USSR Academy of Science (1934-48), Slutsky is best known for his work on demand theory. In an article published in the Italian journal Giornale degli economisti in 1915, he argued that demand theory could be based on the concept of ORDINAL UTILITY. The theory, which was further developed by J.R. HICKS, derived and extended the results of MARSHALL, but without the restrictive assumption of strictly measurable UTILITY. The article was re-discovered by Hicks and R.G. ALLEN in 1934, and the mathematical formulae for the separation of a consumer's reaction to a price change into the INCOME and SUBSTITUTION EFFECTS have been called the SLUTSKY EQUATIONS.

Slutsky made important contributions to econometric theory, especially the demonstration of cyclical fluctuations in moving averages of a time series derived from random numbers.

Slutsky Equation. Most simply defined as:

\[ \text{price effect} = \text{income effect} + \text{substitution effect} \]

Named after E. SLUTSKY.

Smith, Adam (1723-90). Scottish philosopher and economist, educated at the universities of Glasgow and Oxford and subsequently a Professor of Moral Philosophy at Glasgow University. He wrote over a wide area of which economics was only part. His attitude to economic organization was determined to a large extent by his belief in NATURAL LAW, that there existed order in natural phenomena, which could be observed by observation or moral sense, and that social organization and positive legislation should conform to rather than run counter to this order.
His *Inquiry into the Nature and Causes of the Wealth of Nations* (1776) was the first full scale treatise in economics, covering production and distribution theory, reviewing the past in the light of these principles and concluding with policy applications. His main preoccupation was with economic growth, and the engine of growth he found in the DIVISION OF LABOUR, which leads to increased output, TECHNICAL PROGRESS and even CAPITAL ACCUMULATION. Division of labour implies the need to exchange and is limited by the extent of the market. Exchange takes place because each man is prompted by self-interest in his desire for the goods of others. The other element promoting growth is capital accumulation, for which Smith makes parsimony the basis. For growth to succeed the social, institutional and legal framework must be correct and Smith argues for 'the obvious and simple system of natural liberty', where each man, in promoting his own interest, is led (through a harmony of interests) to promote those of society, though he does not intend this. Smith is in fact relying upon a system of free competition, which has its own powers of regulation and which economists have recognized can lead to an optimal allocation of resources. Smith has shown himself aware of this principle in his description of an optimal investment pattern for a country. Though he argued for LAISSEZ-FAIRE, Smith recognized the need for state intervention, e.g. a tariff for infant industries and for the three functions of the state - security, justice and certain public works.

Apart from his model of growth, Smith also examined microeconomic issues. PRICES he argued were determined by costs of production. RENT was price determined, rather than price determining. He offered a compendium of theories to explain WAGES, including a SUBSISTENCE theory and, had many, still pertinent, remarks to make on the net advantages of different occupations to different people. PROFITS, Smith thought, would fall through time owing to competition and the increasing difficulty of finding profitable outlets.

He also examined different systems of political economy and attacked the MERCANTILISTS and the PHYSIOCRATS and made a strong case for foreign trade. Finally, more than one-quarter of the book is devoted to PUBLIC FINANCE, including a discussion of his famous canons of taxation.

Though SCHUMPETER in his *History of Economic Analysis* (1954) has written that '...The Wealth of Nations does not contain a single analytic idea, principle, or method that was entirely new in 1776' it was nevertheless a great achievement, since the time had come for the type of co-ordination of which Smith was capable. Smith's major theoretical achievement was to take the first steps towards a theory of the optimal efficient allocation of resources under conditions of free competition. It is said that before Smith there was economic discussion and that after Smith people discussed economics. (See CLASSICAL ECONOMICS.)

**snake.**

*See EUROPEAN MONETARY SYSTEM.*

**snob effect.** The effect whereby as the price of a good falls and some sections of the community expand their demand for the good, other sections or individuals reduce their demand in order to differentiate themselves from the general trend. That is, they tend to do the opposite to the general trend. The effect is that the MARKET DEMAND CURVE may exhibit a steeper slope than would otherwise be predicted from a straightforward aggregation of individual demand curves.

**social benefit.** The sum of the gains or benefits deriving from an activity or project to whomsoever they accrue. These are the relevant benefits for inclusion in COST-BENEFIT ANALYSIS but should not include TRANSFER PAYMENTS. Occasionally used in a second sense to describe what might be called external benefits, i.e. the benefits to others rather than to the individual who predominantly enjoys the private benefit.

**social choice.**

*See PUBLIC CHOICE.*

**social contract.** A unanimous agreement (usually of a hypothetical or imaginary nature) between all of the individuals composing a society concerning the basic principles upon which that society will operate. This concept was employed in eighteenth and nineteenth century explanations of the
existence of nation states, but had fallen out of favour till revised and reintroduced in the justice theory of John Rawls. Rawls' concept of DISTRIBUTIVE JUSTICE rests upon a form of social contract. This use of the term should not be confused with its application to a temporary agreement between British TRADE UNIONS and the Labour government of 1974–79—which is discussed under INCOMES POLICY. (See RAWLSIAN JUSTICE.)

**social cost.** The social cost of a given output is defined as the sum of money which is just adequate when paid as compensation to restore to their original utility levels all who lose as a result of the production of the output. The social cost is the OPPORTUNITY COST to society (i.e. to all individuals in society) rather than just to one firm or individual. One of the major reasons why social costs differ from the observed private costs is due to the existence of EXTERNALITIES or EXTERNAL COSTS.

**social decision rule.** A procedure or method of making choices between alternatives which must be made by or on behalf of a group of individuals rather than a single individual. Thus a social decision rule is required for choices concerning PUBLIC GOODS or other elements of COLLECTIVE CHOICE. (See SOCIAL WELFARE FUNCTION, PARADOX OF VOTING)

**social discount rate.** This is the rate used to discount collective or public investments. There are three broad approaches towards the determination of the social discount rate, one of which emphasizes the SOCIAL TIME PREFERENCE RATE, another the SOCIAL OPPORTUNITY COST OF CAPITAL and the third which represents a synthesis of these two. The social time preference rate is not equal to the social opportunity cost rate because of imperfections in the capital market and because individuals' collective behaviour towards the future differs from their behaviour as individuals. (See TEST DISCOUNT RATE.)

**social economics.** The application of NEOCLASSICAL economic theory to social policy. The term 'social' is interpreted as widely or as narrowly as the individual author chooses, although it usually encompasses health, education, crime, housing and welfare services. An alternative usage of the term is that of certain RADICAL ECONOMISTS who describe their work regardless of subject area as social economics.

**Social Fund.** See BEVERIDGE REPORT.

**socialism.** A term used to describe the general doctrine that the ownership and control of the means of production—capital and land—should be held by the community as a whole and administered in the interests of all. For Karl Marx socialism is an intermediate stage in the inevitable transformation of CAPITALISM into COMMUNISM. The socialist state is characterized by the dictatorship of the PROLETARIAT and existence of scarcity. While in this sense socialism is a lower form of communism, for many socialists it represents a programme of social reform which essentially maintains the capitalist structure. For many, however, socialism is synonymous with a PLANNED ECONOMY. In this sense, a number of general characteristics of a socialist economy may be distinguished: (1) the concentration of power in the Communist Party representing the proletariat, (2) social ownership of the means of production, (3) central economic planning and (4) the elimination of incomes from property (rent, interest and profit). To the extent that these characteristics exist in both the MIXED MARKET ECONOMY and the planned economy they may be broadly described as socialist.

**socially necessary labour.** See LABOUR THEORY OF VALUE.

**social marginal productivity criterion.** This criterion states that the total net contributions of a unit of investment to output should be considered when allocating resources and not simply the part which accrues to private investors. The social marginal productivity of capital should be equated in its various possible uses if resources are to be allocated efficiently. Critics of the criterion have said that it does not take sufficient account of the changes in the labour and managerial skills, in the volume of saving, in the rate of population growth following from an investment in the present
social returns to education

social opportunity cost of capital. It is argued that the correct way to evaluate public sector investments is through consideration of the OPPORTUNITY COST to society of diverting resources from marginal private sector projects to public sector ones. However, this does not imply that the appropriate SOCIAL DISCOUNT RATE is the INTERNAL RATE OF RETURN on marginal private projects because of the existence, for example, of taxation and risk premia. It is suggested that the marginal rate of return on private investment when suitably adjusted generates an appropriate discount rate.

social optimum. That allocation of a society's resources, pattern of production and distribution of output which is the 'best' attainable according to some stated set of objectives. The concept is most usually employed in WELFARE ECONOMICS where we may be faced with a choice between a number of alternative situations all of which are PARETO OPTIMAL (i.e. in each situation we can only make anyone better-off by making someone else worse-off). By introducing a SOCIAL WELFARE FUNCTION, which represents the welfare of society at large as some function of the welfare of the individuals forming that society, we are able to choose the best of all the Pareto optimal situations - the social optimum. In the diagram below, we have a two-person community. The line \( u-u \) represents, in terms of each individual's UTILITY or well-being the various, alternative Pareto optimal points possible while the \( w-w \) lines represent combinations of individual utility which give rise to equal levels of social welfare. Higher \( w-w \) lines indicate higher levels of social welfare. The point \( S \) is the highest attainable level of social welfare and thus is the social optimum. Although the social optimum concept is usually employed in Paretian welfare economics, it could be formulated in terms of some other set of objectives.

social relations of production. The term used by MARX to define the social relationships between humans, which arise from a particular set of MATERIAL FORCES OF PRODUCTION. The most important relationship is that among the classes following from ownership of the means of production and determining the division of the total product. As the material forces of production change with economic development, they may come into conflict with the social relations and give rise to the need for a social revolution.

social returns to education. The excess return on education over and above any extra earnings obtained from being educate (see EARNINGS FUNCTIONS.). Public authorities must therefore weigh the value of education in such non-quantitative but important areas as the maintenance of democracy and personal freedom, the health of the social body (the possibility of reduced crime rate, for example), and the preservation of the social order, and not simply in terms of a relation between gross earnings and government and private expenditures on education. Moreover, education contribution to economic growth is likely
have been not inconsiderable, particularly where educational investment comes from funds that might otherwise have been used for consumption. Given the empirical elusiveness of such social benefits to schooling, however, estimates in this area can never be more than an educated guess. (See ABILITY AND EARNINGS, SCREENING HYPOTHESIS.)

**social time preference rate.** Society's rate of time preference represents the rate at which society is willing to trade consumption between different time periods. If the rate was 10 per cent this would imply that an additional unit of consumption in year 0 is worth 1.1 additional units in year one. Conversely, 1 unit in year one is worth

\[
\frac{1}{1.1}
\]

units now, since

\[
1.1
\]

units will, at 10 per cent, cumulate to

\[
\frac{1}{1.1} \times 1.1 = 1
\]

unit in year one. It is commonly argued, although not universally agreed, that the social time preference rate is the appropriate SOCIAL DISCOUNT RATE. The social time preference rate is not equal to the market RATE OF INTEREST since individuals might not express all their preferences concerning the future in the market (particularly because of imperfect capital markets). Also their preferences expressed as individuals might not be the same as their preferences when they see themselves as part of society.

**social welfare.** The well-being of the society or community at large. In defining social welfare we face two sets of problems. The first problem concerns the 'social' aspect. In general, social welfare is seen as some aggregation of the welfare of individual members of a society - this raises the question of how the aggregation is to be achieved. The second problem relates to the concept of 'welfare'. I.M.D. Little has argued (see his Critique of Welfare Economics, 2nd edn, Oxford University Press, Oxford, 1957) that 'welfare' is an ethical concept since to define something as contributing to welfare is to make a VALUE JUDGEMENT about whether that thing is good or bad. Alternatively it has been argued that welfare should be equated with the satisfaction of individual preferences and regarded as a 'technical' term. On the whole, Little's argument is the more widely accepted and definitions of social welfare are usually regarded as VALUE JUDGEMENTS.

**social welfare function.** A statement of a society's objectives in which the level of SOCIAL WELFARE or well-being is represented as a function of the way in which resources are allocated. In the form in which this concept was introduced by A. Bergson, social welfare is generally made a function of the levels of UTILITY of the individuals forming the society. However, other variables can be included. In this form the social welfare function is essentially arbitrary since it is imposed from outside the analysis and we are provided with no guidance as to how it is to be formulated. One might imagine it as being decided upon by legislators, civil servants or in I.M.D. Little's phrase an 'ethical superman' (see his Critique of Welfare Economics, 2nd edn, Oxford University Press, Oxford, 1957). This concept has proved to be useful in purely theoretical analysis, permitting definition of the SOCIAL OPTIMUM - the 'best' allocation of society's resources.

K.J. ARROW has analysed the process by which a social welfare function may be formulated, arguing that a social welfare function is only a valid concept if it is derived from the preferences of the individuals composing the society. Arrow's analysis, provided fully in his Social Choice and Individual Values (2nd edn, Wiley, New York 1963), rests on the view that a social welfare function is equivalent to a DECISION RULE or 'constitution'. He then considers whether a rule may be formulated which fulfils certain 'reasonable' (sic) criteria. These criteria are

1. collective rationality - the social welfare function will indicate a choice between alternatives on the basis of any given pattern of individual preferences concerning the alternatives available;
2. the PARETO PRINCIPLE; if every individual
spatial price discrimination
401

in society prefers situation A to situation B then A is ranked above B by the social welfare function;

3. Independence of irrelevant alternatives - the social choice made from a group of alternatives depends only on individuals' preferences between those alternatives. Thus if we are choosing between A, B and C, all that matters are the preferences of individuals concerning A, B etc. - their attitude to, for example, situations Q and E, which are not available, are not relevant.

4. Non-dictatorship; there is no individual whose preferences automatically overrule everyone else's preferences.

Arrow then demonstrates, in his 'Impossibility Theorem', that no rule can be formulated which obeys all of these conditions. Subsequent work has focused on elucidating Arrow's conditions and considering whether they are 'reasonable'. Relaxation of some of the conditions renders a social welfare function of this type 'possible'.

Economists continue to differ in their views of the significance of Arrow's results. One school of thought agrees that Arrow has banished the concept of a social welfare function while another school, including Bergson, would argue that the economist may work with any 'given' social welfare function without being directly concerned with the process of formation.

soft currency. A CURRENCY with a falling EXCHANGE RATE due to continuing BALANCE OF PAYMENTS deficits. Such a currency would not be held by other countries as part of their exchange reserves. (See HARD CURRENCY, RESERVE CURRENCY, INTERNATIONAL MONETARY FUND.)

soft loan. A loan with no RATE OF INTEREST or one below the cost of the CAPITAL being lent.

Solow, Robert (1924–) An American economist awarded the Nobel Prize in Economics in 1987 for his work in the theory and measurement of economic growth.

Solow's NEO-CLASSICAL GROWTH MODEL differs from the HARROD-DOMAR GROWTH MODEL by allowing for the substitutability of CAPITAL for LABOUR, a feature which obviates the KNIFE EDGE problem in the latter and allows a systematic analysis of the properties of STEADY-STATE GROWTH. Though capital can be substituted for labour a surprising conclusion of Solow's model is that SAVINGS and INVESTMENT are not determinants of growth. They set the CAPITAL-LABOUR ratio and OUTPUT per head, but not the rate of growth of output. Starting from such a theoretical viewpoint, when Solow came to attribute to factors their contribution to growth of output, he found that about four-fifths of the growth in US output per worker was due to TECHNICAL PROGRESS. In later models he allowed the capital embodied in machinery to be of different vintages, with more recent vintages incorporating more technical progress. Empirical work starting from this framework found capital to be a more important contributor to growth. Solow has also made significant contributions in the fields of FISCAL POLICY, URBAN ECONOMICS and land use, NATURAL RESOURCES and UNEMPLOYMENT and STABILIZATION policy.

His most important works, because of their pioneering nature, were 'A Contribution to the Theory of Economic Growth,' Quarterly Journal of Economics, 1956 and 'Technical Change and the Production Function', Review of Economics and Statistics, 1957.

spatial economics. See REGIONAL ECONOMICS.

spatial monopoly. An element of MONOPOLY power obtained by a retailer or producer through locating at a distance from his competitors. The possibility of obtaining such a monopoly is likely to arise if transport costs relative to the cost of the goods are such that consumers are unwilling to travel far to purchase the good (i.e. if the RANGE of the good is small). The advantage of obtaining a spatial monopoly is a consideration which must be weighted against the advantages of a more central location (such as AGGLOMERATION ECONOMIES) when a choice of location is being made.

spatial price discrimination. A pricing strategy in which firms selling to consumers located at various distances from the producers do not charge each consumer a price for a good equal to the sum of the price of the good 'at the factory gate' (the FOB price) and the true TRANSFER COSTS of delivering the good. For example, if a firm charges each
consumer, irrespective of location, the same 'delivered price', consumers at greater distances will be paying less than the FOB price plus transfer costs while consumers located near the producer will be paying more than this sum. Consequently, the practice discriminates in favour of consumers at great distances and against those located near the consumer. The practice of the producer bearing some of the transfer costs is known as 'freight absorption'. As with conventional 'price discrimination' this policy is only possible where the producer has some MONOPOLY power and is only a profitable strategy if the more distant consumers have a higher PRICE ELASTICITY OF DEMAND for the product than the nearer consumers. (See BASING-POINT SYSTEM.)

Spearman's rank correlation.
See RANK CORRELATION.

Special Areas. The first form of ASSISTED AREA to be established in the UK. Under the Special Areas Acts of 1934 and 1937 and the Special Areas Reconstruction Act of 1936, various forms of assistance, including loans and subsidies for firms and the establishment of trading estates, were made available in these areas. The creation of the Special Areas in Scotland, Wales and Northern England was a response to high levels of local unemployment and represents the first major step in UK REGIONAL POLICY.

special drawing rights (SDRs).
See INTERNATIONAL MONETARY FUND.

special deposits. A credit control measure introduced by the BANK OF ENGLAND in 1958 and applying then to the London and Scottish clearing banks, but extended in 1971 to all banks operating in the UK and to certain larger FINANCE HOUSES. Under the system banks may be required to deposit funds in special accounts at the Bank; these deposits earn interest at the average Treasury bill rate over the previous week, and are not included in reserves for the purpose of calculating any minimum RESERVE RATE. Their purpose is to allow the Bank to adjust the free reserves of the banks, directly up or down, without resorting to OPEN MARKET OPERATIONS, when market conditions are unsuitable or when the effects of which, e.g. on interest rates, might conflict with other policy aims. In effect, special deposits are an alternative to varying the RESERVE RATIO requirement, a measure which most other CENTRAL BANKS employ. Despite the fact that the present requirement of UK banks is that they maintain balances at the Bank of England equal to 0.5 per cent of deposits and that control of the MONEY SUPPLY has been through interest rates, the Bank of England has retained the right to call for special deposits. (See DEBT MANAGEMENT.)

Special Development Areas. Regions of the UK within which firms were eligible until 1984 for the highest levels of government support available as part of REGIONAL POLICY. These areas were established in 1967 originally in predominantly coal-mining areas of Scotland, Northern England and Wales as a response to very high local rates of unemployment. At that time, the government support available in these areas was significantly higher than in the ordinary DEVELOPMENT AREAS but that difference was subsequently reduced, and the boundaries of the areas were redrawn. The designation of Special Development Area came to an end in 1984 when the various ASSISTED AREAS were regrouped and reclassified into two categories, Development Areas and Intermediate Areas, with revised but still differing levels of financial assistance. (See ASSISTED AREAS.)

specialization. Concentrating activity in those lines of production in which the individual or firm has some natural or acquired advantage. Specialization accompanied by TRADE will raise the living standards in all regions beyond those which would have been achieved had every region been self sufficient. The gains from specialization are illustrated within the static theories of ABSOLUTE ADVANTAGE and COMPARATIVE ADVANTAGE but there may also be dynamic elements as the theories of the VIRTUOUS CIRCLE and PRODUCTIVITY growth illustrate. (See DIVISION OF LABOUR.)

specialization, coefficient of. A statistic calculated to indicate the degree to which the economy of a region is specialized in certain economic activities. 'Specialization' is interpreted to mean that the regional...
economy under investigation has a mix of industry which differs from that of the nation of which it forms a part. The coefficient is expressed as

$$\sum |S_{aj} - S_{an}|$$

(the two vertical lines indicate absolute values, i.e. ignoring positive or negative signs) where $S_{aj}$ is the share of industry $a$ in total industrial activity of region $j$, while $S_{an}$ is the share of industry $a$ in total national industrial activity. A region with an industrial mix exactly matching that of the nation would have a coefficient of zero. The greater the value of the coefficient the greater the extent to which the region's economic structure diverges from the national average and thus the more 'specialized' it is. (See CONCENTRATION, COEFFICIENT OF.)

**specie.** Precious metal in coined form. (See MINT.)

**specie flow mechanism.** According to the traditional theory of the operation of the GOLD STANDARD, a corrective mechanism by which deficits and surpluses in BALANCE OF PAYMENTS would tend to be eliminated by induced flows of gold. Thus the theory held that a deficit country would experience a loss of gold: its adverse payments position would cause its EXCHANGE RATE to depreciate to the 'gold export point', i.e. that rate at which, given the gold values of the various currencies adhering to the gold standard, it became profitable to purchase gold with the depreciated currency and export it to other centres for conversion into their currencies. In the earliest formulation of the specie flow mechanism, by David HUME, the drain of gold produced a simple decline in the deficit country's quantity of money which in turn caused its general level of prices to fall relative to the price levels of other countries. This change in relative price levels, by making the country's exports more competitive abroad and its imports less competitive at home, caused the country's BALANCE OF TRADE to move 'favourably', i.e. towards a surplus of exports over imports, and this improved the country's balance of payments. Theoretically, this improvement would continue until the balance of payments was once more in balance. The development of modern monetary systems, with increasing use first of PAPER MONEY and the CHEMICALS, appeared to strengthen the theory, since a loss of gold due to an external deficit would reduce the cash reserves of the banking system and so, according to the theory of the CREDIT MULTIPLIER induce a multiple contraction in the total money supply. As an account of how the gold standard worked, historically, the specie flow theory has come in for some criticism and modification, notably in the light of Keynesian income and employment analysis: this showed that where a balance of payments deficit (for example) was caused by a decline in exports, or a switch of domestic expenditures towards imports, then would be a contractionary effect on income and employment, which would in turn reduce import demand, thus tending to move the balance of payments in a favourable direction. However, though this process could be expected to operate more directly and rapidly than the specie flow mechanism the theory also showed that the induced effects of the income and employment change would not proceed far enough to remove the deficit on their own.

An analysis similar to the specie flow mechanism has been developed from monetarist analysis and is known as INTERNATIONAL MONETARISM.

**specie points.** Those levels of the EXCHANGE RATE of a currency which is on the GOLD STANDARD at which it becomes profitable to move gold into or out of the country. One of the consequences of a country adhering to an international gold standard is that if the exchange rate of its currency depreciates by a small amount below its gold parity (i.e. the exchange value determined by its gold value), it becomes profitable to convert the currency into gold and export this to other centres for conversion into their currencies (the profit being derived either from their using these currencies to meet foreign debts, or by reconverting them into the original currency at its depreciated rate). The exchange rate at which this takes place is known as the 'gold export point'. Similarly, there is a level above the gold parity at which it is profitable to move gold into the country, known as the 'gold import point'. The margin between these points is determined by the small
differences between the buying and selling prices of gold, normally maintained by the CENTRAL BANK of a country on the gold standard, and by the costs of transporting gold between financial centres.  (See SPECIE FLOW MECHANISM.)

specification error.  An econometric problem in which the form of the relationship to be estimated is wrongly specified, either through an incorrect form of function (e.g. LINEAR instead of NON-LINEAR) or through the omission of relevant variables, or inclusion of irrelevant variables.  If the specification error involves anything other than the inclusion of irrelevant variables, all estimation techniques will result in biased parameter estimates.

specific tax.  Generally, a tax imposed on each unit of output of a good and not on the value of output.  (See AD VALOREM TAX.)

specific training.  Training which produces skills which raise a worker's PRODUCTIVITY in only the firm providing the training.  Such skills are to be distinguished from the transferable skills produced by GENERAL TRAINING.  Neither workers nor firms have the incentive to bear the full costs of specific training, while the worker remains free to quit the job or the firm to dismiss the worker.  Accordingly the costs of specific training are believed to be borne by both the firm and the worker.  Specific skills can result in IDIOSYNCRATIC EXCHANGE and are one cause of the distinction made in INSIDER-OUTSIDER models.

spectral analysis.  A technique by which the cyclical properties of a variable can be established from TIME SERIES data.  This involves the estimation of a 'power spectrum' which plots the strength of the component in the data with a given frequency, against that frequency.  A peak (or high value) in the power spectrum for a certain frequency implies that there is a strong element in the data with that frequency, for instance a peak at a frequency of one cycle in five years may indicate a strong business cycle influence in the data.

speculation.  The practice of buying or selling with the motive of then selling or buying and thus making a PROFIT if prices or EXCHANGE RATES have changed.  Speculators unlike hedgers are risk-lovers and maintain open positions.  Whereas a hedger maintains a closed position by matching a future ASSET against a future LIABILITY, a speculator will hold only the asset or liability, hoping that at the time the contract matures, events will have moved in his favour.  (See ARBITRAGE, EXCHANGE RATES, BEARS, BULLS, EXPECTATIONS, HEDGING, RISK AVERSION.)

speculative balances.  See MONEY, THE DEMAND FOR.

speculative boom.  INVESTMENT in highly risky projects but with high expected RATES OF RETURN or CAPITAL GAIN in a period of rapid economic expansion or boom.  Such investment is usually encouraged by naive EXPECTATIONS that the boom will continue indefinitely or at least long enough to enable the original investor to sell his investment to another even less risk averse speculator and by the availability of cheap bank borrowing.  Such behaviour was notable in the boom which preceded the great SLUMP which began in 1929 in the US.

speculative demand for money.  See MONEY, THE DEMAND FOR.

speculative motive for holding money.  See MONEY, THE DEMAND FOR.

speculative unemployment.  An element of FRICIONAL UNEMPLOYMENT.  More accurately described as speculative UNDEREMPLOYMENT, it is suggested it arises as a result of a fall in the real wage which is regarded as temporary.  This will lead some workers to reduce their present supply of hours in favour of offering more hours at the higher rate expected to govern in the future.  This may be regarded as temporal redistribution of the hours of work the employees will offer over their lifetimes in response to a temporary fall in the real wage.  (See PRECAUTIONARY, SEARCH UNEMPLOYMENT.)

spillover.  See EXTERNALITIES.

spillover hypothesis.  The notion that important wage settlements set a pattern which
Sraffa, Piero (1898-1983). Italian-British economist. In the 1920s he proposed the stimulus for British work on imperfect competition, when in the 'Law of Reversing Returns' (Econ. J. 1926), he raised the question of the nature of increasing returns and whether they were compatible with competition. He suggested further that many frictions imperfections in the economic system were not chance occurrences but deliberate policies on the part of producers, so that a nation would be better to start from the standard MONOPOLY than competition.

In 1960 Sraffa published the *Productive Commodity by Means of Commodities* in which he showed how it is possible to recover the problem of finding an invariable measure of value, a problem which had troubled RICOARD. A standard composite commodity system is an imaginary construction in which the proportion in which commodities net outputs is identical to that in which they enter the aggregate means of production. The composite commodity itself is known as the standard commodity. Relative profits and relative prices are determined in terms of the real wage and the rate of profit are determined in terms of the standard commodity, a linear relationship between the real wage and the rate of profit can be established for the system as a whole. These conclusions have been used in an attack on the NEO-CLASSICAL theory of production distribution by such economists as KALDOR and Joan ROBINSON. Sraffa's work also has implications for the capital controversy in GROWTH THEORY, for he stresses the WICKSELL EFFECT and its consequence the valuation of capital. (See RESWITCH CAPITAL-REVERSING.)

Sraffa, who was responsible for the complete works of David RICARDO *The Works and Correspondence of David Ricardo* (1951-55) is often referred to as a Neo-Ricardian, since his 1960 work is a SICAL rather than neo-classical in nature.

is followed by or at least significantly influences subsequent settlements. Such spillover effects are stressed by those who emphasize the role of comparability and institutional forces in wage determination (see WAGE CONTOUR, WAGE LEADERSHIP). The two key assumptions of the spillover hypothesis are, first, that wage settlement of any one bargaining group is inextricably linked to the wage settlements of other bargaining groups and, second, that the 'links' are principally to be found in the social, political and institutional arena and not in orthodox economic theory. The difficulty here is that orthodox economic theory emphasizes relative wage effects in the firm's supply function so that it is difficult if not impossible to distinguish empirically between the rival explanations.

**spot market.** A market in which a commodity or currency is traded for immediate delivery. It is distinguished from a FUTURES or a FORWARD MARKET, in which contracts for delivery at some future date are traded. Prices in spot markets are known as 'spot prices'. In foreign exchange spot markets the price of one currency in terms of another is known as the 'spot rate'.

**spread effects.** Beneficial effects of the growth of a regional economy on the economies of other regions. These effects consist principally of the creation of expanding markets for the products of the 'other' regions and the diffusion of technical progress from the leading region. Those economists who favour the CUMULATIVE CAUSATION MODEL of regional growth argue that the spread effects will be offset by adverse BACKWASH EFFECTS on the slower growing regions.

**spurious regression problem.** A problem which arises when variables of different orders of integration (see INTEGRATED TIME SERIES) are included in the same regression model. For example in the regression model

\[ y_t = \beta x_t + \epsilon_t \]

where \( \epsilon_t \) is assumed to be WHITE NOISE, thus \( I(0) \) and stationary (see STATIONARITY), if \( y_t \) is \( I(1) \) and \( x_t \) is \( I(0) \) then there will not be any \( \beta \) which will satisfy the relationship and \( u_t \) will not be \( I(0) \). If, however, and \( \epsilon_t \) are both \( I(d) \) and \( u_t \) is \( I(0) \), then \( x_t \) and \( \epsilon_t \) are then said to be cointegrated (see COINTEGRATION). The spurious regression problem has led to the development of ERROR CORRECTION MODELS (see INTEGRATED TIME SERIES on the no.
demand does not enter into his system and prices are determined on the basis of costs of production.

**Stability.** Generally used in the context of partial or general equilibrium systems to refer to the extent to which an equilibrium price or set of prices will be secured despite any 'shocks' to the system which temporarily move price away from its equilibrium level.

**Stabilization.** A normative approach to fluctuations in the level of economic activity. The implicit assumption is that cycles or other irregularities in the time path of economic variables should be smoothed out, by the use of policy instruments to achieve desirable values of policy targets. Alternatively targets may be implied by the specification of a social welfare function, objective function or loss function, from which strategies and decision rules may be derived to optimize the function. Such an approach to macroeconomics, in particular, follows naturally from the Keynesian revolution, with its advocacy of intervention to attain certain objectives or targets such as full employment and economic growth, using instruments such as fiscal and monetary policy.

The approach passes over the aggregation problem of shifting from individual preferences to an aggregate social welfare function, which is usually explicitly specified mathematically. J. Tinbergen and H. Theil are considered originators of modern stabilization theory.

**Stabilization function.** The role of government in manipulating fiscal and monetary policies for the purpose of maintaining a high and even level of economic activity. This function is one of the three economic functions of government in a market economy identified by, among others, R.A. Musgrave. While some economists would argue that the stabilization function requires an active policy, others, notably the monetarists, claim that government should seek merely to avoid causing disturbances to the economy. (See allocation function, distribution function, demand management)

**Stackelberg's duopoly model.** A model of a two firm market developed by H. von Stackelberg. It is an extension of the Cournot duopoly model incorporating the idea of a 'sophisticated' duopolist who recognizes that the competitor acts on the Cournot assumptions. The 'sophisticated' duopolist will act like a monopolist incorporating the rival's predicted decisions into his considerations becoming in effect a price leader choosing the price which maximizes profits subject to the known reaction of the rival firm. Stable equilibrium will be achieved as in the Cournot model except that the 'sophisticated' duopolist will have higher profits and the 'naive' duopolist will have lower profits. If both firms become 'sophisticated' then disequilibrium will result with the necessity for collusion if a price war, damaging to the profits of each duopolist, is to be avoided.

**Stag.** A stock exchange colloquialism for someone who applies for a new issue of securities in the expectation they will immediately rise to a premium on the issue price, and can be sold at a profit before the issue price has to be met.

**Stages of growth.** See Rostow model.

**Stagflation.** Periods of recession and rising unemployment coupled with positive rates of price inflation.

**Stamp duty.** An old form of tax first introduced in the UK in 1694. Many kinds of legal and commercial documents are required to be stamped to denote payment of duty. Sometimes the duty is specific and in others ad valorem depending on the value of the property transferred and the amount of consideration. The rates current in 1986 are 0.5 per cent on the transfer of shares, 1 per cent on real estate above an exempt limit of £30,000 and 1.5 per cent on initial conversion of UK shares into American depository receipts.

**Standard commodity.** A construct used by P. Sraffa to understand the relationship between relative prices and the distribution of income between wages and profits. The standard commodity is a composite commodity constructed such that its price does not change when there are changes in the
distribution of income. It represents Sraffa's solution to the problem of an invariable measure of VALUE which plagued the CLASSICAL SCHOOL and particularly D. RICARDO.

**standard deviation.** A commonly used measure of the degree to which a variable is dispersed (or spread) around its MEAN value. It is calculated from a sample of observations on a variable according to the formula

$$ \sqrt{\frac{1}{N} \sum_{i=1}^{N} (X_i - \bar{X})^2} $$

where $X_i$ is the $i$th sample observation on the variable, $\bar{X}$ is the sample MEAN, and $N$ is the number of observations.

The square of the standard deviation ($S^2$) is the sample VARIANCE. (See RANGE, STANDARD ERROR.)

**standard error.** A measure of the degree to which a calculated STATISTIC is dispersed around its MEAN value. Whereas the term STANDARD DEVIATION is used to describe the dispersion of a variable, the term standard error is employed to describe the same quantity applied to a statistic.

**Standard Industrial Classification (SIC).** Numerical classification of industries introduced in the UK in 1948 and revised in 1958 and 1968 to take account of the change in organization and relative importance of industries.

In 1980 the classification was substantially revised to bring it into line with EUROPEAN COMMUNITY conventions, which can also be arranged to agree at aggregated levels with the INTERNATIONAL STANDARD INDUSTRIAL CLASSIFICATION. The 1980 classification adopts a decimal structure. There are ten major divisions denoted by a single digit from zero to 9. The addition of a second digit represents classes, which are subdivided into groups (three digits), which in turn are divided into activities (four digits). There are ten divisions, 60 classes, 222 groups and 334 activities.

Establishments are allocated into digital categories according to their principal products; thus the whole of the output of an establishment which produces within different industries is classified in that category representing its principal activity. This poses problems for the measurement of industry size and the use and interpretation of CONCENTRATION RATIOS.

**standard of living.** (also referred to as the level of ECONOMIC WELFARE, UTILITY or real income.) The level of material well-being of an individual or household. In economic analysis, the standard of living is usually held to be determined by the quantities of goods and services (including leisure) consumed. The same level of consumption will not, in general, yield the same standard of living for households in different circumstances - for example, a large family will require to consume more than a small family to achieve given living standard. Comparisons of living standards across households are sometimes undertaken using EQUIVALENCE SCALES which seek to establish levels of income or consumption required by households in different circumstances to achieve the same living standard. It should be noted that the approach requires us to assume that PERSONAL COMPARISONS OF UTILITY may be made, an assumption generally rejected in THEORETICAL WELFARE ECONOMICS.

**Standard Regions.** The geographical area into which the UK is divided for the purpose of presenting various government social and economic statistics. At present these are South East, East Anglia, South West Midlands, East Midlands, Yorkshire, and Humberside, North West, North Wales, Scotland and Northern Ireland. The existing designation of Standard Regions dates from 1966, when the boundaries a number of pre-existing regions were altered.

**standard weekly hours.** These are usually determined by collective agreements or company policies, and they are the hours beyond which overtime rates are paid.

**standard working week.** The minimum number of hours of work the employee agrees to supply to his employer each week, the minimum number of hours of work each employee specified in the w CONTRACT.
state organization of production in Eastern Europe. From the end of the Second World War until the early 1990s the state ownership of the means of production in all sectors of the economy was the dominant organizational pattern in Eastern Europe. Industrial production was organized into large state firms and ‘combinates’, whose inputs were determined by central planners. Mandatory output targets were set for all state and collectively owned enterprises. Profitability was no longer a measure of success. In agriculture production was organized into large scale, state farms (sovhozes in the USSR) or into collective farms (kolkhozes in the USSR).

This structure of ownership in agriculture existed in Albania, Bulgaria, Czechoslovakia, Hungary and Romania, though not in Poland, where the private ownership of farms (of an upper size limit of 100 hectares) accounted for 80 per cent of agricultural land.

These forms of organization altered with the political changes in Eastern Europe from the late 1980s onwards. (See PLANNED ECONOMY.)

static expectations. The expectation that the present value of a variable will remain unchanged. (See REGRESSIVE EXPECTATIONS.)

stationarity. An important property of a TIME SERIES, which can be attributed to a series of observations \( x_1, x_2, \ldots, x_T \), if the following conditions can be satisfied.

\[
E(x_t) = \mu \quad t = 1, \ldots, T \\
E(x_t^2) = CT^2 \quad t = 1, \ldots, T \\
E(x_t x_s) = 0 \quad t \neq s \text{ and } t, s = 1, \ldots, T
\]

where \( E \) is the expectation operator (see EXPECTED VALUE). Then the series \( x_t, t = 1, \ldots, T \) is WEAKLY STATIONARY, or COVARIANCE STATIONARY because (a) the mean \( \mu \) is independent of \( t \), (b) the variance \( \sigma^2 \) is independent of \( t \) and (c) the auto covariance \( E(x_t x_s) \) depends only on the difference between \( t \) and \( s \) but is independent of \( t \). If \( x_t \) were to follow a NORMAL DISTRIBUTION in addition to the above conditions it would be STRONGLY STATIONARY. If \( \mu \) were zero then \( x_t \) would be a WHITE NOISE process. The variable \( x_t \) is also known as a stationary STOCHASTIC PROCESS.

stationary point. A point on a function at which its slope (rate of change) with respect to an INDEPENDENT VARIABLE is equal to zero, usually associated with a maximum or minimum value of the function.

stationary state. An economy in a stationary state functions as if output in every period is consumed in the same period. The stock of consumer goods is used up through the period, but it is always exactly replaced at the end. The idea of a stationary state was an important ingredient in the WAGE FUND doctrine. The growth theory of CLASSICAL ECONOMICS may be essentially described as a progression towards the situation of a stationary state or zero economic growth. (See STEADY-STATE GROWTH.)

statistic. Any quantity calculated as a summary of data. Examples include the MEAN, VARIANCE and the estimates of the parameters of a REGRESSION equation. (See TEST-STATISTIC, STATISTICAL INFERENCE.)

statistical cost analysis. In its specific sense, the employment of statistical techniques, such as REGRESSION analysis, to CROSS-SECTION and TIME SERIES cost data, the objective being to identify the nature and shape of the LONG-RUN AVERAGE COST curve. Statistical cost analysis is also used as a banner heading for a range of techniques employed in cost studies, such as the ENGINEERING METHOD and the SURVIVOR TECHNIQUE.

statistical inference. The process of gaining information about a POPULATION (including the characteristics and PARAMETERS of its distribution) from samples of observations on that population, through ESTIMATION, HYPOTHESIS TESTS ETC..

statistical significance. A concept used in HYPOTHESIS TESTS to indicate the degree to which the data are inconsistent with the NULL HYPOTHESIS. The term is not to be confused with numerical or quantitative significance. One variable may have an infinitesimal quantitative impact on another, but may still be a statistically significant element in its determination. (See LEVEL OF SIGNIFICANCE.)
steady-state growth. In GROWTH THEORY a dynamic condition of an economy where all real variables are growing at a constant proportional rate (which may be zero or negative). For example, capital stock may be growing at 3 per cent per annum, the labour force at 4 per cent etc. resulting in steady-state growth for the whole economy as some net effect. In BALANCED GROWTH these percentage rates of change of the constituent variables of the economy are the same. Growth theory is concerned with the possibility or otherwise of steady-state growth and the attendant problem of whether the economy will tend to move to that state if it exists.

steady-state models. See COMPARATIVE DYNAMICS.

stepwise regression. A REGRESSION analysis in which EXPLANATORY VARIABLES are added one by one to the regression equation, until some GOODNESS-OF-FIT criterion is satisfied, usually to determine a satisfactory specification. Backward stepwise regression is the reverse process, whereby after a regression containing a large number of explanatory variables, those whose parameter estimates are statistically insignificantly different from zero are dropped one by one, and fresh regression carried out until only significant variables remain.

sterilization. The offsetting of the monetary effects of BALANCE OF PAYMENTS surpluses or deficits on the domestic money supply of a country. If a country has a $>0$ on foreign payments under a fixed EXCHANGE RATE regime, the domestic currency will be exchanged for FOREIGN EXCHANGE from national reserves to settle the net over payment. Both the reserves and the domestic money supply will decline. To offset contractionary effects of these forces a government may direct its CENTRAL BANK to engage in OPEN MARKET OPERATIONS to offset the reduction in the money supply, which is a consequence of the deficit. The reverse holds for a foreign surplus.

Under a flexible exchange rate system exchange rate should adjust, so that balance of payments should always be maintained with no consequences for the domestic money supply.

sterling area. Originally the sterling area consisted of a group of countries and territories which, because of their strong trade and financial connections with the UK, tended to stabilize the EXCHANGE RATE of their currencies with sterling, and to hold or a large part of their EXTERNAL RESERVES in sterling. The longstanding core of it was constituted by the UK colonies and dominions but from time to time other, non-European countries adhered to it. In 1939 with the outbreak of war, the sterling area was maligned as the 'scheduled territories' comprising those countries and territories which jointly applied EXCHANGE CONTROL on the use of sterling and which maintained a central reserve of gold and dollars in London. As such it continued to exist function after the Second World War, the sterling acting as a major reserve and trading currency, and the area itself constituting an island of free payments in a sea of exchange controls. With the continuing weakness of the international position of sterling and particularly after the crisis and devaluation of 1967, many former members of the 'area' moved their reserves out of sterling, and the 'sterling area' can now hardly be said to exist at all. (See INTERNATIONAL LIQUIDITY.)
Stigler, George Joseph (1911-91). American economist and Charles R. Walgreen Distinguished Service Professor of American Institutions at the University of Chicago. He was awarded the 1982 Nobel Prize in Economics for his 'seminal studies of industrial structures, functioning of markets and causes and effects of public regulation'.

Stigler's contributions to the history of economic thought are also noteworthy, beginning with his first book, *Production and Distribution Theories* (1941), and such essays as 'The Development of Utility Theory' (reprinted in *Essays in the History of Economics*, 1965). *The Organization of Industry* (1968) reprints his articles on INDUSTRIAL ORGANIZATION and covers the topics usually discussed under this rubric; however, the insistence on empirical data and the incisive analysis make the volume far from common. One particular essay, 'The Economics of Information', singled out by the Swedish Academy, deals with the necessary cost of 'search' among an array of prices charged by different suppliers for the same good or service. The analysis can be applied to questions of price rigidity, variations in delivery periods, queueing and unutilized resources. Much of Stigler's work on the economics of regulation appears in *The Citizen and the State* (1975), in which he calls for more use of quantitative methods in the study of regulation. It is with the microeconomist's perspective that he latterly turned his attention to the political system to discover in what ways the legislative process is an ENDOGENOUS, rather than an exogenous, part of the economy. *(See CAPTURE THEORY.)*

**stochastic.** Subject to random variation. *(See DISTURBANCE TERM.)*

**stochastic process.** Usually a time related series which is subject to random variation. An example is the series generated by

\[ X_t = aX_{t-1} + u_t, \]

where \( X_t, X_{t-1} \) are the current and lagged values of a variable respectively, \( u_t \) is a stochastic variable, and \( a \) is a constant. *(See MARKOV PROCESS, STATIONARITY.)*

**stock.**

1. The ISSUED CAPITAL of a company, or a particular issue of SECURITIES, e.g. by a government, which is in a consolidated form so that it can be held or transferred in any amounts. The distinction is with SHARES in a company which must be for fixed nominal amounts, and held or transferred in such units.

2. A variable the value of which has no time dimension, e.g. the stock of capital. The opposite of FLOW.

**stock-adjustment demand function.** Applied to the demand for consumer durables. This is a demand function where demand in any one period reflects the difference between actual possessions and some 'optimal' desired stock of consumer durables. The desired level is usually taken to be some function of the level of income and in each period the consumer adds to his stock in an effort to achieve the optimal stock. Various limitations, including his income, prevent him from reaching the desired level immediately.

**stock appreciation.** An increase in the nominal value of INVENTORIES as a result of a rise in prices during the period in question. *(See NATIONAL INCOME.)*

**stockbroker.** An intermediary who buys and sells STOCKS and SHARES, as agent, on behalf of a client, charging a commission for doing so. Stockbrokers must be admitted members of a STOCK EXCHANGE, on which - except for MARKET MAKERS on the London Stock Exchange - only they (or their 'authorized clerks') may trade. However, while they hold membership of an exchange as individuals, all operate in partnerships, which in recent years have grown in size and declined in number. Besides carrying out stock transactions, stockbrokers act as advisers to their clients, and are also involved in new issues of securities, for example, arranging for them to be listed (quoted) on the stock exchange and to be sub-underwritten. Some ISSUING BROKERS handle new issues in their entirety. *(See NEW ISSUES MARKET.)*

**stock dividend.** A method of paying dividends by issuing additional shares rather
than paying out cash. In order to do this, a firm must transfer funds from net profits to its capital account.

stock exchange. A market in which the SECURITIES issued by central government, local government bodies and PUBLIC COMPANIES, other than BILLS and similar short-term instruments, are traded. Stock exchanges are really associations of dealers in securities, i.e. in the UK STOCKBROKERS and MARKET MAKERS (formerly JOBBERS). In the UK until 1986 no firm could be both a stockbroker and marker maker, but now dual capacity is permitted, though the operations must be kept rigidly apart. On the London Stock Exchange members no longer transact business on the ‘floor’ but deal with each other by electronic communication. Conditions of membership and codes of practice are regulated by the SECURITIES AND INVESTMENTS BOARD and its subsidiary (self) regulatory bodies. Similarly, companies and other security-issuing bodies have to meet specific requirements if their issues are to be 'listed' (or 'quoted') on an exchange. The existence of such a market is a vital condition of the provision of finance on the scale needed in a modern mixed economy, since it provides a SECONDARY MARKET in which ownership of claims created in the raising of finance can be transferred. The existence of this facility encourages the holding of such claims, and hence the provision of financial capital. (See NEW ISSUES MARKET.)

stock market. An institution where STOCKS and SHARES are traded. They exist in all advanced Western countries. The arrangements for trading differ from one country to another. For example the Stock Exchange in the UK has a system of MARKET MAKERS and STOCKBROKERS who are respectively wholesalers and retailers in stocks and shares, a feature which not all stock markets have. The economic significance of a stock market results from the increased marketability resulting from a stock exchange share quotation. Investors know that they can quickly realize their holdings. In general this means that companies wishing to raise EQUITY or loan CAPITAL from the public can do so more easily and cheaply as investors will be prepared to purchase stocks with a ready market at a lower required return compared to a situation where there was no ready market.

SAVING and INVESTMENT should be higher as a result. GOVERNMENT SECURITIES, ORDINARY SHARES, PREFERENCE SHARES and DEBENTURES can all be quoted on a stock market. (See STOCK EXCHANGE.)

stock option. The right to buy a given SECURITY (a 'call'), or to sell it (a 'put'), at a determined price, over a period of time usually three months, on the STOCK EXCHANGE. The transactor taking out an option pays a price for it. Trading in stock options is a form of forward dealing which may be undertaken as a speculation or as a HEDGE against the risk of an unfavourable price movement.

stocks. See INVENTORIES.

Stolper-Samuelson Theorem. Using the HECKSCHER-OHLIN framework Stolper and Samuelson have shown that on certain restrictive assumptions international trade necessarily lowers the real wage of the scarce factor of production without it being necessary to specify its pattern of consumption. A corollary to this proposition is that protection necessarily raises the real wage of the scarce factor.

Stone, Sir Richard (1913-91). British economist; awarded the 1984 Nobel Prize in Economics for his pioneering research into the development of systems of NATIONAL ACCOUNTS, both in terms of their theoretical underpinning and their practical application. His early work, with J.E. MEADE, inspired by KEYNESIAN macroeconomic analysis and led to the publication of first White Paper on NATIONAL INCOME expenditure for the UK in 1941. His last major research was empirical search into growth in the Cambridge Growth Project. His major publications are *National Income and Expenditure* (1944) with

'stop-go'. Action on the part of the government to curtail aggregate demand due to (say) a BALANCE OF PAYMENTS deficit, soon followed by action with opposite effect to ameliorate the rise in unemployment caused by the first policy intervention. This pattern of 'stop-go', usually dictated by balance of payments deficits, has been a conspicuous feature of UK macroeconomic policy since World War II. Stop-go appeared to have ended with the economic boom stimulated by Chancellor of the Exchequer Barber's budget policy in the early 1970s. The policy reappeared in the UK in the late 1980s and early 1990s as a result of the policies of the Conservative governments. Such a series of policies is usually dictated not by an overall STABILIZATION policy but by political expediency.

store of value. One of the functions of money is that unlike a barter situation, it enables wealth, or value to be stored. An individual can sell a good or service and store the money until he needs something and can then use the money to purchase what he needs. To be useful as a store of wealth, money must have a stable value; if the level of prices changes a great deal, money will not be considered to be useful for storing value as it would not be reliable in terms of future purchasing power. (See MONEY, THE DEMAND FOR; MONEY.)

strategic voting. A practice sometimes found in COLLECTIVE CHOICE procedures where individuals do not simply vote in accord with their true preferences but may mis-state their preferences in order to deceive other voters or influence the outcome. The existence of strategic voting may lead to decisions which are not OPTIMAL. (See PREFERENCE REVELATION, SOCIAL DECISION RULE.)

strike insurance. A form of mutual aid employed by a variety of industrial concerns to protect themselves against the selective strike tactic. (See WHIPSAWING.) In the US, the railroad and airline industries have strike insurance schemes which pay out monies to struck employers. In the UK, such schemes are of less relevance because of the phenomenon of industry-wide bargaining.

strike measures. There are four principal measures of the extent and seriousness of strikes: the number of workers involved in strikes (and LOCKOUTS); the number of strikes (and lockouts); the man-days lost because of strikes (and lockouts); and the percentage of estimated available working time lost in strikes (and lockouts). Each measure has a useful purpose, but some are more sensitive indicators of strike activity than others.

strikes. Withdrawals of labour, associated with an impasse in the COLLECTIVE BARGAINING process, either with regard to the negotiation of a new contract of employment or over the interpretation of an existing agreement. Strikes may be classified as official or unofficial; the latter term signifying that the withdrawal of labour is not sanctioned de jure by the union leadership.

Given the number of negotiations in progress at any one time the number of strikes (see STRIKE MEASURES) is modest. Most contracts are, therefore, settled without recourse to strike action, and most disputes over an existing contract are settled satisfactorily under established grievance machinery.

Empirically, strike frequency appears to be positively related to the size of plant, the rate of change of productivity, and price inflation; and negatively related to the past rate of increase in real or nominal wages, the level of profits, and the level of unemployment (a proxy for the level of economic activity). However, although there is a measure of consensus about the importance of particular varieties, the interpretations given to the results are very different. One interpretation is that strikes are mistakes or accidents attributable to uncertainty and lack of knowledge. Another is that strikes are the result of worker militancy in conjunction with employer resistance. Yet another
view is that union leaderships, more actively aware of bargaining possibilities than the rank and file, enter claims they know to be unrealistic and which result in strikes as the only measure of squaring the expectations of the membership with reality.

**strongly exogenous.**
See EXOGENEITY.

**strongly stationary.**
See STATIONARITY.

**structural form.** The form of a set of SIMULTANEOUS EQUATIONS in which the causal and definitive relationships between the ENDOGENOUS VARIABLES are explicitly considered. The term usually refers to the original specification of the system which allows for variables endogenous to the model to appear as EXPLANATORY VARIABLES in some of the equations. (See also REDUCED FORM.)

**structural unemployment.** On a KEYNESIAN view this form of unemployment results from the coexistence but mismatching of the unemployed and existing JOB VACANCIES. The unemployed possess neither the right skills nor live in the right places to fill the existing job vacancies. It is therefore often thought of as a more extreme form of FRICIONAL UNEMPLOYMENT which can only be eliminated by retraining workers or by a change in the location of either industry or the unemployed. It cannot be eliminated by expanding AGGREGATE DEMAND. However, if relative wages adjust to reflect the underlying shifts in demand that have caused this imbalance in the structure of labour demand then this form of unemployment should disappear. The possibility of this form of unemployment existing into the long-term is therefore denied by NEO-CLASSICAL economists. They argue that while the NATURAL RATE OF UNEMPLOYMENT will contain both a frictional and structural element the latter results from the characteristics of labour and commodity markets and social and legal impediments such as MINIMUM WAGES and unemployment compensation. On this view the coexistence of unemployment and vacancies provides no guide to the degree of structural unemployment. (See SEASONAL UNEMPLOYMENT, DEMAND-DEFICIENT UNEMPLOYED.)

**structure-conduct-performance framework.** Both a means of classification and a framework for analysis in industrial economics. The conventional approach has been to identify and specify the causal chains linking aspects of market structure, such as CONCENTRATION and BARRIERS TO ENTRY, with elements of business conduct - e.g. ADVERTISING and RESEARCH AND DEVELOPMENT - and industrial performance. Examples of the last would be profitability and innovation. The direction of causation has generally been presumed to run from structure through conduct to performance, as with concentration and profitability for instance. However, recent developments in this area have highlighted the possibility of feedback effects: for example, it can be argued that advertising strategy as an aspect of business conduct can significantly affect elements of market structure such as barriers to entry and concentration.

**structure of interest rates.**
See TERM STRUCTURE OF INTEREST RATES.

**structure of taxes.** Every country has a range of different types of taxes. The structure of the tax system refers to this mix. Generally the relative importance of INCOME and WEALTH TAXES and taxes on expenditure is highlighted in this exercise. Rough-and-ready conclusions are sometimes drawn about how PROGRESSIVE or otherwise a tax system is. In less developed countries the tax structure is heavily dependent on indirect taxes especially customs and excise duties. This is because these taxes are relatively easy to collect. Very broadly, as a country develops the relative importance of income tax grows. Only advanced countries have well developed systems of income tax.

**subsidy.** A payment made by the government (or possibly by private individuals which forms a wedge between the price consumers pay and the costs incurred by producers, such that price is less than MARGINAL COST. Such payments have a number of possible objectives: (1) a transfer from taxpayers to producers or consumers of a particular good, for example, in order to raise farmer: incomes, (2) to influence behaviour (suppliers or demanders via the mechanism of the ELASTICITY of supply or demand, fc
example, in the case of an EXTERNAL ECONOMY, (3) to keep prices of certain goods low or stable, for example, as part of an anti-inflation policy. A further use of subsidies is by multi-product firms engaging in CROSS-SUBSIDIZATION.

**subsistence.** The minimum level of consumption necessary for existence. The concept was used by the CLASSICAL ECONOMISTS to explain the long run level of wages. Wages were constrained to be at subsistence level by population growth. (See MALTHUS.)

**subsistence expenditures.** A level of expenditure necessary to sustain a subsistence or 'survival' standard of living. In LINEAR EXPENDITURE SYSTEMS it refers to some minimum quantity of each separate set of goods (between which sets there is no substitutability) which will be bought regardless of price.

**subsistence wage.** See IRON LAW OF WAGES.

**substitute.** A good which can be substituted for another good, or an input that can be substituted for another input. In NEO-CLASSICAL theory substitution possibilities are generally assumed to exist, accounting for the 'smoothness' of INDIFFERENCE CURVES and ISOPRODUCT CURVES. Where substitution is limited this smoothness disappears and will be replaced by 'piecewise linear' curves. (See diagram.) For substitutes the CROSS ELASTICITY OF DEMAND will be positive.

**substitution effect.** The effect on the demand for a good of a change in price of that good assuming real income is held constant. The substitution effect is always negative, that is, as price rises the quantity demanded falls and vice versa. Two measures of the substitution effect have been put forward. They differ according to how 'real income' is specified. According to J.R. HICKS constant real income means that the consumer stays on the same INDIFFERENCE CURVE, so that the move is from A at the old price to H at the new lower price of x. According to SLUTSKY real income is constant, if the consumer is left with an income which would enable him to buy his original collection of goods at the new price, if he wished to do so. In this case the move is from A to S in the diagram. (See also PRICE EFFECT, SLUTSKY EQUATION, INCOME EFFECT.)

**sum of squares.** The sum of the squared values of a set of observations on a variable, normally in terms of deviations from its sample MEAN, i.e.
supplementary special deposits

\[ S_S = \sum_{i=1}^{N} (X_i - \bar{X})^2, \]

where \( S_S \) is the sum of squares, \( X_i \) is the \( i \)th observation in the variable \( X \), \( \bar{X} \) is its sample mean, and \( N \) is the sample size.

The sum of squares is a convenient measure of the degree of variation of a variable. (See VARIANCE, COEFFICIENT OF DETERMINATION.)

sunk costs. Costs which cannot be recovered when a firm leaves an industry.

superconsistency. A situation where ORDINARY LEAST SQUARES estimators converge more rapidly to their true population values as the SAMPLE size is increased than is the case under CONSISTENCY. In particular if all the variables in a REGRESSION model form a cointegrated set (see COINTEGRATION) then when the PARAMETERS are estimated by ordinary least squares, they benefit from the property of superconsistency.

super-environment. Refers to those factors which are outside the control of the 'representative' firm in the long term. This is a concept used in GROWTH THEORIES OF THE FIRM and is treated as exogenously determined.

superior goods. See NORMAL GOODS.

super-neutrality. Money is said to have this property if a change in the rate of growth of the SUPPLY OF MONEY has no effect on the rate of growth of REAL OUTPUT in the long run. This implies that the level of output associated with the NATURAL RATE OF UNEMPLOYMENT is independent of the INFLATION rate, and of any past DISEQUILIBRIUM in the economy. (See NEUTRALITY OF MONEY, VEIL OF MONEY.)

super-normal profits. Corresponds to the definition of PROFITS, the difference being purely semantic. Firms within an industry in which they are generating revenue exceeding all opportunity costs are commonly referred to as earning super-normal profits. The term is then used to categorize these firms which are earning a return which exceeds the minimum necessary to induce them to remain within the industry they currently occupy. (See NORMAL PROFITS.)

supernumerary expenditure. Expenditure on a good or group of goods over and above some minimum or SUBSISTENCE EXPENDITURE.

supplementary benefit. An income maintenance payment which at one time formed part of the UK social security system. The payment was available to persons who were not employed nor in full-time education and whose financial resources were less than some calculated level of 'requirements'. Entitlement to this benefit was not affected by payment or non-payment of NATIONAL INSURANCE CONTRIBUTIONS. Formerly known as national assistance, this benefit was conceived in the BEVERIDGE REPORT as a 'fall-back' provision for those who somehow failed to be eligible for the various payments, such as unemployment benefit and sickness benefit, available under the national insurance system.

supplementary special deposits. A form of control of the deposit-taking and lending activities of the BANKS and certain larger FINANCE HOUSES introduced by the BANK OF ENGLAND in 1973 as a major supplement to the system of CREDIT control introduced in 1971, but phased out in 1980. It was known familiarly as the 'corset'. The measure was designed to control the rate of growth of certain types of deposit liabilities, a purpose for which the pre-existing measures had proved inadequate. In activating the control, the Bank laid down a maximum rate at which interest-bearing 'eligible liabilities' (known as IBELS) might grow over a stated period. If a bank exceeded this rate, as a penalty it had to make supplementary special deposits with the Bank which, unlike ordinary SPECIAL DEPOSITS, bore no interest. The object of the control when activated was to make it less attractive for banks to bid for extra deposits, from sources outside the banking system. It was discontinued because it was thought that it simply diverted the flow of funds through less controllable channels. (See COMPETITION AND CREDIT CONTROL, MONEY SUPPLY.)
supply curve. A graphical representation of the relationship between the supply of a commodity and its price (usually with price on the vertical axis, and quantity supplied measured along the horizontal axis). The positive relationship between these two variables is reflected by the fact that the supply curve slopes upwards from left to right.

supply of effort. The supply of hours and the supply of effort are often treated as synonymous. This convention is reasonable where work effort is controlled by technology. In practice, equal time inputs may have very different productivity values.

One important result of the distinction between hours and effort is that workers may still be presented with a choice situation in what appears an all-or-nothing work decision; i.e. acceptance or rejection of an 8-hour day, 40-hour week job specification. Here, the problem for the worker is to maximize his utility - comprising money income, which is a function of effort made under systems of PAYMENT BY RESULTS and leisure, which is reduced via the higher rest and recuperation time associated with greater effort input - subject to income and time constraints. Changes in wages will have predictable effects on the supply of effort.

On the demand side, it is management's responsibility to monitor and control the supply of effort. However, the extent to which the pace of work can be controlled is limited by the protective role of the union.

supply of labour. The amount of labour available to an economy is fundamentally determined by the size of the population of working age. This magnitude is a function of fertility and deaths and also of immigration and emigration. In the short run, the population can be taken to be fixed. The amount of labour supplied by a given population is here a function of the LABOUR FORCE PARTICIPATION RATE, the number of hours people are willing to offer having made the decision to enter the labour force (see BACKWARD BENDING SUPPLY CURVE), and the amount of effort provided by workers while at work (see SUPPLY OF EFFORT). In the longer term it is also necessary to consider the qualitative aspects of labour supply; namely the skill content of the labour force. The acquisition of new skills is obtained through investments in HUMAN CAPITAL. There are also a number of short-run 'gradients' along which the supply of labour may be altered. First, there is the geographical dimension - i.e. where the labour is to be supplied. Second, there is the workplace dimension, concerning to whom - i.e. to which employer(s) - the labour is to be supplied. Finally, it should be recognized that the supply of labour time to the market is but one aspect of the supply of time. Time can be allocated not only to market work or leisure but also to other purposes. In view of this fact, the analysis of the supply of labour time has to be treated as part of a more general analysis of the allocation of TIME to a number of alternative uses.

supply-side economics. A body of thought which emphasizes that the principal determinant of the rate of growth of national output in both the short and long run is the allocation and efficient use of the labour and capital in an economy. Accordingly, it focuses on impediments to the supply of and efficient use of factors of production. Effectually this means it is concerned with the slope and position of the AGGREGATE SUPPLY CURVE and thus in part with the determinants of the NATURAL RATE OF UNEMPLOYMENT, rather than the level of effective demand in the short run as in conventional Keynesian macroeconomics. Chief among these impediments are believed to be disincentives to work and invest as a result of the level and structure of taxes and institutional...
and customary barriers to the efficient allocation of resources such as the restrictive practices of unions. The policy prescriptions that flow from this analysis typically take the form of lowering tax rates and introducing measures designed to increase the degree of competition in labour and product markets. Supply-side economics gained particular prominence in the early nineteen eighties with the election in the USA of a conservative government under President Reagan; thus on occasions these ideas have been labelled ‘Reaganomics’. They represent a return to orthodox CLASSICAL ECONOMICS and its recent more formal statement the NEW CLASSICAL MACROECONOMICS. See Bartlett, B., and Roth, T.P., eds, The Supply-Side Solution, London, Macmillan (1984).

surplus unit. Any economic unit whose ASSETS are greater than its LIABILITIES, and is therefore willing to lend money, extend credit, or purchase financial instruments. (See DEFICIT UNITS.)

surplus value. MARX applies the LABOUR THEORY OF VALUE to labour, in the sense that the value of the total labour force (worker and family) is equal to the number of hours of labour necessary to produce the goods to maintain the labour force intact. If a capitalist hires a worker he must pay him a sum which will supply the worker and his family with these necessary goods for the period of the hire, but because of the power situation in capitalism the worker is required to work for more hours than are necessary to produce these wage goods, and the capitalist is able to appropriate this surplus, which in the Marxian system is the sole source of PROFIT.

surrogate production function. In the debate surrounding the CAPITAL CONTROVERSY a concept of the PRODUCTION FUNCTION which implied some substitution between labour and capital in the long run was introduced with the aim of allowing the use of derived demand functions for factors of production in econometric work. These demand functions would be derived 'as if (hence the name 'surrogate')' the production function existed. The difficulty arose because of the non-malleability of capital (see MALLEABLE CAPITAL). The surrogate function is allowable provided the FACTOR PRICE FRONTIERS associated with different techniques are straight lines such that the GRAND FACTOR PRICE FRONTIER does not entail the reintroduction of a previously abandoned technique for changes in the rate of profit (i.e. as long as RESWITCHING does not occur). (See P. Samuelson ‘Parable and Realism in Capital Theory: The Surrogate Production Function’, Review of Economic Studies, 1962).

survivor technique. A statistical method of identifying the MINIMUM EFFICIENT SCALE OF PLANT OR FIRM, which is based on the rationale that in competitive markets those plants/firms which survive the best in the market place are those with minimum costs. It thus follows that if a certain size of plant or firm is accounting for an increasing proportion of total industry output, this size lies within the optimum size range and is therefore of minimum efficient scale. The reliability of estimates using this technique are dependent upon the existence of competitive conditions. This assumption has been one source of criticism of this method. (See STATISTICAL COST ANALYSIS.)

sustainable development. The maximization of the net benefits of ECONOMIC DEVELOPMENT, subject to maintaining the services and quality of NATURAL RESOURCES over time. By the latter, environmental economists, who introduced the concept in the 1980s, mean using renewable natural resources at rates below their regenerative capacity and non-renewable resources with optimum efficiency, taking account in the latter of the substitution of TECHNOLOGICAL PROGRESS for natural resources.

swap arrangements. A method of improving LIQUIDITY arrangements developed in the 1960s by swapping currencies. The CENTRAL BANKS of two countries would credit each other with an equivalent amount of the other’s currency such that either government could draw on this extra FOREIGN EXCHANGE reserve if necessary. It is usually for a specified period of time, after which the transactions would be reversed at the original rate of exchange. (See INTERNATIONAL LIQUIDITY, INTERNATIONAL MONETARY FUND, EXCHANGE RATE, BALANCE OF PAYMENTS.)
Sweezy, Paul (1910– ). American Marxist economist, he co-founded the *Monthly Review*. He is best known for his work in interpreting and presenting the economic theory of Karl Marx in a manner which allows comparison with modern economic theory. *The Theory of Capitalist Development* (1942) is generally regarded as a standard textbook in Marxian economics. Sweezy has been responsible for a treatment of Marx which stresses the importance of the Keynesian concept of aggregate demand, arguing that both Marx and Keynes analysed the occurrence of unemployment in essentially the same way. *Monopoly Capital: an Essay on the American Economic and Social Order* (1966, with Paul Baran) is a reinterpretation of Marxian economic theory in the light of twentieth century developments in the world economy. Baran and Sweezy substitute a law of rising economic surplus as a proportion of total output for the old Marxist law of the falling rate of profit. His other major works include: *Socialist Cuba: Anatomy of a Revolution* (1960, with Leo Huberman); *Socialism in Cuba* (1966); *Modern Capitalism and Other Essays* (1972).

**systems estimator** (also known as full information estimator). An estimator which is used to gain estimates of all of the parameters in a simultaneous equation system at the same time, and which is used to gain estimates of all the parameters in a simultaneous equation system at the same time, and which takes into account any correlation between the residuals of different equations. This type of estimator usually results in better estimates (in the sense that they have lower variances) than single equation or limited information estimators, but are much more expensive computationally. Examples include three stage least squares and full information maximum likelihood.
Taft-Hartley Act. A 1947 amendment to the NATIONAL LABOUR RELATIONS ACT (Wagner Act), the Taft-Hartley Act was designed to limit the power of unions. The Wagner Act contained the key statement ‘Employees shall have the right to self-organisation . . . ‘. The Taft-Hartley Act added the phrase, 'and shall also have the right to refrain from any or all of such activities'. While the Wagner Act clearly prevented businesses from interfering with union activity, the Taft-Hartley Act had the effect of preventing unions from pressuring employees to join. It also provided some additional restrictions on union activity, specifically prohibiting secondary boycotts and certain kinds of picketing. One of its most important provisions gave the Federal government the power to enjoin a union from striking if the industry was 'vital to national security'. Such injunctions allowed for a maximum 80-day 'cooling off period after which a strike could begin if management and labour were unable to reach a COLLECTIVE BARGAINING agreement. Taft-Hartley injunctions have been used sparingly, but their threat has clearly led to lessening use of strikes as bargaining tools in vital industries. (See BARGAINING UNIT.)

take-home pay. Disposable income; gross-earned income less tax and national insurance contributions which are deducted at source.

take-off. See ROSTOW MODEL.

takeover. The acquisition by a 'RAIDER' FIRM of more than 51 per cent of the voting shares of another company. The take-over process involves the raider company making a bid to the shareholders of the 'VICTIM' COMPANY; this can take the form of cash, loan stock or a new issue of shares in exchange for the shares of the victim company. Though both MERGER and takeover are terms used with reference to the fusion of two previously independent companies, merger is usually used to cover those amalgamations which are agreed on a voluntary basis between respective firms' shareholders and directors.

takeover bid. An attempt by an individual, group or company to acquire sufficient VOTING SHARES for control of another company. Bids made by a PUBLIC COMPANY for the VOTING SHARES of another public company are usually made on the basis of current STOCK MARKET VALUATIONS. The RAIDER generally makes these bids in the form of an offer of a proportionate number of its own shares, a cash payment per share or a combination of both.

The motives underlying take-over bids varied. Commonly stated reasons are: ECONOMIES OF SCALE, DIVERSIFICATION, the acquisition of larger financial resources and greater MARKET POWER. (See MERGER.)

tangible assets. Physical assets such as plant and machinery, which are distinguished from intangible assets such as value of a patent or a firm's GOODWILL.

tap issue. The system by which GILT-ED stocks are continuously available for chase from the government broker in London STOCK EXCHANGE. Issues of stocks are made discontinuously, nominally for sale on specified days. Stock not taken by the public on the date of issue, usually a large proportion of the amount on offer, is absorbed into the Issue Department of the BANK OF ENGLAND, which in effect underwrites all issues of gilt-edged. The stock is then sold off in the market by the government broker, 'through the tap', as market conditions permit and at rates and prices consistent with official policy. TREA BILLS are also issued through a tap, but to government departments and public agencies.
targets (also known as POLICY TARGETS). These are a set of quantitatively fixed objectives of economic policy, to be achieved by a choice of values for POLICY INSTRUMENTS. This approach to macroeconomics in particular was advocated by the Dutch economist Jan Tinbergen in the 1950s, and was extended by Henri Theil in the late 1950s and early 1960s. Theil changed Tinbergen's approach in three ways:

1. he replaced targets with a WELFARE FUNCTION or LOSS FUNCTION to be optimized;

2. the instruments themselves entered the function to be optimized, reflecting the costs associated with the use of different instruments;

3. uncertainty was allowed for by the use of CERTAINTY EQUIVALENCE.

Further developments which followed this pragmatic approach use the methods of control theory which allows for NON-LINEARITY of the functions etc.

tariff. A tax imposed on a good imported into a country. A tariff may be specific, when it is levied as a fixed sum per unit of the imported good, or AD VALOREM, when it is applied at a percentage rate with reference to the value of the import. Of the arguments advanced for the imposition of tariffs only two, the anti-dumping and the optimum, find support in economic analysis. The objectives sought by the others (employment, development of an infant industry), are better attained by other means. (See DUMPING, INFANT INDUSTRY ARGUMENT FOR PROTECTION, OPTIMUM TARIFF.)

tariff factory'. A change in the location of production of a good from a low cost situation to a higher cost location in another country, where the inability to sell in the latter country, over a high tariff wall, makes necessary the creation of a 'tariff factory' to supply the market in that country.

tariff structure. The overall pattern of tariff rates. Tariffs are not usually applied to all imports at a uniform rate. A typical structure may allow duty-free entry to raw materials, a positive tariff on semi-manufactures and a still higher rate on finished goods. Such a structure results in an EFFECTIVE RATE OF PROTECTION in excess of the nominal rate.
important under a PROGRESSIVE income tax and means that a person receiving his income at irregular intervals would pay more tax than someone receiving the same income on a regular basis. In practice averaging provisions for people such as authors and artists help to maintain HORIZONTAL EQUITY.

The appropriate definition of income should take into account all income whether it results from market transactions or not. Thus food grown and consumed by farmers should be included. Imputed rent accruing to an owner-occupier should be a part of taxable income.

Income should be defined in net terms. Thus the cost of acquiring an income should be allowed as a deduction. In practice the appropriate costs are often a matter of dispute.

taxation. Compulsory levies on private individuals and organizations made by government to raise revenue to finance expenditure on PUBLIC GOODS and services, and to control the volume of private expenditure in the economy. Taxes are classified in various ways. Some are called DIRECT TAXES, examples of which are INCOME TAX and WEALTH TAX. Others are called INDIRECT TAXES. These are taxes on transactions, especially expenditure. Examples are EXCISE DUTIES and VALUE-ADDED tax.

tax base. 
See TAXABLE INCOME.

tax burden. 
See AVERAGE RATE OF TAX.

tax credit. This is a credit given directly against a tax: the tax payable is reduced by the amount of the credit. It can apply in several different situations. In some countries (for example Kenya) personal income tax credits are given instead of personal allowances against gross income. When an income tax credit is raised all tax-payers benefit equally unlike the situation with personal allowances under a PROGRESSIVE INCOME TAX system where an increase would benefit high income earners and tax payers more than those in low tax-paying positions. Another example relates to VALUE-ADDED TAX. Under the system employed in the EC a tax-paying organiz-

ation is liable for VAT on the selling price but is allowed as a tax credit the amount of VAT which has been paid on purchases inputs. A common case arises with MULTINATIONAL COMPANIES. An international organization based in the UK and operating overseas will find itself in the situation where it is paying income tax to the government of an overseas country on its profits arising there. It will also be liable for corporate tax in the UK on these same profits. To prevent DOUBLE TAXATION the UK system taxation allows the income tax levied by overseas country to be credited against tax due in the UK. The net result is that organization pays the higher of the two taxes.

tax credit scheme. An INCOME MAINTENANCE programme in which everyone is guaranteed a minimum income, while income above that level is taxed. When a ceiling income level is reached, the tax paid will just equal to the guaranteed payment - is the 'break-even' income level. This type of programme is formally identical with NEGATIVE INCOME TAX though there are differences of emphasis in presentations. Both types of scheme are characterized by: (1) a minimum guaranteed income, (2) a 'break-even' income level, (3) a tax rate any two of these are known, the thin-
tment may be calculated (so long as we fine ourselves to a single PROPORTIONA rate). Thus a guaranteed minimum income of £100 plus a break-even level of £50 implies a tax on income (other than the first £50) of ten per cent. Proposals for such a system were put forward in the UK in 1970-74 Conservative government but never adopted. A negative income tax system has been operated in New Jersey, tax disincentive. An INCOME TAX cause work effort to be reduced. Its ence makes leisure relatively more attrive, as it is not subject to taxation. termed the SUBSTITUTION EFFECT of t

The tax will also encourage some work longer hours to earn a higher income so that his net income is not so much as a result of the tax. T effects thus pull in different directions. In general it may be argued that the tuition effect operates more stron
higher the MARGINAL RATES OF TAX and the income effect may operate more strongly with high average rates. Much empirical work has been done to discover the effects in practice. In general the disincentive effects have not been found to be strong for the majority of tax-payers. There is some evidence that the effect may be significant for married women, and also for some people in the highest tax-paying brackets.

There has been a considerable debate about the effect of taxation on INVESTMENT. The view that income taxation reduces the return to investment, and thus causes a disincentive to investment has been found to be too simple. When the uncertainty of the outcome of an investment and the fact that most income tax systems have LOSS-OFFSETTING PROVISIONS are taken into account, the existence of income tax may not reduce the mean expected return from an incremental project: the government becomes a partner which shares in both the losses and the gains from the new project. In fact, because of the risk-sharing, investment could actually be increased as a result of the tax. The outcome depends on several factors, such as the attitude of investors towards risk and the variety of assets available to investors.

tax expenditure. A term used to describe the various allowances which may be used to reduce tax liability - generally liability to income tax. Examples include tax relief on payments of MORTGAGE interest and dependants allowances. Tax expenditures are so called on the grounds that they should be seen as analogous to direct payments or subsidies provided by the government. This is said to be so in three ways; first, the granting of a tax allowance increases the recipient's income just as a direct payment would have done, second, the existence of a tax allowance will influence the pattern of expenditure and third, granting a tax allowance reduces government revenue and thus alters the government's net deficit or surplus in the same way as would an increase in expenditure. Thus it is argued that analysis of the effects of PUBLIC EXPENDITURE should include the effects of tax allowances.

tax-push inflation. This is related to workers' interests in maintaining after-tax real wage growth and is one of the factors alleged to have made wage changes less responsive to business cycle conditions. On this argument, then, there is a significant tendency for nominal wage demands to be raised to catch-up a past short-fall of real or desired after-tax earnings compared with their 'normally expected' increase. Tax thresholds that are not inflation indexed will result in a growing claw-back of income to the state and threaten the desired increase in net earnings. Nominal wage claims will be notched-up accordingly and the rate of wage inflation increased. This is a controversial hypothesis.

tax shifting. The phenomenon whereby those on whom taxes are levied are able to pass the burden either partly or fully on to others. (See INCIDENCE OF TAX for a discussion of the conditions under which shifting takes place.)

tax yield. The revenue collected from a TAX. The relationship between collection costs and revenue from a tax is often a matter of discussion. The elasticity of the tax yield in response to a given increase in income is often analysed, especially in less developed countries where a growing tax yield is particularly important.

t-distribution (also known as STUDENT’S T-DISTRIBUTION). A PROBABILITY DISTRIBUTION often used in HYPOTHESIS TESTS in small samples, and where the VARIANCE of the variable concerned has to be estimated from the data. It is a bell-shaped distribution, with MEAN equal to zero, the dispersion around the mean being dependent on the DEGREES OF FREEDOM dictated by the sample size. The T-STATISTIC (or t-ratio as it is sometimes called) is the most commonly used TEST STATISTIC in quantitative economic analysis; and is defined as the ratio of a NORMAL VARIABLE to a Chi-square variable divided by degrees of freedom. In the case of tests of significance of parameter estimates in REGRESSION analysis, the calculation of the t-statistic involves dividing the estimate of the parameter by its estimated STANDARD ERROR. The distribution of the t-statistic approaches that of the standard NORMAL VARIABLE as the number of degrees of freedom approaches infinity.
**technological unemployment.** A central element in ECONOMIC GROWTH which enables more output to be produced for unchanged quantities of the inputs of labour and capital to the production process. In the simplest growth models no particular transmission mechanism is specified: rather, technical progress is 'disembodied' and assumed to fall 'like manna from Heaven'. More sophisticated models allow for EMBODIED TECHNICAL PROGRESS to be included in new capital stock. Classification is usually into labour saving, neutral or capital saving technical progress. (See HICK'S NEUTRAL TECHNICAL PROGRESS, HARROD NEUTRAL TECHNICAL PROGRESS.)

J. HICKS and R. HARROD were among the first economists to take up this task of classification. Hicks' procedure was to compare points in the growth process at which the capital to labour ratio is constant, while Harrod considered points at which the CAPITAL-OUTPUT RATIO is constant. The Hicksian view was to 'classify inventions accordingly as their initial effects are to increase, leave unchanged or diminish the ratio of the marginal product of capital to that of labour. We may call these inventions "labour saving", "neutral", and "capital saving" respectively' (J.R. Hicks, Theory of Wages, 2nd edn, Macmillan, London, 1963). The 'neutral' type has become known as Hicks' neutral technical progress. Harrod defined 'a neutral advance as one which, at a constant rate of interest, does not disturb the value of the capital coefficient', and which 'leaves the distribution of the total national product as between labour and capital unchanged' (R. Harrod, Towards a Dynamic Economic, Macmillan, London, 1948). This second neutral type has become known as HARROD NEUTRAL TECHNICAL PROGRESS.

Since innovations which are Harrod neutral do not affect the capital coefficient in the production function the result is labour augmenting technical progress, which can be seen as equivalent in effect to an increase in the supply of labour or to an increase in labour efficiency.

Hicks' definition of neutral technical progress is much less amenable to use in growth models with steady growth than is Harrod's definition which was specifically designed for such models.

It should also be noted that a third type of classification comparing points in the process of economic growth where the labour to output ratio is constant is of a more recent origin (R.M. Solow, 'Investment and Technical Progress' in Arrow, K., Karlin, S. and Suppes, P. (eds), Mathematical Methods in the Social Sciences, Stanford, 1960). TVC Solow's neutral technical progress is capital augmenting and may be compared with Harrod neutral case which is labour augmenting. (See EMBODIED TECHNICAL PROGRESS, DISEMBODIED TECHNICAL PROGRESS.)

**technological dualism.** The process combining capital-intensive heavy industry with labour-intensive methods elsewhere to utilize the excess labour. The heavy industry leads the move towards modernization and the other projects employ the excess labour while the basic capital infrastructure is built up. (See LEADING SECTOR.)

**technological external effects.** An alternative name for EXTERNALITIES. The adjective 'technological' was included originally to differentiate such effects from PECUNIARY EXTERNAL ECONOMIES.

**technological progress.** Most theories of economic development emphasize the necessity for technical progress, and often an increase in the rate of technical progress. Some evidence of acceleration is required. This progress usually requires capital, entrepreneurial skill, managerial and technical skills and a trained labour force, which are general scarce in less developed countries. BALANCE OF PAYMENTS problems often prohibit the importing of these factors on a significant scale and many less developed countries are reliant on aid programmes to provide some basis from which to begin.

**technological unemployment.** The unemployment which results from the adoption of labour-saving capital equipment as the economy grows. However the CAPITAL-LABOUR RATIO chosen by ENTREPRENEURS as a result of the relative factor prices at that time, therefore, for such a situation to arise relative prices must fail to reflect the relative availability of the two inputs. It would suggest a downward rigidity of money wages. On a NEO-CLASSICAL view such a situation is purely temporary and they would, therefore,
technology, choice of. A key aspect of development strategy is the choice of techniques. There can be more flexibility here than with the labour force. Direct transfer of technology from industrialized countries is usually inappropriate because of its capital-intensive and labour-saving nature. In developing countries, the factor availabilities are often quite the reverse in that capital is scarce and expensive and there is an abundance of cheap labour. The implementation of capital-intensive technology can reduce the level of employment and real income.

There are various policy guidelines that have been suggested with respect to the choice of technology. First, wide disparities in capital-intensity per worker in different sectors should be avoided, and the technology should suit the economic and social environment. A new technology should stimulate output in the indigenous industries and should be capable of being reproduced locally. The productivity of the level of capital being used should be maximized, but the social costs of production minimized. The available sources of progressive technologies include the possibility of their being specially designed, the adaptation of modern technology and the improvement of long-established designs.

In terms of methods of implementing progressive technology, there is a wide range of possibilities. Customs unions can be formed with other countries which are at the same stage of development but have complementary resources. This would stimulate efficiency and international division of labour. In order to persuade entrepreneurs to use labour and not capital, high interest rates on capital can be charged. Training and education schemes can be set up, including information centres on types of technology, technical education at school-level and training for planners and managers in skills necessary for project appraisal and work study, which may increase the efficiency of existing techniques. Incentive schemes have been set up to provide finance for local labour-intensive schemes or suitable inventions. Co-operatives may be formed to help local handicraft industries, and there should be publicity campaigns to make producers and consumers aware of the value of indigenous technologies.

In countries or regions where APPROPRIATE TECHNOLOGY has been widely implemented, it appears to provide a valuable weapon in the war against poverty by making better use of available resources and providing growth and prosperity for the whole population as opposed to a privileged minority.

technology matrix. In INPUT-OUTPUT analysis, a MATRIX (usually denoted A) whose $ij$th element (i.e. the element in the $i$th row and $j$th column) gives the amount of the $i$th sector’s output used as an intermediate input in producing one unit of output in the $j$th sector of an economy. (See LEONTIEF INVERSE.)

technology transfer. In the broadest sense the exchange among countries of the knowledge of the existence of and of the operations of types of machinery and in many cases of the machinery itself. (See TECHNOLOGY, CHOICE OF.)

technostructure. The managerial class and their technical and planning expertise which modern industrial production requires. The concept is an important feature of J.K. GALBRAITH’S thesis that corporations within modern capitalist economies have established sovereignty in product markets.

temporary layoffs. Employees discharged by their employer but knowing that they can return to that same employment at sometime in the near future. Employees temporarily unemployed due to a downturn in demand and awaiting recall. One element in DISCHARGES.

term loan. A bank loan made for a fixed term of years, usually three to five but sometimes longer, at a fixed rate of interest, and normally repayable by instalments spread over a period. A term loan is particularly suited to the finance of certain types of capital expenditures by business, e.g. on plant or buildings, since the borrower has the assurance that so long as regular repayments are made the loan will not be recalled. This is in contrast with an overdraft which is subject to periodic review and is in principle
recallable at any time. The term loan was an American concept, first introduced by a British bank in 1959, and since then generally adopted by UK banks.

**terms of trade.** A relationship between the prices of exports and the prices of imports. When the concept is not further qualified reference is being made to the net barter terms of trade, which is the quotient between an index of export prices and an index of import prices. This is also known as the commodity terms of trade. On the assumption that the value of exports equals the value of imports, the gross barter terms of trade can be found by dividing the quantity of exports by the quantity of imports.

Countries are concerned about movements in the terms of trade, since an improvement (a rise) in the net barter terms of trade implies that a given quantity of exports now commands a larger volume of imports, so that *prima facie* the standard of living could increase. A rise in the relative price of exports may, however, lead to a fall in demand, so that while a unit of exports commands more imports, total exports decline and with them the capacity to import. This has led to the notion of income terms of trade, where the net barter terms of trade are weighted by the volume of exports. This gives an indication of the purchasing power of exports.

A deterioration in the net barter terms of trade because of, for example, lower export prices does not necessarily imply a reduced standard of living, if the decline in price is due to increased productivity. If productivity in exports rose by 20 per cent and prices declined by less than this, a given input of factors would still command more imports, so that while some of the productivity gain is shared with other countries, welfare still increases within the country. The concept used to express this idea is the single factorial terms of trade, which is the net barter terms of trade multiplied by an index of productivity change in the export industries. The final measure of the terms of trade is the double factorial terms of trade, in which the net barter terms of trade are multiplied by the quotient between an index of productivity change in the export industries and productivity change in foreign factors of production making imports. In effect it measures the rate of exchange via commodities between a unit of factor service time in one country and factor service time in another.

**term structure of interest rates.** The structure or relationship between interest rates, or more strictly the redemption yields, on securities of different terms to maturity (i.e. repayment). Typically, but not invariably, this structure - which can be exhibited in a yield curve (see diagram) - is one in which shorter-term assets produce lower yields than longer-term assets, and this has sometimes been regarded as in some sense a natural pattern.

The classical or expectations theory of the term structure of interest rates is concerned with ‘pure’ interest rates and therefore with the structure of rates on government debt, since private debt is assumed to involve an element of investor risk. It starts by recognizing that an individual wishing to buy a financial asset can always hold a succession of short bonds rather than hold a single long-dated bond over the entire investment period. Similarly an individual wanting to hold bonds over a short period, say for two years, can always buy and then sell, holding successively for one year in each case two long-dated bonds which will not reach maturity during the period. Therefore, if all individuals have similar expectations about the future yields on short bonds and the future prices at which they can sell a longer-dated bond held over the same period - since unlike the short bond this will not come to maturity - the total returns across all securities should be the same over any given period.

The possibility of a capital loss from holding longer dated securities will therefore lead to a higher interest rate on these securities in order to induce people to hold them. On this view, therefore, the different interest rates for securities of differing maturity dates is explained by expectations about the future prices of securities. It would seem to suggest a smooth continuum of gradually rising interest rates as we move along the spectrum from short to long-dated securities which have increasingly risky capital values.

Two Keynesian theories of the term structure stand in sharp contrast to this. First, Hicks' liquidity premium theory argued that
The supply of and demand for securities was in a different state of balance at the long and short ends of the market. Borrowers, it was argued, dominated the long end because they preferred to borrow long and there would therefore be an excess supply of long-dated securities, thereby depressing their price and raising the interest rate on long-dated securities. Lenders, on the other hand, those offering cash, preferred to lend short, and since there would be a shortage of securities at this end of the market it would bid up their price and depress the interest rate. Lenders would end up, in other words, paying a premium, receiving a lower interest rate, because of their preference for LIQUIDITY. Of course, if a significant liquidity premium emerged it would be profitable for arbitrageurs to 'buy in' long-dated stock which is about to mature at the current low price and hold these as assets while they sold corresponding liabilities of short-dated securities at the higher price. Arbitrage would in other words tend to equalize returns across securities of differing maturities according to the classical hypothesis. MODIGLIANI subsequently refined the Hicksian theory further by arguing that while some lenders do indeed have a preference for liquidity, others in fact have a preference for lending their money over a longer period. In general, in fact, he argued, lenders have a preference for acquiring an asset, a security, the maturity of which will match their liability. Some investors of course have very long-dated liabilities as in the case of insurance companies, and therefore wish to acquire securities which mature at a similar date. Investors have, it was hypothesized, 'preferred market habitats' but again it can be objected that if significant premiums emerged arbitrage would occur to equalize returns.

The classical theory, therefore, postulates a smooth continuum of rates and explains any gap in terms of expectations, while Keynesians would argue that the market is segmented and that yields on very similar securities could differ quite significantly. The latter view implies that changes in interest rates at the short end of the market may not be transmitted to the long end, and therefore that changes in the money supply may not result in changes in the interest rates that matter to borrowers wishing to invest in physical capital. This is a further reason why Keynesians argue that monetary policy is ineffective. {See PORTFOLIO BALANCE APPROACH.)

test discount rate. A rate at one time employed in the appraisal of CAPITAL INVESTMENT by British NATIONALIZED INDUSTRIES using the DISCOUNTED CASH FLOW technique. The criterion has been obsolete for a number of years. Introduced in 1967, the rate was set for a long time at ten per cent in real terms. However, in practice the rate was only applied to a limited proportion of investment and many of the industries' investment programmes were decided on other criteria. Consequently, attention has turned to alternative methods of considering the cost of CAPITAL in investment decisions, and the government has required nationalized industries to earn a RATE OF RETURN of five per cent in real terms (eight per cent since 1989), before tax, on new investment as a whole (rather than individual projects). This rate is known as the 'required rate of return'. Both the test rate and the required rate were set with reference to rates used in the private sector, though some economists have argued that a SOCIAL RATE OF TIME PREFERENCE would be more appropriate.

test statistic. A STATISTIC which is calculated for HYPOTHESIS TESTS. Under the NULL HYPOTHESIS this statistic follows a given
PROBABILITY DISTRIBUTION, which under the alternative hypothesis it does not. Should the value of the test statistic therefore fall outside the CRITICAL VALUES of the distribution, it is deemed unlikely that the null hypothesis is true. Examples of test statistics include the T-STATISTIC, F-STATISTIC and DURBIN-WATSON statistic. (See STATISTICAL SIGNIFICANCE.)

threat effect. Where a non-union employer pays the union wage, or one approximating it, in an attempt to forestall the unionization of his labour force. According to this hypothesis the direction of causation in wage inflation is from the union to the non-union sector.

threat pay off. (See NASH SOLUTIONS.)

three stage least squares (3 SLS or Th SLS). A member of the LEAST SQUARES family of ESTIMATORS applicable to the estimation of the parameters of SIMULTANEOUS EQUATIONS systems in which the DISTURBANCE TERMS may be correlated between equations. (See FULL INFORMATION MAXIMUM LIKELIHOOD.)

threshold. The point beyond which there is some change in the behaviour of the economic agent, i.e. a threshold on price expectations means that expectations are not revised constantly in the light of accumulating evidence of price changes but are revised at intervals once the rate of price change has exceeded a certain point. More recently the term has been used to describe a particular form of INEXATION of wage contracts which operates only after inflation has exceeded some prespecified level.

threshold analysis. A technique employed in physical planning in determining the desirable size of communities and the provision of public services. The analysis rests on the idea that there are INDIVISIBILITIES in the Provision of public services such that there exists a given minimum and maximum Population for which the provision of some Public or communal service is viable. If the Population of (say) a town is below the threshold for a given service, the service should not be provided, while if population exceeds the maximum limit the service require to be duplicated. The technique be criticized for its reliance on strict phys limits rather than consideration of the c of alternative levels of provision. (THRESHOLD.)

threshold effect. An increase in the level of taxation which a community is said to be willing to pay resulting from some crisis. It is argued that in time of crisis, such as a war, the member of a community will be willing to pay higher taxation than would previously have been regarded as acceptable and that once a 'threshold' has been crossed, the community will still be prepared to pay the new tax even when the crisis is over. The effect formed an important part of the explanation of PUBLIC EXPENDITURE growth advanced by A. Peacock and J. Wiseman, The Growl (London, Allen and Unwin, 1961). (See PLACEMENT EFFECT.)

threshold of a good. In regional or spatial economics, the minimum population will can provide a market for some good or service. When the population of an area (such as a town) is below the threshold, demand for the good will be so low that its provision is not economically viable. The concept relevant where there are ECONOMIES OF SCALE in the provision of a good: thus the AVERAGE COST of the goods falls as sales rise, the threshold may be thought of as the size of market at which the AVERAGE REVENUE is earned from sales of the good just equals the average cost. This concept is sometimes used in explanations of the location of retail service centres, in CENTRAL PLACE THEORY and in regional planning. (See THRESHOLD ANALYSIS.)

Thünen, Johann Heinrich von (1783-1850) A German agricultural economist, Thünen developed a theoretical model based on his own farming experience. His model was designed to show the optimum local level of cultivation in special regard to distance from the centre of demand. He was not only a pioneer in LOCATION THEORY, but also of MARGINAL ANALYSIS. He set out a theory of RENT very similar to that of RICARDO, and a theory of distribute
based on MARGINAL PRODUCTIVITY. The application of marginal productivity theory to wages as well as capital, his use of differential calculus and marginal reasoning to provide equilibrium solutions of economic variables, and his generic statement of the LAW OF VARIABLE PROPORTIONS have allowed him to be described as the founder of marginal analysis. Alfred MARSHALL paid particular tribute to von Thiinen. His main work is Der isolierte Staat in Beziehung auf Landwirtschaft und Nationalökonomie (3 vols, 1826, 1850, 1860). Part I has been translated into English under the title Von Thunen's Isolated State, ed. P. Hall (1966).

Tiebout model. An analysis of the provision of PUBLIC GOODS which argues that if certain public services are provided at the level of local governments, individuals can indicate their preferences concerning these services and obtain a combination of public services and taxes which corresponds with their preferences by moving between local government areas. The model was first presented by C. M. Tiebout 'A pure theory of local government expenditures' Journal of Political Economy, 1956. This analysis has both a NORMATIVE aspect, in arguing that provision of public goods at the local level is desirable, and a POSITIVE aspect in predicting that people will move in response to local taxes and services. (See CLUBS, FISCAL FEDERALISM.)

tied loan. See TYING OF AID.

tight money. A phasa of monetary policy when the supply of CREDIT is restricted and interest rates are high. The object of such a policy is to reduce the general level of demand, or restrain its growth, in the interests of restraining a rise in prices or improving an adverse BALANCE OF PAYMENTS (or both). (See MONETARY POLICY.)

time, allocation of. The traditional labour-leisure model of the supply of hours assumes that all time is allocated either to market work or to leisure. Yet there are a number of activities that do not fall easily into this typology. One such activity is the home preparation of food. Such activities can be termed non-market work. The importance of this extra classification is that it suggests that the supply of labour time must be treated as part of a more general analysis of the allocation of time to a number of alternative uses.

The general theory of the allocation of time assumes that neither time nor consumer goods are consumed by themselves. Accordingly, consumption decisions are made among alternative activities or outputs that require both goods inputs and time inputs. This means that the total price of any activity should be taken as the sum of its market price plus the value of the time required to perform it. The individual's supply of labour hours is thus determined simultaneously with consumption. Recognition of this fact extends the predictive reach of the basic labour-leisure model. For example, higher real income could cause hours of work and leisure to increase because of a reduction in the time devoted to non-market work.

time deposit. A deposit in a BANK which is withdrawable only after a period of notice. It originated in the US where in the FEDERAL RESERVE SYSTEM member banks are required to maintain different minimum reserve rates against time and DEMAND DEPOSITS. In the London clearing banks DEPOSIT ACCOUNT balances are time deposits being subject formally to seven days' notice of withdrawal (although in practice this is not often insisted on). With the proliferation of different forms of deposits, e.g. for fixed periods or at longer than the traditional seven days notice, as a term of general usage it is less clearly defined than it was. However in the revision of British banking statistics in 1976 it was given a precise statistical meaning: briefly all deposits other than SIGHT DEPOSITS, but including certain bills and other financial instruments. (See WHOLESALE BANKING.)

time preference. Individuals with a positive rate of time preference value units of current consumption or income more highly than those accruing in the future. For this reason in INVESTMENT APPRAISAL the stream
of future costs and benefits is **DISCOUNTED** to a **PRESENT VALUE** so that projects with different time profiles of costs and benefits can be compared. A number of reasons have been suggested why individuals might have positive time preference rates. The 'risk of death' argument points out that an individual may not survive in order to enjoy future benefits. PIGOU suggested that pure **myopia** or what he referred to as individuals having a 'defective telescopic faculty' would lead to present consumption being valued more highly than future consumption. If individuals themselves and future generations are expected to be wealthier and it is held that there is diminishing marginal utility of consumption, this also would lead individuals to discount future benefits.

**time series.** A set of observations on the values which a variable takes at different points of time (normally in successive periods). For instance, an annual time series on **NATIONAL INCOME** would involve observations on the value of the variable in successive years. The most common time series consist of annual, quarterly or monthly observations. (See **CROSS-SECTION.**)

**time varying parameter models.** See **VARIABLE PARAMETER MODELS.**

**Tinbergen, Jan (1903-).** Dutch economist and joint winner, with R. FRISCH, of the Nobel Prize for Economics in 1969 for his pioneering work in **ECONOMETRICS.** His most celebrated early study was into cyclical fluctuations in the USA, in which he endeavoured to specify quantitatively the importance of different factors in business cycles in the USA.

Another influential work of Tinbergen has been his *Theory of Economic Policy* (1952), in which he demonstrated the need for as many policy variables as there are policy ends. Tinbergen is a practitioner as well as a theorist and as Head of the Central Planning Bureau in the Hague he has been instrumental in constructing an econometric model for forecasting and planning economic policy in the Netherlands. Tinbergen has also concerned himself with the problems of planning in developing countries and as well as giving advice, he has made significant contributions to the concept of 'SHADOW' PRICES.


**Tobin, James (1918-).** American economist and Professor of Economics at Yale University; awarded the 1981 Nobel prize in Economics for his work in 'the theory of financial markets and their relation to consumption and investment decisions, production, employment and prices'.

Tobin has built on the work of KEYNES and has probably done more to develop and refine Keynesian ideas than any other economist. His most significant work on **PORTFOLIO** selection, in which he has stressed the trade-off between risk and yield over a whole range of assets, including money, can be regarded as re-establishing the intellectual respectability of Keynesian notions of **LIQUIDITY PREMIUM.** His **GENERAL EQUILIBRIUM** approach and his emphasis on substitution over a range of assets makes him critical of the stress on one asset, money, by MONETARISTS. In addition to explaining portfolio balance, Tobin has analysed the way in which changes in financial assets, brought about by, for example, changes in MONETARY or Fiscal policy impinge upon the **REAL** variables in the economic system.

In the Keynesian tradition Tobin has paid much attention to rigidities in wages. Their existence, he argues, undermines the **RATIONAL EXPECTATIONS** approach to macroeconomics. He believes that changes in demand in commodity and labour markets are for this reason much more likely to express themselves in changes in output and employment rather than in changes in the inflation rate. To avoid this waste associated with unemployment argues that there is still a theoretical case for **DEMAND MANAGEMENT.**

Almost all of Tobin's prolific output work has taken the form of papers in journals or collections of essays rather than books on a single subject.

**Todaro model.** The best-known economic model of internal migration in DEVELOP
COUNTRIES. Its author, Michael Todaro, is an American economist who has spent some time working in Africa. The model sets out to explain why the observed high rates of rural-urban migration found in most developing countries is quite rational 'from an economic viewpoint. The determinant of the migration decision is the expected real income difference between income in the urban area and that in the rural area. The potential migrant first estimates the real income which he would obtain in the urban area for a job commensurate with his qualifications. He next makes a subjective judgement of the probability of obtaining such a job. He then compares the expected income with that which he hopes to obtain in the rural area. His migration decision is based on the differences. For example, if the expected rural income were £100 and the real income of an urban job which appears within his range of competence were £200, that information by itself would not be sufficient to make the migration decision. If the subjective probability of obtaining the urban job was 0.4 the expected income would be £80 and no migration would take place. If the probability were 0.8 the expected income would be £160 and the worker would migrate. The implications of this model are far reaching. For example, if the government of the country concerned were successful in fostering industrial development in an urban area employment would increase there. The effect would be to increase the subjective probability of obtaining urban employment in the minds of rural inhabitants. Migration would increase and the eventual effect of the new industrial development could be that urban unemployment becomes higher than the level ruling before the new development took place. There will be some level of urban unemployment which produces equilibrium in the sense that no further migration takes place. Potential migrants may take a long-term view in making their decision. They may consider that their chances of obtaining an urban job will be higher after a waiting period of some months. Thus they will compare the present value of the sum of expected urban earnings with the present value of expected rural earnings. They may be content to accept a low income in the urban informal sector for some time. This might still be a rational decision on a long-term basis.

The root of the problem is the large difference between earnings in the modern industrial sector and those in the rural areas. Often the former are well above market clearing levels for a variety of reasons. The long-term answer to the problem is to produce a set of policies for both urban and rural areas which reduces the real income differences between the two areas.

token money. Any form of money the value of which as means of payment rests on legal enactment, e.g. legal tender, or on conventional acceptability, and which bears no relation to its intrinsic commodity value. Token money could at one time be contrasted with 'full bodied' money, e.g. the gold sovereign before 1914, the exchange value of which was equal to the value of the metal from which it was made.

Tokyo Round. The seventh round of multilateral trade negotiations, conducted under the auspices of the GENERAL AGREEMENT ON TARIFFS AND TRADE (GATT) which took place in Tokyo between 1973 and 1979. Unlike previous negotiating rounds, such as the KENNEDY ROUND, the Tokyo Round addressed the problem of both tariff and non-tariff barriers to trade. Most of the member countries who participated in the negotiations agreed to industrial tariff reductions averaging 25 to 30 per cent, to be implemented in equal annual stages between 1980 and 1987. Reductions in non-tariff trade barriers included an agreement on public purchasing designed to increase opportunities for exporters to bid for government contracts, a reduction in technical trade barriers arising from product standards and certification systems and the approval of a consistent method of customs valuation.

total cost. The total cost of producing any given level of output. In the SHORT RUN total costs can be divided into two parts: FIXED COSTS, i.e. those costs which do not vary with output (sometimes referred to as OVERHEAD COSTS), and VARIABLE COSTS, i.e. those costs which vary directly with output (sometimes referred to as DIRECT COSTS). In the short run output can only be changed by adjustment of the variable factor inputs. Thus the addition
to total costs from any increase in output is given by the cost of the extra variable INPUTS required.

In the LONG RUN all factors are variable. The long-run total cost schedule of a profit maximizing firm is then given by those factor input combinations which minimize total cost at all output levels. (See COST MINIMIZATION, RETURNS TO SCALE, U-SHAPED COST CURVES.)

total remuneration. The total pecuniary benefits a worker receives from his employment. Most frequently the term is employed to refer to the SALARY and FRINGE BENEFITS of WHITE-COLLAR WORKERS.

total revenue. The total receipts from sales of a product or series of products produced by a single firm or industry. (See AVERAGE REVENUE)

trade. The exchange of commodities between individuals or groups either directly through BARTER or indirectly through a medium such as money. The benefits of trade consist of an extension in the range of commodities available for consumption and a specialization in productive activity. Without trade the individual or group would be forced to meet all requirements from their own resources. Voluntary trade allows a DIVISION OF LABOUR such that all participants may benefit. (See INTERNATIONAL TRADE.)

trade bill. In the London DISCOUNT MARKET a BILL drawn to finance an actual trade transaction, e.g. to cover the shipment period of goods, and which has not been accepted by a BANK or ACCEPTANCE HOUSE, when it is known as a BANK BILL.

trade creation. The replacement in international trade of a high-cost source of production by a lower cost source as the result of a change in tariffs, quotas or other impediments to trade on a geographical basis e.g. formation of a customs union. When such changes lead to the supplanting of a more efficient source by a less efficient source the situation is referred to as trade diversion.

trade credit. Credit extended by a trader or producer to his customers through terms of sale which allow payment at some time after the actual transfer of the goods. doing this the supplier rarely makes an explicit charge for the credit (although some retailers now do this on CHARGE ACCOUNTS form of trade credit to consumers); but implicit charge in the form of a discount for early payment is very common, and amounts to a charge on extended credit. Many businesses are both takers and givers of trade credit, and it is a major channel through which credit flows between sectors of the economy, and a significant source of ELASTICITY in the financial system. Whether or not trade credit, in nature and effect presents a close parallel with BANK CREDIT, some maintain, is a matter of debate.

trade cycle. (also known as the business cycle or the cycle). A fluctuation in the level of economic activity (usually proxied by national income) which forms a regular pattern, with an expansion of activity followed by a contraction succeeded by further expansion. Such cycles occur about the SECULAR long-run trend path of output. (See diagram).

The curved line plots actual paths of output, with peaks at B and F and a trough at D. The time occurring between any two points at the same stage of the cycle is the period of the cycle such as A to E or B to
The AMPLITUDE of the cycle is given by the height of a peak above the trend line or of a trough below it, such as distance BG. The cycle may be divided into two PHASES (i) EXPANSION phase and (ii) CONTRACTION phase where the contraction phase is usually shorter than the expansion phase, and may be convergent ('DAMPED'), divergent ('EXPLOSIVE') or constant in amplitude. Trade cycle theory is associated with HICKS, SCHUMPETER, Metzler and Goodwin amongst others. (See MULTIPLIER-ACCELERATOR INTERACTION.)

**trade-off.** Conflict of policy objectives with the result that one objective can be attained only at the cost of moving away from another. The idea is most frequently employed in the context of the choice between higher wage inflation or higher unemployment. That is, we can only obtain some additional employment, i.e. reduce unemployment, at the cost of a higher rate of change of wages. (See PHILLIPS CURVE.)

**transactions motive for holding money.** A generalisation of the COBB-DOUGLAS PRODUCTION FUNCTION of the form

\[ Q = AL^aK^b \alpha e^{aL + b'K} \]

where \( Q \) is output, \( K \) and \( L \) are capital and labour INPUTS and \( \alpha, \beta, \alpha' \) and \( \beta' \) are constants and \( e \) is the base of the natural logarithm. This function makes it possible for marginal products to rise before eventually falling and permits both the elasticity of production and the ELASTICITY OF INPUT SUBSTITUTION to vary over the range of inputs. If \( \alpha' \) and \( \beta' \) vanish the above function reduces to the Cobb Douglas.

Other generalisations of the Cobb Douglas production function are the CONSTANT ELASTICITY OF SUBSTITUTION PRODUCTION FUNCTION (CES), the Zellner-Revankar production function, the Nerlove-Ringstad production function and the TRANSLOG PRODUCTION FUNCTION.

**transactions approach.** The name given to Newcomb and Fisher's version of the classical QUANTITY THEORY OF MONEY: \( MV = PT \). This differs from the Cambridge version \( M = kPT \) in that the VELOCITY OF CIRCULATION \( V \) is included directly as opposed to its reciprocal \( k \) which appears on the right-hand side in the Cambridge equation. (See CAMBRIDGE SCHOOL.)

**transactions balances.** See MONEY, THE DEMAND FOR.

**transactions costs.** Those costs other than price which are incurred in trading goods and services. These costs can be substantial particularly in markets where the good being traded is heterogeneous and complex.

**transactions demand for money.** A motive for demanding money for the purpose of transactions, i.e. of payments and receipts, using money in its function as a medium of exchange. The amount demanded is a function of the volume of economic activity. (See MONEY, THE DEMAND FOR.)

**transcendental logarithmic production function.** See TRANSLOG PRODUCTION FUNCTION.

**transcendental production function.** A generalisation of the COBB-DOUGLAS PRODUCTION FUNCTION of the form

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where \( Q \) is output, \( K \) and \( L \) are capital and labour INPUTS and \( \alpha, \beta, \alpha' \) and \( \beta' \) are constants and \( e \) is the base of the natural logarithm. This function makes it possible for marginal products to rise before eventually falling and permits both the elasticity of production and the ELASTICITY OF INPUT SUBSTITUTION to vary over the range of inputs. If \( \alpha' \) and \( \beta' \) vanish the above function reduces to the Cobb Douglas.

Other generalisations of the Cobb Douglas production function are the CONSTANT ELASTICITY OF SUBSTITUTION PRODUCTION FUNCTION (CES), the Zellner-Revankar production function, the Nerlove-Ringstad production function and the TRANSLOG PRODUCTION FUNCTION.

**transferable rouble.** An accounting currency unit introduced by the USSR in 1963 for the settlement of trade balances between COMECON countries. It was never convertible into either soft or hard currencies nor did it fulfill any other monetary function. Despite the existence of the transferable rouble, trade between Comecon countries was still conducted on a bilateral basis. The transferable rouble lost its role as unit of account in January 1991, after which trade between Eastern Bloc countries was conducted on a multilateral basis at world prices with the use of convertible currencies.
transformation problem

transformation problem. The problem Marxian economics of deriving a unique set of prices from values, i.e. labour inputs. Volume I of Capital, by virtue of his spec assumptions of equality in all industries the rate of PROFIT, of the CAPITAL-LABOUR RATIO and of the period of turnover, MA was able to show that prices were proportional to labour inputs. When, howev the ratio of capital to labour or the period

transfer costs. The costs involved in moving some object between two points. The costs include not only the direct costs of movement which will vary with distance moved (and thus may be called 'distance costs'), but also all the costs of loading, unloading, handling and administration at each end of the journey. This latter set of costs may be referred to as terminal costs. (See LONG-HAUL ECONOMIES.)

transfer deed. Generally this refers to the document by which the ownership of SECURITIES is legally transferred from a seller to a buyer. STAMP DUTY is levied on the transfer though there are a number of exceptions to the duty, particularly government securities.

transfer earnings. See ECONOMIC RENT.

transfer incomes. Incomes which cannot be regarded as payment for current services to production and which therefore do not enter NATIONAL INCOME. Examples of transfer incomes are retirement pensions or the receipt of private gifts. Corresponding to transfer incomes are transfer payments which are payments out of FACTOR INCOMES for which no goods or services are received in return. Examples of such payments are national insurance contributions or private gifts. Transfer incomes and payments should not be confused with TRANSFER EARNINGS.

transfer of technology. Technology is a main factor in the promotion of ECONOMIC GROWTH. Developing countries have to decide whether to develop their own technologies or to import them from developed countries. Imported technology often comes via MULTINATIONAL CORPORATIONS based in Western countries and is often inappropriate for the FACTOR PROPORTIONS generally existing in developing countries. Usually the technology will be too CAPITAL-INTENSIVE for countries which have scarce capital and abundant labour. Highly-skilled labour may also be required to cooperate with this technology. The transfer of inappropriate technology can thus distort the pattern of development. It can lead to the introduction of inappropriate products. Nevertheless if, as does happen in some cases, the technology is modified productivity in industry and agriculture can be substantially increased. (See APPROPRIATE TECHNOLOGY, APPROPRIATE PRODUCTS.)

transfer payment. A payment made to an individual (usually by a government) which does not form part of any EXCHANGE of goods or services. Examples of these payments include student grants and security benefits. The making of these payments is part of the process of redistribution of an economy's output. (See DISTRIBUTION FUNCTION, TRANSFER INCOMES.)

transfer pricing. The system of setting transfer prices for transactions among subsidiaries of a MULTINATIONAL CORPORATION, where prices are not subject to market determination. The prices are often deliberately chosen so as to minimize tax or tariff duties on the corporation on a world scale. For example, costs may be overstated in subsidiary countries with a high profits tax so that profits can be shifted to a subsidiary in a lower tax country.

transfer problem. The name given to the debate in international economics as to whether a country, which has to make an unrequited payment to another country, e.g. a reparations payment, suffers an excess secondary burden, i.e. a burden greater than the magnitude of the payment, in order to effect the transfer by earning a corresponding surplus on foreign payments. The current position is that where there exist SAVING in the KEYNESIAN sense, there will be an excess burden, which will take one of the mixture of two forms, namely worse TERMS OF TRADE or an increase in the level of unemployment.

transformation function. See PRODUCTION FRONTIER.

transformation problem. The problem Marxian economics of deriving a unique set of prices from values, i.e. labour inputs. Volume I of Capital, by virtue of his spec assumptions of equality in all industries the rate of PROFIT, of the CAPITAL-LABOUR RATIO and of the period of turnover, MA was able to show that prices were proportional to labour inputs. When, however, the ratio of capital to labour or the period
transitivity of preferences

In Volume III of *Capital* Marx attempted to derive prices of production, when the ratios of capital to labour differed. On the basis of special assumptions (sum of SURPLUS VALUES equals sum of profits, sum of prices equals the sum of values and industries are independent of each other) he was able to derive prices of production from values: industries with an above average (for the economy) capital to labour ratio had prices above values and those with a below average ratio had prices below values. Subsequent work has attempted to derive prices from values without use of these special assumptions. The current position is that it is possible to derive a unique set of prices corresponding to any set of values but to do so requires the adoption of one invariance postulate, which is the requirement that one magnitude must be the same in value and price terms, so that there exists a vehicle by which the two systems can be linked together. Invariance postulates which have been used are equality between the sum of surplus values and the sum of profits or of the sum of prices and the sum of values or of a commodity, whose price is the same as its value.

**transitivity of preferences.**

*See Axioms of Preference.*

**transitory consumption.** An unanticipated rise or fall in consumption. (*See Permanent Income Hypothesis.*)

**transitory income.** Unanticipated income. A windfall gain or windfall loss. (*See Permanent Income Hypothesis.*)

**translog production function.** (or transcendental logarithmic production function)

This is a generalisation of the COBB-DOUGLAS PRODUCTION FUNCTION of the form

\[
\ln Q = a + \alpha \ln L + \beta \ln K + \gamma \ln L \ln K + \delta (\ln L)^2 + \epsilon (\ln K)^2
\]

where \(Q\) is output, \(L\) and \(K\) are labour and capital \(a, \alpha, \beta, \gamma, \delta, \text{ and } \epsilon\) are constants. This function which is quadratic in the natural logarithms \(\ln\) of the variables reduces to the Cobb Douglas if the parameters \(\gamma, \delta, \text{ and } \epsilon\) are all zero, otherwise it has the property of non-unitary ELASTICITY OF SUBSTITUTION. This function is particularly useful and flexible in approximating a wide range of production technologies in terms of input substitution possibilities and as such is a very useful approximation to almost any production function.

**trans-shipment points.** Locations at which transport changes from one type or mode to another (e.g. at a sea port there is a change between land or river transport and sea transport). These locations are also known as points of modal interchange. Such locations often become centres of manufacturing, or of the processing of raw materials. This phenomenon is explicable in terms of three main influences:

1. Trans-shipment points generally involve not only a change of transport mode but also a change in the number of routes (for example from one sea route to many road routes). If (say) a raw material is cheap to transport in bulk, but less economical to transport in small quantities the most advantageous processing point may be where the load is broken up - at the trans-shipment point - this advantage is reinforced if there are ECONOMIES OF SCALE in the processing operation.

2. There may exist economies of scale which lead to reduction in the costs of handling, loading and unloading (TERMINAL COSTS) at trans-shipment points.

3. These points will, in any case, tend to develop specialized facilities for handling and storing goods.

**Treasury, the.** The department of the UK government which controls economic policy and PUBLIC EXPENDITURE. It is managed by the Chancellor of the EXCHEQUER. (*See Treasury, US Department of.*)

**Treasury, US Department of.** In the USA, the government department which administers most revenue collections, the manufacture of coin and currency and some law enforcement. It is involved in estimating
revenue and monitoring changes in the tax system; it is responsible for repaying holders of maturing TREASURY BILLS and for offering and deciding the mix of short-term and long-term FINANCIAL INSTRUMENTS constituting the federal debt. Its secretary serves as an economic adviser to the President along with the COUNCIL OF ECONOMIC ADVISERS and the OFFICE OF MANAGEMENT AND BUDGET. (See FEDERAL RESERVE SYSTEM.)

**Treasury bill.** A short term borrowing medium of the UK government introduced in 1877 and at that time modelled on the COMMERCIAL BILL. Their original purpose was to serve purely seasonal needs for finance but since the First World War they have been a permanent element in government debt with very large amounts outstanding in the years following the Second World War. Treasury bills have a term of 91 days (some 63-day bills are issued at certain times of the year), and they are sold by tender in weekly lots, with TAP ISSUES to government departments and other public agencies. Though the volume of non-public holdings is now much reduced from earlier levels, the Treasury bill remains an important financial instrument, with a significant role in the operation of monetary management. By an arrangement dating from the 1930s the weekly Bill tender is effectively underwritten by the DISCOUNT HOUSES whose bids in total always cover the amount on offer. This arrangement, backed by understandings with the CLEARING BANKS and by the Discount Houses' access to the BANK OF ENGLAND as LENDER OF LAST RESORT, provides a means by which the government can always obtain the funds it needs.

In the US, a corresponding instrument exists. US Treasury bills from the US Department of Treasury are issued in three-, six-, nine-, and twelve-month maturities through the FEDERAL RESERVE banks. Although these securities are virtually riskless short-term investments, there is risk in secondary market trading prior to maturity, because prices fluctuate with changes in market interest rates. (See DEBT MANAGEMENT.)

**Treasury Deposit Receipt (TDR).** This was a short-term (six-month) non-marketable security introduced by the UK Government in 1940 as an instrument of wartime finance, and sold in determined weekly amounts to the banks. The securities were in effect a form of compulsory borrowing from the banking system and by 1945 formed almost 40 per cent of the assets of the London CLEARING BANKS. Thereafter their issue was progressively reduced and they were phased out in 1953.

**Treasury-Federal Reserve Accord.** From 1942-51, the US FEDERAL RESERVE SYSTEM supported US government bond prices in order to facilitate Federal government borrowing. The Federal Reserve agreed to buy all new Federal government bond issues at agreed prices, thus allowing the Treasury to finance war and post-war debt at very low interest rates. This meant, however, that the Federal Reserve had given up its ability to control credit by changing the interest rate. Without the use of such monetary tools, the Federal Reserve could do little to ameliorate the rapid inflation of the late 1940s. As a result, in 1952 the Federal Reserve and the Treasury came to an 'accord', an agreement that freed the Federal Reserve from any bond buying responsibility.

**Treasury note.** See CURRENCY NOTE.

**Treasury view.** A view held by the UK Treasury in the early part of the twentieth century which considered that additional government expenditure would be offset by a reduction in private expenditure. This view was not adhered to by many UK economists in the 1920s with the exception of Hawtrey; it was at this time that KEYNES and PIGOU were advocating government expenditure as a cure for the unemployment problem.

**Treaty of Rome.** See EUROPEAN COMMUNITY.

trend (also known as time trend).

1. An underlying, long-run component in TIME-SERIES data, which is often calculated to display the long-run direction of movement of a variable. There are various methods by which the trend can be established, including REGRESSION analysis and MOVING AVERAGES. (See DETRENDING, FILTER.)

2. A measure of the average level of an
trend stationary process (TSP). A TSP may be written as the regression model:

\[ y_t = a + \beta t + u_t \]

where \( u_t \) is white noise and \( t \) is a time trend. Variables such as \( y_t \) can be troublesome to deal with in an econometric model as their behaviour is often dominated by the trend component \( \beta t \). It can, however, be detrended by estimating \( \beta \) by ordinary least squares and removing this effect from \( y_t \). A series such as \( y_t \) above is said to have finite memory, as the impact of a particular value of \( u_t \) is restricted to the period in which it occurs. This situation is very different from that in a difference stationary process (DSP), where the series has infinite memory.

trigonometric functions. Functions defined by the properties of right-angled triangles, including sine (sin), cosine (cos) and tangent (tan). In a right angled triangle, if the sides adjacent to the right angle are of length \( X \) (horizontal) and \( Y \) (vertical), and the angle between the hypotenuse and the horizontal side is \( \theta \) then

\[ \tan(\theta) = \frac{Y}{X}, \quad \sin(\theta) = \frac{Y}{\sqrt{X^2 + Y^2}}, \]

\[ \cos(\theta) = \frac{X}{\sqrt{X^2 + Y^2}}. \]

t-truncated earnings function. A test of the DUAL LABOUR MARKET HYPOTHESIS that the wage determination mechanism differs as between 'primary' and 'secondary' sectors of the labour market, the former rewarding HUMAN CAPITAL, if only as a screen for a set of attitudes that employers find beneficial, and the latter rewarding neither experience nor schooling. The test truncates the values of the DEPENDENT VARIABLE in the EARNINGS FUNCTION, two REGRESSION equations being run for the two sectors. It can be shown that the rewards to education and training are considerably reduced in the secondary sector. However, truncation introduces bias by cutting off the high values of the dependent variable. In effect, it amounts to standardizing for occupation and must therefore understate the return to education for the simple reason that it denies the effect of schooling on earnings via changes in occupation.

trust. As a term of law this applies to various legally defined and regulated arrangements under which assets belonging to an individual or a group are placed in the custody of trustees who, depending on the type of trust, may actually manage them for the benefit of the owners. For various reasons, including tax advantages, trust arrangements are widely used by private individuals and by institutions. In the late nineteenth century the trust form was used in the US as a means of establishing a MONOPOLY in certain industries, so that there and elsewhere the word 'trust' acquired a derogatory meaning, strongly associated with monopoly practices - as in the 'anti-trust' laws of the US. Today in the UK, the term is applied to two types of financial institution, the INVESTMENT TRUST and the UNIT TRUST; of these only the latter has any of the legal properties of a trust.

t-statistic. A statistic which follows the T-DISTRIBUTION. t-statistics are commonly used in HYPOTHESIS TESTS to determine the STATISTICAL SIGNIFICANCE of the PARAMETERS of ECONOMETRIC MODELS, and are calculated as the ratio of the estimated parameter value to its STANDARD ERROR.

turning point. The point in the business cycle when an EXPANSIONARY PHASE of the business cycle is replaced by a CONTRACTIONARY PHASE or vice versa. Peaks and troughs are known as turning points.

turnover. 

See TOTAL REVENUE.

turnover tax. Sometimes known as cascade tax. This is an early form of SALES TAX. It is normally levied as a given percentage of the sales value. It is levied on each occasion that a transaction takes place and the base of the tax includes any tax paid on transactions
at previous stages in the production and distribution process. The effect of this tax is thus to encourage VERTICAL INTEGRATION in industry and commerce as a reduction in the number of times that a transaction takes place reduces the amount of tax payable. The inefficiency of this type of tax has been realized and in recent years many countries have changed over to a VALUE-ADDED TAX which does not have these inefficiencies.

turnpike theorems. A class of propositions in GROWTH THEORY concerned with the closeness of optimal growth paths to BALANCED GROWTH at the highest rate. The name 'turnpike theorem' was given by R. Dorfman, P. Samuelson and R. Solow in Linear Programming and Economic Analysis, McGraw Hill (1958).

twelve-month rule. See INCOMES POLICY.

two sector growth model. A model used in GROWTH THEORY where the fundamental differences between CONSUMPTION and CAPITAL goods are recognized, with one sector concerned with each of the two goods. Examples are the models of J.E. Meade, and H. Uzawa. (See ONE SECTOR GROWTH MODEL, MULTISECTOR GROWTH MODELS.)

two stage least squares (TSLS or 2 SLS). An econometric procedure for the ESTIMATION of the STRUCTURAL FORM parameters of SIMULTANEOUS EQUATION systems, which avoids simultaneous equation bias. The technique involves the estimation of the REDUCED FORM parameters by ORDINARY LEAST SQUARES (OLS). These are used to calculate estimates of the values of the ENDOGENOUS variables of the model, which are subsequently used as INSTRUMENTAL VARIABLES for the actual explanatory endogenous

variables in the estimation of the OLS parameters of the structural form. TSLS is a member of the LEAST SQUARES family of estimators, and is a SINGLE EQUATION (or Instrumental) estimator. (See LIMITED INFORMATION MAXIMUM LIKELIHOOD, THREE S LEAST SQUARES.)

tyling contract. A condition of selling requiring the buyer of a given product to purchase another (different) product, us complementary to the first product. For example, a seller of stapling machines requires buyers to purchase his staples as a condition of buying the machines. The contract may be the seller's means of levying his MONOPOLY of the first product; of exploiting the interdependence of the two product demands functions; of applying PRICE DOMINATION among buyers with different intensities of demand; of ensuring that the reputation of the desired product is damaged by buyers' use of inferior copies of the product not desired; and of avoiding the effects of PRICE CONTROL on the desired product (assuming no control on the product desired). These agreements may be illegal with the usual application of the SHERMAN ACT, the CLAYTON ACT, or the FEDERAL TRADE COMMISSION ACT.

type I/type II errors. The types of error which can be made in HYPOTHESIS TEST! A type I error is the rejection of the Null HYPOTHESIS when it is in fact true. A type II error is the acceptance of the Null HYPOTHESIS when it is false. The probability of making these types of error is closely related to the LEVEL OF SIGNIFICANCE of the test. The higher the level of significance the lower probability of making a type I error, and higher is that of making a type II error, vice versa.
U-form enterprise. A company in which decision making is centralized around a top board of executives whose functional responsibilities are applied to all company products. This form of organization is common to small and medium-sized firms; large firms adopting the U-form organization tend to suffer control-loss. (See M-FORM ENTERPRISE.)

unanimity rule. A procedure for COLLECTIVE CHOICE which requires that before a policy can be adopted it must be approved by all of the members of the community affected by the decision. If this rule is adopted we can be sure that any policy adopted will be a PARETO IMPROVEMENT. However, in practice use of the rule would be difficult and time consuming. The use of this rule is analogous to the VOLUNTARY-EXCHANGE MODEL of public finance. (See SOCIAL DECISION RULE.)

unanticipated inflation. That proportion of the actual level of inflation which people did not expect; actual minus EXPECTED INFLATION. If people expect the rate of inflation to be five per cent per annum but in fact inflation is ten per cent over that period the unanticipated inflation rate is five per cent.

unbalanced economic growth. See BALANCED ECONOMIC DEVELOPMENT, GROWTH PATH.

unbiased estimator, See BEST LINEAR UNBIASED ESTIMATOR.

uncalled capital. See PAID-UP CAPITAL.

uncertainty. A situation in which the likelihood of an event occurring is not known at all. That is, no PROBABILITY DISTRIBUTION can be attached to the outcomes. If the event in question is an investment in a project, uncertain returns would mean that the conceivable returns will be known but their probability of occurrence will not be known. In such circumstances it is necessary to resort to some rule based on the investor's attitude to the balance of gains and losses in the event that a particular choice is taken and a particular set of circumstances occur. (See DECISION THEORY, RISK.) See McKenna, C.J. The Economics of Uncertainty, Harvester Wheatsheaf, London (1986).

unconvertible loan stock. See FINANCIAL CAPITAL.

uncovered interest parity. In a flexible EXCHANGE RATE regime, when investors are risk-neutral and do not cover themselves against exchange risk in the FORWARD MARKET, the requirement that the future spot rate for a currency diverge from the present spot rate (see SPOT MARKET) by an amount which exactly offsets the interest differential in two countries. Thus if the rate of interest in the US exceeds that in the UK, the future spot-rate for the dollar would have to be at a discount to the present spot, so that a UK investor would believe that the extra yield he would get by lending to the US would be exactly offset by a capital loss in returning from dollars to sterling at the future spot rate. (See COVERED INTEREST PARITY.)

UNCTAD. See UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT.

undated securities. See DATED SECURITIES.

underdeveloped countries. A term for DEVELOPING COUNTRIES which is now used infrequently, in favour of less pejorative terms.

underdevelopment. See DEVELOPING COUNTRIES.

underemployed workers. The mirror image of OVEREMPLOYED WORKERS. The under-
employed worker is thus one who values income more highly and leisure less highly than the typical worker or, in other words, one whose MARGINAL RATE OF SUBSTITUTION of income for leisure is less. An underemployed worker would prefer to work a larger number of hours than that offered to him by the standard working week. Indeed he would be willing to offer more hours at a rate possibly substantially below the established wage. Underemployed workers will actively seek OVERTIME and if this is denied them in sufficient quantities, they will seek part-time work elsewhere in addition to their principal job. This latter phenomenon is known as moonlighting or multiple job holding. The propensity to moonlight is a negative function of income and a positive function of family size. Also, moonlighters must have principal job schedules which permit them to take second jobs. Classic examples are postal workers, milkmen and school teachers. In the US approximately five per cent of all employees are moonlighters. In less-developed economies underemployment of workers is commonplace.

underemployment. According to the DUAL LABOUR MARKET HYPOTHESIS, the secondary labour market consists of many workers who either already possess skills that would enable them to function satisfactorily within the primary market or who could be trained for skilled jobs at no more than the usual costs. Given the barriers to entering the primary sector, however, they are forced to take up unskilled secondary sector jobs and are in this sense underemployed. (For a different sense of underemployment, see UNDEREMPLOYED WORKERS.)

underidentification (also known as UNIDENTIFICATION). See IDENTIFICATION PROBLEM.

undervalued currency. In a fixed EXCHANGE RATE system a currency whose parity leads to persistent BALANCE OF PAYMENTS surpluses. The price is below its free market level and maintained at this level by adding foreign currencies to reserves and sterilizing the domestic monetary expansion which follows from a surplus. With flexible rates the undervaluation would be seen in a departure from purchasing power parity: the country's goods would be too cheap. Japanese yen was allegedly undervalued in the early 1980s, its undervaluation being maintained by large scale overseas lending (See REVALUATION, CURRENCY APPRECIATION)

underwriter. Someone who agrees to be a risk, or some part of it, in return for payment known as an INSURANCE PREMIUM. ISSUING HOUSES also underwrite new issues of shares such that if the whole issue is taken up by the public, the underwriters left to take up the remainder of the issue.

undistributed profits. That proportion of total profit not distributed in the form of dividend payments to owners of equity capital or released in the form of tax payments. These funds are an important source of finance for corporate sector investment plans. (See DISTRIBUTED PROFITS.)

unearned income. A term which usually refers to any type of non-wage income which could be in the form of PROFITS, INTEREST or RENT. It is differentiated usually for taxation purposes as most 'earned' income, i.e. wage income is taxed at source, unearned income often has to be declared and taxed separately.

unemployment. The stock of all those individuals who are not in employment and who are either in the process of moving into a new job or who are unable to find work at the prevailing real wage rate. The unemployed may be classified by cause according to a modern Keynesian view (see FRICTIONAL, SEASONAL, DEMAND-DEFICIENCY CYCLICAL GROWTH GAP and TECHNOLOGICAL UNEMPLOYMENT) or according to KEYNES' distinction between VOLUNTARY and INVOLUNTARY UNEMPLOYMENT, or by characteri stics according to a NEO-CLASSICAL view (SEARCH, PRECAUTIONARY and SPECULATIVE UNEMPLOYMENT, NATURAL RATE OF UNEMPLOYMENT). See Nickell, S., 'Unemployment Survey', Economic Journal, (1990), 100, pp. 391-439.

unemployment benefit. A payment made to an individual who is unemployed. The payments are made from the NATIONAL INSURANCE.
unemployment equilibrium. The central proposition of KEYNES' General Theory that even if wages and prices are fully flexible, as assumed in classical theory, the economy will not always return to FULL EMPLOYMENT. Under the assumption of fixed wages and prices as incorporated in the INCOME-EXPENDITURE MODEL and Hicks' IS-LM MODEL, an unemployment 'equilibrium' could be easily demonstrated, although as the NEOCLASSICAL SYNTHESIS has subsequently shown we can no longer consider this to be an equilibrium position. However Keynes' argument did not rest solely on fixed wages and prices. He had also demonstrated that even with flexible wages and prices INVOLUNTARY UNEMPLOYMENT was possible. He suggested that both the LIQUIDITY TRAP and INVESTMENT demand which was completely inelastic resulted in an unemployment equilibrium. In so doing he appeared to have driven a stake through the heart of classical theory which asserted the self-regulating properties of the market economy. Classical economists in fact countered by arguing that the REAL BALANCE EFFECT would lead to greater expenditures out of rising real wealth as prices fall and this would arrest the downward spiral of prices and wages and stimulate output and employment. However, as the subsequent debate about INSIDE MONEY AND OUTSIDE MONEY has revealed these effects may be trivial. More important seems to be the empirical evidence against the liquidity trap and completely inelastic investment demand and the fact that both these hypotheses rest on rather implausible assumptions about the manner in which individuals formulate EXPECTATIONS.

unemployment rate. In the UK the percentage of the labour force without work and actively engaged in looking for work. This is computed by expressing the number in unemployment as revealed by either the REGISTERED UNEMPLOYED or by a survey of households as a proportion of the labour force. In the USA the same procedure is followed except that the armed forces are omitted from the denominator.

A comparison of the unemployment rate with the estimated natural rate of unemployment is frequently used as a measure of the excess supply of labour.

unequal exchange. In its strict Marxian form the exchange of the products of developed economies at prices above their labour values (see LABOUR THEORY OF VALUE and TRANSFORMATION PROBLEM) for the products of less developed economies at prices below their labour values. On the assumption that the RATE OF PROFIT is to be equal on all capitals advanced, if prices were simply proportional to labour inputs, then in countries with much capital per man the rate of profit would be lower than in less developed economies where SURPLUS VALUE (the source of profit) has to be spread over a smaller total of VARIABLE plus CONSTANT CAPITAL.

Even within a Marxian framework the proposition is open to dispute, since the large quantity of labour (and the ensuing surplus value) at work with an outmoded technique of production in a less developed country may not represent Socially Necessary Labour, while the high capital to labour ratio in a developed country may so raise surplus value that the going rate of profit could be earned without having prices exceed values. In a looser formulation unequal exchange has been defined as the deterioration in the TERMS OF TRADE between the products of less developed countries and those of developed, a matter on which the statistical evidence is not unambiguous.

UNIDO guidelines. A technique of appraising projects in DEVELOPING COUNTRIES and an alternative to the LITTLE-MIRRLEES method. It is essentially a COST-BENEFIT ANALYSIS where the numeraire is present consumption. The authors argue that the social value of an incremental unit of INVESTMENT exceeds that from a unit of consumption. They introduce an accounting price for investment to indicate its social worth in terms of consumption in PRESENT VALUE terms. The SHADOW WAGE RATE is related to
the MARGINAL PRODUCT of labour in its alternative occupation and also incorporates an adjustment for the belief that SAVING and investment are socially more valuable than consumption. The shadow exchange rate is equal to the weighted average of the ratio of domestic prices at which import and export markets are cleared and world prices at official exchange rates. The SOCIAL DISCOUNT RATE is employed to find the NET PRESENT VALUE OF PROJECTS. The costs or benefits of employing foreign resources are evaluated in domestic currency. Thus there are several differences in the UNIDO approach compared to the Little-Mirrlees method but in practice there may not be many divergences in the ranking of projects between methods. (See INVESTMENT CRITERIA FOR DEVELOPING COUNTRIES, UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION.)

**unintended inventory disinvestment.** Run-down of STOCKS due to an unexpected rise in sales or fall in production. (See INVENTORIES.)

**unintended inventory investment.** Increase in stocks resulting from the failure of expected orders to materialize. (See INVENTORIES.)

**union density.** The proportion of the labour force that is unionized. Union density varies widely across industries and between different countries as a result of differences in the costs and benefits of unionisation. The key determinants of these costs and benefits appear to be average establishment size, the degree of product market CONCENTRATION and the wage rate. The first variable enters on the costs side of organization: it is less costly to organize and maintain organization in industries with a few large visible plants than in industries with a more atomistic employment structure. The two latter variables enter on the benefits side of organization. Market concentration is a crude proxy for monopoly power and thus implies a less elastic DERIVED DEMAND curve. Similarly, higher wages indicate greater benefits to organizing the industry.

Changes in union density through time have also been shown to be a positive function of the rate of inflation and a negative function of the lagged level of membership. A further factor is the changing attitude of governments.

Union density in the UK and the US approximated 42 per cent and 17 per cent respectively at the end of the 1980s.

**union market power.** The market power of trade unions is a function of the elasticity of DERIVED DEMAND for union labour. It is plain that a union need have less fear for the employment consequence of a given wage claim if the elasticity of derived demand for union labour is low, CETERIS PARIBUS. In this case, the union is said to possess more power. It was MARSHALL who first categorized the determinants of this elasticity. The four Marshallian rules in question state that the union is likely to be better placed vis-à-vis the employer in obtaining higher wages for a given grade of labour:

1. The less elastic is final demand for the product.
2. The less elastic it is to substitute other inputs for the grade in question.
3. The smaller is the grade’s share in the total expenses of production.
4. The lower the elasticity of supply of co-operant factors.

To these rules it is useful to add a fifth, relating to the effectiveness of union control over alternative supplies of labour to the grade in question. This effectiveness is a function of UNION DENSITY. Higher union density alters the conditions described by rules 1 and 2 in a manner favourable to the union. Note that union market power may be buttressed by union political power.

**union/non-union differential.** This measures the extent to which unions have raised the wage of their membership relative to equivalent non-union labour. Calculation of this magnitude is complicated by a variety of factors. First, when wages are raised employers have an incentive to screen job applicants more carefully and to take on only the more highly qualified. This adjustment could in principle iron out most differences in terms of EFFICIENCY UNITS. Second, wages and union membership might be jointly determined - higher wages may encourage unionization as much as unions cause higher wages. Third, and less important, the THREAT EFFECT may lead to an underestimate of the differential. Studies which
recognize these complications produce much reduced estimates (less than ten per cent) of the union/non-union differential. A middle of the road position would put the differential in the range of 10 to 15 per cent. Whatever estimate is chosen, the differential moves counter-cyclically, possibly because union wages are more rigid than non-union wages.

**union pushfulness.** The propensity of unions to engage in a wage push, i.e. their mood for militant action. The basic difficulty with this notion is that militancy or pushfulness is a subjective magnitude and is, therefore, empirically elusive. Two broad approaches to pushfulness exist. The first is an economic approach based on the argument that there exist measurable magnitudes, which are plausibly correlated with the subjective magnitude and which are, therefore, employed as proxy measures for the underlying attitudinal variable. Two main types of proxy, union membership proxies and strike activity proxies, have been used in econometric tests. Considerable controversy attaches to each, not least because both union membership and strike frequency are related to the level of economic activity. Accordingly, an observed relation between either variable and the rate of change in wages may be a spurious correlation, reflecting the fact that the militancy proxy variable and the rate of change in wages are jointly determined by economic forces.

The second approach has been to argue that union pushfulness is not an economic phenomenon but rather a sociological phenomenon. An array of sociological hypotheses have been advanced, associated with relative deprivation, the dispersion of power from the centre to the base in collective bargaining, 'permissiveness' and so on.

**union shop.** An arrangement whereby a worker must join the union within a specified period of time after beginning employment. The employer thus has complete discretion in his choice of labour. This arrangement would be termed a post-entry closed shop in the UK.

Arguments in favour of the union shop are that the arrangement is necessary for the survival of the union because of the free rider problem and provides a more stable industrial relations environment. Unions also commonly claim that the union shop is democratic; before the arrangement can be negotiated it is first necessary to gain the vote of a majority of the employees in the bargaining unit. Arguments against basically focus on the forced rider issue: the union shop is thus said to be unfair because it compels workers against their will to join a purely private organization in order to keep their jobs. This deficiency has to be set against the stabilization of the industrial relations environment attendant upon reduced membership raids by rival unions.

**uniqueness.** Generally used in the context of general equilibrium theory to refer to the existence of a unique set of market clearing prices. (See equilibrium.)

**unit root tests.** Tests used to determine whether or not a time series is difference stationary. If a time series can be described by the model,

\[ y_t = a + \rho y_{t-1} + u_t \quad t = 1, \ldots, T \]

then testing for \( \rho = 1 \) is called testing for a unit root. If \( \rho = 1 \) then the above series can be written as

\[ Ay_t = a + u_t, \]

which is known as a random walk or a difference stationary process. This is said to be a random walk with drift if \( a \neq 0 \).

A large literature exists on this problem, but the most commonly used tests are derivatives of the dickey-fuller test. A closely related problem is that of distinguishing between a trend stationary process (TSP) and a difference stationary process (DSP).

**United Nations Capital Development Fund.** A special body created by the United Nations General Assembly in 1966 to facilitate economic growth in developing countries by supplementing existing sources of capital assistance with grants and loans; generally earmarked to finance small scale rural development projects which are unable to generate alternative financing due to insufficient collateral or credit worthiness on the part of the applicant. (See United Nations.
NATIONS DEVELOPMENT PROGRAMME, UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION.)

United Nations Conference on Trade and Development (UNCTAD). The conference, first convened in 1964, is now a permanent organ of the General Assembly and has subsequently met in 1968, 1972, 1976, 1979, 1983 and 1987. All members of the UN or of its specialized agencies are members of the conference and it has a permanent executive organ and a permanent secretariat. In 1990 it had 166 members.

The role of UNCTAD has been to protect and champion the case of the less developed countries against the trade policies of the developed countries, many of which are very restrictive e.g. COMMON AGRICULTURAL POLICY of the EC and American agricultural policy. UNCTAD has argued for easier access to the markets of developed countries at UNCTAD IV in Nairobi, 1976, and put forward an Integrated Programme for Commodities for regulating and strengthening markets by bringing under the aegis of international agreements as many products from the third world as possible. A Common Fund was also proposed to finance BUFFER STOCKS and possibly to act as a catalyst in devising new trade policies. Given the general reluctance of developed countries to accede to these proposals, UNCTAD's progress has been very slow. By 1986 the Integrated Programme had lost its momentum in the face of falling commodity prices and the Common Fund has still not come into existence largely because the USA has failed to ratify the Common Fund Agreement. UNCTAD's major success has been in pressing successfully for the Generalized System of Preferences (GSP, commenced 1971) by means of which some exports from developing countries are given preferential access to the markets of industrial countries. In 1990 the GSP covered US $50,000 million of annual exports from developing countries.

United Nations Development Programme. In 1966 the United Nations Expanded Programme of Technical Assistance, and the United Nations Special Fund were combined to create the United Nations Development Programme, a special body of the UN which is responsible for administering and coordinating development projects and technical assistance provided under the auspices or in liaison with the United Nations system of development agencies and organizations. It is the world's largest agency for technical co-operation, supporting several thousand development projects. Activities support directly or indirectly by the programme include natural resource surveys, assessment of industrial, commercial and export potential, manpower training, creating incentives for capital investment, technology transfer schemes and economic and social planning programmes. The programme is financed by voluntary contributions of UN members and a collaborating development organization and agencies. The bulk of its assistance is non-monetary. In 1989 out of an expenditure of $1200 million about 46 per cent went on the hiring of experts and consultants, 28 per cent on equipment and 12 per cent on training. Of the help given about 35 per cent went to each of Africa and Asia and 15 per cent to Latin America. In its fourth programme cycle from 1987 to 1991, 80 per cent of its resources have been destined for poorest developing countries with a per capita income of less than $750.

(See UNITED NATIONS CAPITAL DEVELOPMENT FUND and UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION.)

United Nations Industrial Development Organization (UNIDO). Established 1966 as a United Nations special body following a resolution of the United Nations General Assembly, the organization provides technical assistance designed to accelerate the industrialization of developing countries. It assists countries in executing industrial surveys, formulating industrial development policies, conducting project evaluations and assessing plant or industrial productivity and marketing strategies. In 1989 with 151 members its expenditure projects amounted to some $134 million, of which about 41 per cent went on hiring personnel, 28 per cent for equipment and 15 per cent on training and fellowships.

unit of account. See MONEY.

unit tax. See CUSTOMS, EXCISE AND PROTECTIVE DUTIES.
Unit Trust. The term used in the UK for an institution, resembling an INVESTMENT TRUST, which enables investors to spread their risks by purchasing an interest in a PORTFOLIO OF SECURITIES. By buying 'units' in such a trust the investor in effect acquires ownership of the trust's securities in proportion to the number of units held. Unit trusts are run by managers, who include many of the major banks and insurance companies and who usually run several trusts each specializing in particular ranges of securities. The managers are obliged to sell and buy back units freely at prices related to the current market values of the underlying securities: if sales exceed repurchases, the portfolio expands, so that unit trusts are 'open-ended'.

Unlisted Securities Market (USM). Launched in 1980 by the London STOCK EXCHANGE (by which it is regulated) the USM is a less organized market than the Stock Exchange. For companies, of which over 200 now use it, it has less onerous disclosure requirements and formalities, including costs.

unsecured loan stock. See FINANCIAL CAPITAL.

unvalidated inflation. An INFLATION rate which is not accompanied by a similar rate of increase in the money supply.

urban economics. That branch of economics which applies the tools of economic reasoning to the analysis of economic activity in, and the economic problems of, cities and towns. Much of urban economics is concerned with analysing the pattern of location of economic activities in and between urban areas - thus it has strong links with REGIONAL ECONOMICS and with LOCATION THEORY. Other topics include the issues of optimum city size and analysis of the economic growth of towns and cities - this latter indicates a connection with regional macroeconomics.

However, urban economics should not be viewed as simply a form of regional economics since it also analyses topics such as problems of urban transport and urban public services which are not comparable with aspects of regional economics.

urbanization economies. Cost savings which arise when economic activities are concentrated in urban areas. These economies, also known as economies of urban concentration, are a particular form of AGGLOMERATION ECONOMIES. The existence of urbanization economies helps to account for the growth of urban industrial and commercial centres.

Uruguay round. See GENERAL AGREEMENT ON TARIFFS AND TRADE.

user cost of capital. The implicit rental value of CAPITAL SERVICES, or the price a FIRM should itself pay for the use of the CAPITAL STOCK it owns or is considering acquiring. It may also be considered as the price the firm would pay if it rented capital goods to obtain capital services, just as in the case of labour. TAXATION and INTEREST RATE changes may be considered to affect INVESTMENT through the user cost of capital. This concept is much associated with the NEO-CLASSICAL theory of investment, in particular as seen by D. Jorgenson and associates, and assumes a PUTTY-PUTTY capital model, with factor substitution equally possible before and after investment.

use value and exchange value. A distinction, which was the subject of discussion from the time of ARISTOTLE up to MARX, between the UTILITY obtained from a good and its price. SMITH dealt with it in the paradox of value. Water has a high use value but a low exchange value, while the reverse holds for diamonds. The doctrine of MARGINAL UTILITY resolved the problem by explaining that price (exchange value) is related to marginal utility and not to total utility (use value).

U-shaped cost curves. Curves showing how the average costs of a firm or industry vary with the level of output. They are an integral feature of the theory of PERFECT COMPETITION, where it is assumed that the long-run average cost curve of the firm initially exhibits INCREASING RETURNS TO SCALE which pertain up to the point of MINIMUM EFFICIENT SCALE. Beyond this point DECREASING RETURNS TO SCALE set in as a consequence of the existence of fixed factors such as high
quality management, for instance, which gets over-utilized as output rises. Such a returns to scale pattern yields a U-shaped average cost function.

utility. Widely construed in economics to be synonymous with 'welfare', ECONOMIC WELFARE, satisfaction, and, occasionally, happiness. More strictly, however, to say that someone derives utility from a good or event is to say that they prefer the good to exist rather than not to exist. To say that they derive more utility from good X than good Y is simply to say that X is preferred to y. For an argument that utility is a circular concept see J. Robinson, Economic Philosophy, Penguin, Harmondsworth (1964), p. 48.

utility function. A function stating that an individual's UTILITY is dependent upon the goods he consumes and their amounts. M formally written as:

$$ U = U(X, Y, Z, \ldots) $$

where X, Y and Z are the amounts of goods in question.

utilitarianism. Philosophical and political term to describe the doctrines of BENT and his followers, who took as their criterion for judging actions the principle of greatest happiness of the greatest number. While utilitarianism had a major influence on reforms enacted by Parliament in the early nineteenth century, its impact on theoretical economic writings was not great. Of the CLASSICAL ECONOMISTS only John and his son, J.S. MILL, were utilitarians; the only significant theoretical contribution was J.S. Mill's tax theory developed in a theory of equal sacrifices of UTILITY.
vacancies. Employers' unsatisfied demands for additional employees. In the UK vacancies for most MANUAL WORKERS and some NON-MANUAL WORKERS are notified to the public employment service and are systematically recorded. As a result monthly statistics on the level of vacancies and the VACANCY RATE are published. In contrast vacancies for professional and senior non-manual employees are most frequently advertised in the national press and professional journals. They are not notified to and recorded by the public employment service since this does not constitute the traditional channel of JOB SEARCH for this class of workers. Published vacancy statistics therefore under-record the level of vacancies outstanding in the economy at any one time although changes in vacancies probably provide a reasonably accurate indication of changes in the demand for extra employees.

vacancy rate. An index of the demand for labour at the prevailing wage rate. In the UK this is computed by expressing those VACANCIES notified to the public employment service as a proportion of vacancies plus the total number of employees in employment.

validated inflation. INFLATION which is allowed to persist because the government allows the MONEY SUPPLY to expand at the same rate as inflation.

valuation curve. See GROWTH-VALUATION FUNCTION.

valuation ratio. The ratio of the stock market valuation of the firm $V$ to the book value of assets $K$. Given STEADY-STATE GROWTH conditions a firm's stock market valuation will be equal to the NET PRESENT VALUE of expected dividend payments multiplied by $n$, the current share issue size of the firm. We can write

$$V = \frac{nD}{i - g}$$

where $D$ is the dividend payment per share which grows at the constant annual rate $g$ and $i$ is the DISCOUNT RATE. Alternatively, we may write

$$V = \frac{(1 - r)\pi K}{i - g}$$

where $r$ is the RETENTION RATIO and $\pi$ the profit rate. Dividing through by $K$ gives us the expression for $V$, the valuation ratio

$$\frac{V}{K} = \frac{(1 - r)\pi}{i - g}.$$ 

(See GROWTH THEORIES OF THE FIRM and GROWTH VALUATION FUNCTION.)

value, money, a standard of. One of the functions of MONEY is that it acts as a standard of value. That is, it provides a system of units of account in terms of which PRICES are expressed, and deferred payments, e.g. DEBTS, are defined.

value, theory of. The intrinsic worth of a commodity. If defined in terms of money, value determines PRICE. Since the time of ARISTOTLE onwards it has been traditional to separate the concepts of use value and value in exchange. Value in use is not an intrinsic quality of a commodity, but its capacity to satisfy human wants. Value in exchange is the worth of commodity in terms of its capacity to be exchanged for another commodity. The exchange ratios of two commodities are the relative prices of those commodities if expressed in terms of a constant money commodity.

In CLASSICAL ECONOMICS the existence of use value was a prerequisite for commodities to have value in exchange. A commodity must possess UTILITY or usefulness in order for it to be produced or exchanged. The exchange value of a commodity was determined by the costs of producing that commodity - wages, profit and rent. Adam SMITH explained the price of a commodity in these terms arguing that the costs of production
determine the 'natural price' of the commodity around which actual prices fluctuate according to variation in short-run demand. David RICARDO is often credited with advancing a LABOUR THEORY OF VALUE. The value of a commodity depends on the relative quantity of labour which is necessary for its production although he recognized that a strict labour theory held only under certain special assumptions. However, for Ricardo, value theory was not primarily a theory of relative prices but the key to the explanation of INCOME DISTRIBUTION. Ricardo was concerned with the search for an invariant measure of absolute value. The late nineteenth century neo-classical economists focused not on intrinsic value, but on the determinants of market price. In contrast to earlier writers they concentrated on the utility of a commodity developing a theory of exchange value. Price was determined by MARGINAL UTILITY which was the source and cause of exchange value. Alfred MARSHALL advanced the idea that market price was determined by the interaction of DEMAND and SUPPLY both of which were derived from the principle of utility. The theory of value became a theory of the allocation of scarce resources to specific uses rather than a search for intrinsic value. Modern theory has furthered this line of thought substituting the dual incentives of utility maximization for the consumer (demand) and PROFIT MAXIMIZATION for the producer (supply) for the single principle of utility. Only the followers of Karl MARX who developed the labour theory of value into a theory of profit or SURPLUS VALUE retain the separation of value theory from the theory of price determination.

value-added. The value of the firm's output minus the value of the inputs it purchases from other firms. Essentially it is the sum of the FACTOR INCOMES, the wages and profits, of the firm. (See NATIONAL INCOME.)

value-added tax (VAT). Conceptually this is a tax based on the VALUE-ADDED in a country. The thinking behind the tax is that it is an equitable way to tax the value of sales. It does not discriminate against any activity as do specific sales taxes such as EXCISE DUTIES or PURCHASE TAX and so is more neutral in its impact. Further, the tax is levied on value-added excluding the tax paid at previous stages in the production process and so does not give an incentive to VERTICAL INTEGRATION as does a TURNOVER TAX. In practice this type of tax is not actually based on value-added. In the UK for example ports are not liable but imports are. Further government expenditure on wages and salaries is not part of the tax base. The VAT does allow for CAPITAL EXPENDITURE by immediately allowing for all new investment and not just that part which replaces worn out capital. Further, certain services exempt because it was found difficult to administer the tax. The UK VAT is best described as a tax on consumption in the private sector which leaves out some services. There are exempt goods such as financial services, education and health. With some the trader does not charge his customer tax on his sale. He cannot however reclaim any tax which he himself has paid on purchases of inputs. Transactions versus exempt because of the difficulty administering the tax. There are also zero-rated goods. Here the trader does not charge tax to his customer and in addition he can reclaim any tax he has paid on his purchase of inputs. Zero-rated items in the UK include food, books and journals, coal, and electricity, the construction of builds and medicines supplied on prescription. Small traders whose turnover is less than a minimum value are exempt. For second-hand goods the general rule is that tax is imposed on the full second-hand value. A main exception is motor cars where the tax is paid on the dealer's gross margin.

The tax is administered in the UK (and the other EC countries) by the indirect tractive method. Thus tax at the full rate (currently 17.5 per cent) is charged customer. The trader then recoups which he himself has paid on his purchases of inputs from other traders.

value judgement. A statement that can generally be reduced to the form 'X is (bad)'. In turn, such statements are analysed in different ways by different philosophers. Some would say 'X is good' means 'I like for others it means 'I like X and you should like it too', and so on. The term value judgement causes extensive confusion in economics. Common misconceptions are that
value marginal physical product

synonymous with 'a matter of opinion', whereas 'in my opinion it will rain tonight' is a positive statement of predictive form and has no value judgement involved.

value marginal physical product.
See MARGINAL REVENUE PRODUCT.

variable capital. In the Marxian scheme that part of CAPITAL, represented by labour power, which undergoes an alteration of value in the production process. If the wage necessary to buy the SUBSISTENCE goods to keep the labour stock constant is £10 per day, the capitalist will get back more than the £10 he advances for this purpose, for the worker will produce an output or value equal to the £10 and an excess or SURPLUS VALUE which accrues to the capitalist, so that the money advanced to buy labour power varies (increases), whereas the money advanced to buy machines (CONSTANT CAPITAL) undergoes no increase in value.

variable costs. Costs which vary with the level of OUTPUT - e.g. labour costs. In the SHORT RUN some costs will be fixed and some variable. In the LONG RUN, all costs are likely to be variable.

variable elasticity of substitution production function (VES production function). This is a generalisation of the CONSTANT ELASTICITY OF SUBSTITUTION PRODUCTION FUNCTION which allows the elasticity of substitution to vary with the ratio of the factor inputs. This function may be estimated by regressing the logarithm of output per unit labour on the REAL WAGE and the capital to labour ratio.

variable labour costs.* The costs of employment that vary proportionately or more than proportionately with hours worked. The principal examples are hourly wage rates and overtime/premium-time pay. But various NON-WAGE LABOUR COSTS will also often have a variable as well as a fixed cost component.

variable parameter models. Econometric models where the underlying population parameters which are being estimated are assumed to be variables, unlike the situation in REGRESSION analysis where these parameters are assumed to be fixed. If the parameters vary over time they are called TIME VARYING PARAMETER models. One approach to this type of model is to assume that there is a small number of different regimes with an associated parameter change: another and more general approach is that the variation is continuous. There are many methods of estimating such models such as that suggested by Hildreth and Houck (Journal of the American Statistical Association, 1968) or by using the KALMAN FILTER. If the variation in the parameters is not systematic but STOCHASTIC then the models are called pure RANDOM COEFFICIENT MODELS.

variance. A commonly used measure of the extent to which a random variable (or STATISTIC) is dispersed about its MEAN value. It is defined as

$$\sigma = \int_{-\infty}^{\infty} (X - \mu)^2 \cdot f(X) \cdot dX$$

where $X$ is the variable, $\mu$ is its mean, and $f(X)$ is its probability density function.

An estimate of the variance of a variable can be obtained from sample information by the calculation of the sample variance, according to the formula

$$s^2 = \frac{1}{N-1} \sum_{i=1}^{N} (X_i - \bar{X})^2$$

where $X_i$ is the $i$th observation on the variable $X$, $\bar{X}$ is the sample mean, and $N$ is the sample size.

Note that the square root of the variance is the STANDARD DEVIATION, or STANDARD ERROR. (See RANGE, COVARIANCE.)

variance-covariance matrix. The matrix of VARIANCES and COVARIANCES of a set of jointly distributed RANDOM VARIABLES, the variances forming the diagonal elements, while the covariance occupy the relevant rows and columns. In econometrics this term normally applies either to the matrix of variances and covariances of parameter estimates, or to that of the values of the stochastic DISTURBANCE TERM in a REGRESSION equation.
Variation.
See VARIANCE, ANALYSIS OF VARIANCE, SUM OF SQUARES.

Veblen, Thorstein B. (1857-1929). An American economist and sociologist, Veblen was Professor of Economics at the University of Chicago from 1892. The founder of INSTITUTIONAL ECONOMICS, he was highly critical of the hedonistic and atomistic conception of human nature implicit in NEOCLASSICAL ECONOMICS. Moreover he viewed that body of theory as an apologia for the status quo. His idea of economic science was that of an inquiry into the development of economic institutions. Economic institutions for Veblen were no more than the attitudes and mores which they encapsulated. A large number of Veblen's terms which he used to characterize the leisure class of his day have passed into common English parlance. Consumption for the purposes of creating an impression on others rather than for the satisfaction of need he called 'conspicuous consumption' and is characterized by 'ostentatious display'. The distancing of financial control from technical aspects of production he called 'absentee ownership'. His major works, such as The Theory of the Leisure Class (1899) and The Theory of Business Enterprise (1904), examine the values and beliefs of the controllers of industry and thereby the institutional framework of capitalist society. Veblen believed that the major characteristic of modern industrial society is one of conflict. Unlike the Marxian view of conflict between the BOURGEOISIE and the PROLETARIAT, Veblen identified conflict between 'pecuniary employments' and 'industrial employments', i.e. making money and making commodities. Conflict for Veblen is between businessmen who control the financing of industry and are concerned with profit and the engineers and workforce who are concerned with efficiency in physical terms. The conflict between the two arises out of the desire of the latter to innovate, constantly destroying the value of the capital owned by the business class. Veblen analysed the institutions of what he called the pecuniary culture and attempted to show that technology by destroying those institutions promoted conflict and the eventual breakdown of the system. His other works include: The Place of Science in Modern Civilization (1919), Absentee Ownership (1923), Essays in our Changing Order (1934).

Veblen effect. The phenomenon whereby as the price of a good falls some consumer construe this as a reduction in the quality of the good and cease to buy it. The result is that the MARKET DEMAND CURVE will exhibit a steeper slope than would otherwise be predicted. It could even slope upwards in contradiction of the LAW OF DEMAND. The phenomenon is named after Thorstein VEBLEN.

Vector. An ordered one-dimensional array of numbers or elements, which can either be written horizontally (row vector) or vertically (column vector). A vector of order $n$ contains $n$ elements. The zero vector or null vector is a vector whose elements are all zero. A unit vector has one element equal to unity, the rest being equal to zero. The common notation for a vector is its symbol underlined, e.g. $\underline{a} = [a_1 \ldots a_n]$.

Vectors are often used as a shorthand method of representing the co-ordinates of a point in a dimensional space. Thus a point on a two-dimensional graph having a horizontal axis value $X$, and a vertical axis value $Y$ may be represented in vector form as $\underline{Z} = \{XY\}$.

(See LINEAR DEPENDENCE, MATRIX.)

Vector autoregression (VAR). One of the most widely used FORECASTING techniques in economics. As with most purely TIME SERIES methods it is seen as neutral with respect to any particular economic theory. VAR analysis arose from dissatisfaction with the conventional solutions to the IDENTIFICATION PROBLEM in the STRUCTURAL FORM of ECONOMETRIC MODELS and has been widely adopted in MACROECONOMICS following the LUKAS CRITIQUE. The method does not distinguish between ENDOGENOUS and EXOGENOUS VARIABLES but is concerned with the path through time of a VECTOR of variables, which considered of interest to the problem hand. Forecasts generated by VAR systems are not always accepted as superior.
BOX-JENKINS forecasts using a full econometric model.

**vehicle currency.** In the major FOREIGN EXCHANGE trading centres most business is conducted in a few major currencies, holders of other currencies converting them into one or other of these major currencies for carrying out their transactions. Such major currencies are termed vehicle currencies, and while a number of them are in active use, the US dollar remains the world's principal vehicle currency. (See EXCHANGE RATE, EXTERNAL RESERVES.)

**veil of ignorance.**  
*See RAWLSIAN JUSTICE.*

**veil of money.**  
*See CLASSICAL DICHOTOMY.*

**velocity of circulation.** The speed at which a given sum of money circulates in the economy - i.e. the average number of times a unit of money changes hands in a specified time period. One version of the equation of exchange is

\[ MV = PT \]

where \( M \) is the money flow, \( V \) the velocity of circulation, \( P \) the general price level and \( T \) the level of transactions. On rearrangement it becomes

\[ V = \frac{PT}{M} \]

*(See QUANTITY THEORY OF MONEY, INCOME VELOCITY OF CIRCULATION.)*

**venture capital.**  
*See RISK CAPITAL.*

**vertical equity.** Justice or fairness in the treatment of individuals in different circumstances. In the field of taxation, vertical equity is held to require that individual's tax burdens should be related to income levels. Thus vertical equity is often put forward as an argument for PROGRESSIVE or PROPORTIONAL TAX by which higher income earners pay more tax. It is usually argued that MARGINAL amounts of income have less significance at high than at low income levels, thus fairness in sharing the burden of taxation requires higher taxation for the higher paid. The distribution of benefits from, say, free education might also be analysed in terms of vertical equity. Ultimately, a concept of vertical equity must imply some view of what constitutes a 'fair' distribution of income. *(See EQUITY, HORIZONTAL EQUITY, DISTRIBUTIONAL EQUITY.)*

**vertical integration.** A situation where the activities of a firm extend over more than one successive stage in the production process of transforming raw materials into final goods. Vertical integration can be partitioned into two types: backward integration, where a firm extends itself into a previous stage of the production process and forward integration, where a firm moves into a succeeding stage of activity.

Motives commonly adduced for such integration are reduction in WORKING CAPITAL requirements, elimination of prohibitory transaction costs, greater price competitiveness as a consequence of avoiding successive profit mark-ups and, in the case of forward integration into retail outlets, the acquisition of 'secure' markets.

**vertical merger.** The amalgamation of two firms which produce products belonging to different stages of the same production process. *(See MERGER, VERTICAL INTEGRATION.)*

**vertical Phillips curve.** The hypothesis that in the LONG RUN there is no TRADE-OFF between the rate of money wage change and the level of unemployment as the PHILLIPS CURVE originally suggested. In contrast to Phillips' original hypothesis, FRIEDMAN (1968) suggested that it is the REAL WAGE and not the money wage which is the focus of the wage bargain.

The hypothesis suggests that workers are concerned to protect the real value of their wages and will, therefore, demand money wage increases which compensate for the expected rate of inflation. That is:

\[ \Delta W = F(U) + \lambda \Delta P_e \]

where \( X = 1 \)

\( AW \) is the change in money wage rates,  
\( U \) is the unemployment rate, and  
\( \Delta P_e \) the expected change in prices, all in period \( t \).
This is illustrated above. Starting from EQUILIBRIUM point \( A \) at the NATURAL RATE OF UNEMPLOYMENT the government expands AGGREGATE DEMAND in an attempt to reduce unemployment. Demand rises, employers hire more labour and unemployment declines. Of course, employers can only hire more labour by offering higher wages and therefore we move up the short-run Phillips curve to \( B \), but now assuming zero productivity growth, prices rise, real wages fall and unemployment falls back to \( C \). Now there is a positive rate of inflation at the natural rate of unemployment, for those who remain in employment formulate their expectations of future price rises on the basis of the past behaviour of prices and demand higher money wages to compensate for the positive rate of inflation. If no further action is taken by government this equilibrium rate of inflation will continue.

However if the government again attempts to reduce unemployment below the natural rate we shall move up a second short-run Phillips curve first to point \( D \) then \( E \). Points \( A \), \( C \) and \( E \) are on a vertical Phillips curve. The system tends towards the natural rate. (See ADAPTIVE EXPECTATIONS, RATIONAL EXPECTATIONS.)

VES production function

See VARIABLE ELASTICITY OF SUBSTITUTION PRODUCTION FUNCTION.

vicious circles. This term usually refers to a view of DEVELOPING COUNTRIES which believes that a subsistence economy will remain as such because total output is low, with little or no reserve stocks. Hence, after consumption takes place there is no surplus for capital accumulation without which there is little hope of increasing output. The key to breaking the vicious circle is capital accumulation. If a country succeeds in breaking out of the vicious circle, then the opposite effects can happen, in fact a virtuous circle: once capital accumulation begins, output rises, and then incomes rise, giving a larger surplus from which more savings can contribute towards investment and capital accumulation.

victim company. A firm which is the subject of a TAKEOVER bid.

vintage growth models. Models in economic growth which allow capital and its embodied TECHNICAL PROGRESS to age with time. New innovations only affect new investment, thus the capital stock is composed of differing vintages.

virtuous circles.

See VICIOUS CIRCLES.

visibility hypothesis. INCOMES POLICY tends to rely heavily on techniques of publicity and censure. These exposure effects are said to have their strongest impact upon those wage settlements which are most in the public eye, i.e. which are most 'visible'. To the extent that incomes policies do exert an influence on wage change, empirical studies point to a more pronounced slow down of wage change in visible industries and in more highly unionized industries during the application of incomes policy.

visible balance. That part of the CURRENT ACCOUNT of a BALANCE OF PAYMENTS statement which reports the relationship between the value of physical goods exported and those imported. The other component of the current account is INVISIBLES e.g. trade in services such as insurance, transport, tourism.

voluntary-exchange model. An approach to the analysis of the provision of PUBLIC
GOODS which seeks to establish conditions under which these goods can be provided on the basis of unanimous agreement - i.e. without coercion. This may be contrasted with the generally observed arrangement that the provision of public goods is financed by compulsory taxation and not by voluntary agreement. The voluntary approach was first advanced by Knut WICKSELL who argued that (1) each public good should be financed by a separate, identifiable tax, and (2) that the unanimous agreement of all members of society would be required to decide on the amount (if any) of the good to be supplied. At the outset, individuals would be aware of their allotted share of any tax to be levied. The problem would then be to decide the level (if any) of provision. The analysis was extended by E. Lindahl, who presented a model in which both the share of taxes and the amount of good were open to debate. In Lindahl’s model, EQUILIBRIUM requires each individual to pay a tax rate just equal to the individual’s MARGINAL UTILITY from the good. This can be illustrated for a two-person community (consisting of A and B) in the diagram below which has the quantity of the good along the horizontal axis and the share of tax paid by A and B along the vertical axis. A’s tax share increases from the bottom up and B’s share (corresponding) increases from the top down. The schedule $D_A$ indicates the amount of the good A will wish to produce at different levels of his tax share.

As his share of the cost goes down his desired level of provision increases. $D_B$ indicates B’s preferences - again as his share of the cost falls his preferred quantity of the good increases. The Lindahl equilibrium involves producing $Q^*$ of the good with tax shares as indicated at point $S$.

In the Wicksell and Lindahl models, public goods are provided in a manner which ensures everyone gains from their provision - i.e. the provision of the goods is always a PARETO IMPROVEMENT. Lindahl’s analysis adds the condition that each individual consumes his most-preferred or 'optimal' amount of the public good given his tax share. Despite the appeal of the model, difficulties arise in its application. In particular the problems of reaching a unanimous agreement and the possibility that individuals will not indicate true preferences (i.e. they may seek to be FREE RIDERS) undermine the usefulness of the model. (See UNANIMITY RULE.)

**voluntary export restraint.** A voluntarily imposed limit on an export by the producers in a country to forestall official protective action on the part of an importing country. In the 1980s the Japanese automobile industry imposed quantitative constraints on the number of cars exported to the USA and the UK to prevent action by the governments of these countries.

**voluntary unemployment.** That unemployment which results from the process of JOB SEARCH and SPECULATIVE and PRECAUTIONARY UNEMPLOYMENT. (See INVOLUNTARY UNEMPLOYMENT.)

**von Neumann-Morgenstern utility.** Named after J. von Neumann (1903-57) and O. Morgenstern (1902-77), this is an approach to demand theory which is held to be applicable to RISK situations. Among the axioms are:

1. that all alternatives are subject to the preference or indifference relationship (COMPLETENESS).
2. TRANSITIVITY of preferences.
3. if $X$ has a probability of $p$ and $D$ has a probability of $(1 - p)$ then if $X$ is preferred to $Y$ when both are certain events, then the lottery of $pX + (1 - p)D$ is preferred to $pY + (1 - p)D$.
4. if $X$ is preferred to $Y$ and $Y$ to $Z$ then some probability $p^*$ exists such that the consumer regards $p^*X$ as being of equal utility to $(1 - p^*)Z$ and to the certainty of $Y$.
Quite simply, the consumer is prepared to 'TRADE-OFF' risk for extra gain.

Now, assign some arbitrary number, say 100, to the best event, X, and another arbitrary number, say 1, to the worst event, Z. Consider the lottery \( p^*X + (1 - p^*)Z \) versus the certainty of Y. Then the UTILITY number to be attached to Y is (substituting the arbitrary values for X and Z):

\[
p^*100 + (1 - p^*) = 99p^* + 1.
\]

If \( p^* \) is determined, an exact number can be found. The resulting utility index is therefore CARDINAL. The theory then asserts that consumers will behave so as to maximize their expected utility - i.e. the sum of the individual utilities each weighted by their probability of occurrence.

**von Neumann ratio.** Denoted

\[
\frac{S^2}{\hat{S}^2}.
\]

A TEST STATISTIC calculated for the purpose of detecting the presence of SERIAL CORRELATION of RESIDUALS in REGRESSION analysis, according to the formula

\[
\frac{S^2}{\hat{S}^2} = \frac{\sum_{t=2}^{N} (e_t - e_{t-1})^2}{\sum_{i=1}^{N} e_i^2/N - 1}.
\]

where \( e_t \) is the value of the residual in period \( t \), and

N is the sample size.

It is related to the DURBIN-WATSON d-statistic by the formula

\[
\frac{\hat{S}^2}{S^2} = d \cdot \left( \frac{N}{N - 1} \right)
\]

and follows approximately a NORMAL DISTRIBUTION for large values of \( N \) with

\[
\text{MEAN} = \frac{2N}{N - 1}, \text{ and}
\]

\[
\text{VARIANCE} = \frac{4N^2(N - 2)}{(N + 1) (N - 1)^2}.
\]

**vote maximizer.** Someone who seeks to maximize the number of political votes for himself. A vote does not express intensity of want since it is a straightforward 'yes' or 'no'. This contrasts with an economic vote where intensity of want is expressed through a higher WILLINGNESS TO PAY. (See ECONOMICS THEORY OF POLITICS.)

**vote trading.**

*See LOGROLLING.*

**voting and non-voting shares.** The own of a company's ordinary shares (see EQUITIES) generally have full voting rights at company meetings. However, in the 1950s; 1960s 'A' ordinary shares were issued by some companies in the UK. These contain all the risks of other ordinary shares, but not have voting rights. They were issued by companies whose directors did not wish to lose control of the organizations through takeover bids. The issue of such shares generally been frowned upon. The owners of PREFERENCE SHARES, though regarded members of a company rather than creditors, normally do not have voting rights except where their dividends are in arrears where an item of business affects rights. Owners of DEBENTURES do not have voting rights.

**voucher.** A method of government provision of some good or service in which individuals are given funds solely for purchase of the specified good or service in order to ensure that the money provided is spent for the specified purpose, a coupon 'voucher' is given which can only be exchanged for the specified good. The government has operated such a program in connection with food for relatively poor people (the 'Food Stamps' programme) a system of this type has been suggested as a means of financing school education in the UK. Proponents of vouchers argue that it provide the recipient with a greater range of choice than does the direct provision of the good by government be

**voucher schemes.** Vouchers are a tool of IN-KIND REDISTRIBUTION. They trade PURCHASING POWER while restricting the individual's spending decision, for example education vouchers must be spent on education. A great variety of such schemes has been proposed. They differ as to whether the value of the voucher is related
voucher schemes

recipient's income or in the extent to which the recipient's income may be added to the voucher and so on. It is suggested that they are a way of increasing CONSUMER SOVEREIGNTY in areas like education and health care.
wage competition model. See JOB COMPETITION THEORY.

wage contour. A set of KEY RATES across several different INTERNAL LABOUR MARKETS. Contours may be bounded by the specific product market in which the firms populating the contour operate or they may be confined to a specific LABOUR MARKET or sphere of influence of a trade union. Across the contour wage settlements will display a marked degree of uniformity.

wage contracts. Formal and informal agreements between employers and either employees or their representatives about the number of hours to be worked, the quality of work and the remuneration that is to be received in return. Frequently these contracts take the form of a basic WAGE RATE or SALARY in return for a standard number of hours per week, the STANDARD WORKING WEEK. Thus the contract averages employment conditions over some period and reduces for both the employer and the employee the uncertainty, which is associated with continuous recontracting. Contracts may be explicit but more typically are implicit contracts. (See NEW-NEW MICRO-ECONOMICS.)

wage differentials. Differences in the average levels of pay of groups of workers classified according to the industry or location in which they work or according to the occupational or racial group to which they belong. In its narrower sense this term is applied to differences in the pay of groups of employees in a single negotiating group. (See INTERNAL LABOUR MARKET.)

While the concept of the WAGE STRUCTURE is concerned with the relative ranking of groups of workers along one of these dimensions the concept of wage differentials is concerned to measure the differences in pay between groups on some common scale. Occupational and regional wage differentials are perhaps the most frequently employed.

In the former case the relative pay of workers who differ only in respect to the occupation in which they are employed is compared while in the latter case a single group of workers differing only with respect to the region in which they work are compared. When analysing occupational wage differentials it is necessary to control for differences in industry, region, sex and race as well perhaps as other intruders. In practice it is of course extremely difficult to do this and for this reason differentials are seldom observed in their pure form. (See OCCUPATIONAL WAGE DIFFERENTIALS, REGIONAL WAGE DIFFERENTIALS, INDUSTRIAL WAGE DIFFERENTIALS, SKILL DIFFERENTIALS.)

wage discrimination. A term used to describe a situation in which equally productive workers are paid different wages. The term has also been used where the wage a worker receives is less than his MARGINAL REVENUE product. However, competitive theory identifies a number of reasons why wages differ from marginal revenue product and this cannot, therefore, be taken as A PRIORI evidence of DISCRIMINATION in LABOUR MARKETS as once believed. (See EQUALISING OCCUPATIONAL DIFFERENTIALS.)

wage drift. An increase in the effective rate of pay per unit of labour input by arrangements that lie outside the control of the recognized procedures for scheduling rates. In practice this is frequently interpreted to mean a rise in standard weekly EARNINGS in excess of the rise in nationally negotiated wage rates, e.g. if standard weekly earnings rise by 15 per cent in one year and wage rates by 10 per cent wage drift would on this view be 5 per cent. This is not, however, correct because recognized procedures for scheduling rates might still account for part of the difference between these two variables. Formal PLANT and COMPANY BARGAINING, increased payments for shiftworking or increased bonus or productivity payments may account for the
difference. 'True' drift arises from informal arrangements between employers and workers to allow pay to rise or the required labour input to fall and most frequently occurs under piecework systems. (See earnings drift.)

wage fund. According to classical economic doctrine, a fund available for the payment of wages. At any given time the fund, along with the given supply of labour, determined the average wage. In the long run both the fund and supply of labour were variable, since the fund could be augmented by savings while the supply of labour was thought to be determined by some 'minimum of existence'. While classical doctrine was clear that wages were advanced out of capital, it failed to explain satisfactorily the division of capital between the wage fund and physical capital. (See iron law of wages.)

wage inflation. A rise in money wages over time. This may be due, but need not be, to wage-push inflation.

wage leadership. A situation where a single settlement or the general level of settlements within a specific sector serves as a point of reference for all subsequent wage claims. (See leading sector and comparability.)

wage-price spiral. The notion that wage increases lead to price increases, via the increase in production costs, which in turn feed through into wages, as workers seek to preserve the purchasing power of their wages, and so on. The interpretation of the wage-price spiral as a mechanical sequence is intimately linked to the cost-push view of inflation.

wage-push inflation. A variant of cost-push which attributes the origins of the inflationary process to trade union pressure in the labour market. There are a number of versions of the argument ranging from the exertion of trade union monopoly power, through models of union bargaining power based on objective economic variables (e.g. the costs imposed on employers by strike activity) to non-economic models of trade union militancy.

wage rates. The rate of payment an individual receives for the supply of each of the minimum number of hours specified in the wage contract. Often referred to as basic hourly wage rates, they specify some minimum level of remuneration the individual can expect for each hour of the standard working week. The total minimum remuneration for the standard working week is frequently referred to as basic pay or the weekly wage rate. The wage rate should be distinguished from earnings which vary with the length and intensity of the input of labour.

wage restraint. See incomes policy.

wage round. The hypothesis that substantial linkages exist between the settlements of all negotiating groups in the economy and that in consequence wage settlements conform to certain patterns each year. These patterns have variously been suggested to take the form of a bunching of settlements in certain months, an orderly and repetitive sequence of settlements and a marked similarity in the size of all settlements. In practice, these patterns had seldom been observed in the UK prior to the incomes policies of the 1970s. These policies, however, appeared to concede the right to an annual pay review for all employees with the result that a fairly orderly sequence of settlements throughout the year was established. Some economists have advocated compressing the wage round into a few weeks in an attempt to produce a coordinated wage policy. (See comparability.)

wages boards. Statutory bodies similar to wages councils but controlling the pay and conditions of work in the agricultural industry.

Wages Councils. Statutory bodies empowered by the government to make proposals about the pay and hours of work in certain industries in the UK. Established in 1909 and modified in 1945 these bodies were introduced into industries which were thought too weak to support voluntary collective bargaining in an attempt to eliminate low pay. In the mid-1970s approximately one-fifth of all manual workers in the UK
were covered by Wages Councils and WAGES BOARDS. In the main, these were concentrated in the retailing and distribution industries. Changes introduced in 1985 removed workers under 21 from the protection of Wages Councils, while further changes in coverage have substantially reduced the importance of these bodies.

The Councils consist of an equal number of representatives of employers’ associations and trade unions together with a number of independent members appointed by the government. The recommendations on pay and hours made by the Councils have the force of law and are policed by a Wages Council Inspectorate which visits workplaces to ensure that they comply with the orders.

While the WAGE RATES established by the Councils can differ from industry to industry, in practice they reveal a remarkable degree of similarity. They constitute an effective minimum rate in the industries covered and, therefore, constitute the MINIMUM WAGE LEGISLATION in the UK. (See FAIR WAGES.)

wages freeze.
See INCOMES POLICY.

wages fund doctrine.
See IRON LAW OF WAGES.

wage structure. The ranking of pay levels of different groups of workers classified according to the industry or location in which they work or according to the occupational or racial group to which they belong. While the concept of WAGE DIFFERENTIALS is concerned to measure the differences in pay between groups on some common scale the notion of a wage structure is concerned only with the relative ranking of groups of workers. Since groups of workers who differ on one of the above dimensions are unlikely to be the same in all others, it is in practice extremely difficult to describe a ranking along any single dimension. Nonetheless the notion of a REGIONAL WAGE STRUCTURE and of an INDUSTRIAL WAGE STRUCTURE still attract attention. (See OCCUPATIONAL WAGE STRUCTURE.

wage theory. NEO-CLASSICAL theory is today the dominant scientific paradigm in the analysis of wage determination. However, the predominance of neo-classical labour theory has by no means been continuous and was itself preceded by the CLASSICAL treatment. The cornerstone of the latter was the MALTHUSIAN principle of the population and the concept of the WAGES FUND. The classical economists firmly believed that wages tended to oscillate around their natural or subsistence level. This pessimistic view of the long-term prospects for the working class led to the designation of economics as the 'dismal science'. The classical economists were aware that wages varied between occupations and although their main concern was to explain the general level of labourers' wages and the movement of labour's share in the national product with population growth they did give attention to these variations and much of their analysis of differentials remains valid today.

Gradually the approach to the theory of wages changed. Among later classical economists, especially J.S. MILL, the wages fund doctrine fell into disrepute, although the classical school continued to cling to the Malthusian principle of population. The latter half of the nineteenth century was characterized by dissatisfaction with classical analysis on two principal fronts. First, the development of Marxist theory provided a radical departure from the classical analysis, particularly in respect of value theory. From the manpower perspective of wage theory, however, the Marxist LABOUR THEORY OF VALUE and the prediction that the wage rate under capitalism tends toward the subsistence level were in fairly close conformity with early classical analysis. Second, and more substantively, came the marginalist revolution. Whereas the classical economists viewed cost of production as the determinant of product price, the early marginalists viewed MARGINAL UTILITY, or demand, as the determinant of price. The wage of labour was thought to be determined by the DERIVED DEMAND for labour, represented by the value MARGINAL PRODUCT of labour. The worker was paid out of a flow of revenue from the sale of goods he helped (in association with capital - a distinct source of value) to produce and not out of a fund. Subsequent analysis, and in particular that of A. MARSHALL and his successors, showed that wage determination was a product of
the interaction of demand and supply, although the role of non-competitive influences such as monopsony were discussed. This neo-classical theory of wages and employment, albeit with significant modification, continues to be the mainstream approach to the analysis of wage determination.

The classical school had focused attention on the general level of wages while neo-classicists were more concerned with micro-economic considerations. The acceptance of the macro-implications of the neo-classical analysis was severely challenged by the Great Depression and the Keynesian revolution. Neo-classical economists viewed unemployment as a DISEQUILIBRIUM phenomenon such that deviations from full employment were but transitory, whereas the analysis of J.M. Keynes pointed to the possibility of an EQUILIBRIUM at under full employment (we note the objection of those latter-day Keynesians who would argue that the Keynesian system is a disequilibrium model). Keynes stressed the rigidity or inflexibility of wages in a downward direction. Wages do not on this view respond to excess supply. Yet the sources of this inflexibility were insufficiently explained so that there cannot be said to be a Keynesian theory of wage determination: the existing wage rate is treated as EXOGENOUS. This treatment of the wage rate as determined outwith the economic system opened the way for the development of institutional theories of wage determination that emphasized the importance of sociological, political and institutional factors almost to the exclusion of economic and market forces. INSTITUTIONAL ECONOMICS was prominent in economics generally from around 1890 to 1930 and in wage determination analysis in the 1940s and 1950s. Institutionalist labour economics was sceptical of neo-classical models of perfect competition, the concept of rational evaluating maximizing man, and profit/utility maximizing firms/households. While often providing a worthwhile description of wage determination, no unified theory was presented but rather a number of ad hoc hypotheses of varying methodological orientations. Yet the challenge of institutional economics in labour theory was such that LABOUR ECONOMICS became divorced from mainstream economics during this period.

Despite the dominance of institutionalist analysis and the more extreme forms of BARGAINING THEORY (OF WAGES) over this interval, a neo-classical revival characterized the 1960s and 1970s. Gradually the neo-classical model, enriched by HUMAN CAPITAL theory, the economics of information and the NEW MICROECONOMICS, succeeded in outflanking the institutionalist position by providing neo-classical explanations for many of the empirical phenomena upon which the institutionalists' criticism of the explanatory power of orthodox economics had rested. Neo-classical economists extended their method into the analysis of COLLECTIVE BARGAINING, DISCRIMINATION and a number of other important areas ignored by pre-Keynesian neo-classical economists. Meanwhile, the institutionalist approach became transformed into DUAL LABOUR MARKET theory while the Marxist tradition continued in the form of RADICAL ECONOMICS. Both schools focus on the phenomena of poverty and unemployment. They emphasize that the cumulative effect of a wide variety of institutional inequalities and discriminatory practices produces an effective stratification of the labour market thoroughly resistant to the impact of competitive forces and individual decisions. The radical theories, unlike dual labour market theory, employ the concept of class and link labour market stratification with educational stratification. See Elliott, R.F., Labour Economics: A Comparative Text, McGraw-Hill, 1991.

wage-wage spiral.

See LEAP-FROGGING.

Wagner's law. A hypothesis, advanced in the late nineteenth century by a German economist Adolph Wagner (see passages in R. Musgrave and A. Peacock (eds), Classics in the Theory of Public Finance, London, Macmillan, 1958), which stated that the development of an industrialized economy would be accompanied by a rising share of PUBLIC EXPENDITURE in GROSS NATIONAL PRODUCT. Wagner identified three main causes of this expenditure growth:

1. A relative increase in the costs of public administration, law and order and the regulation of economic activity as a society developed.
2. 'Cultural' and 'welfare' activities provided by the state were said to have an income elasticity of demand greater than one—that is as incomes rose the demand for these services would increase more than in proportion.

3. Economic development would be accompanied by a rise of industrial monopolies which would require state control. Although Wagner's predictions have, to a considerable extent, been borne out by subsequent events his 'law' has been subject to criticism. In particular it can be argued that Wagner's 'law' is not a law at all but merely a set of assertions some of which have, in the past, been correct. Further, since the argument is not based on any rigorous theory of human behaviour or of government, it cannot be regarded as a source of predictions concerning the future. (See displacement effect, threshold effect.)

wait unemployment.
See precautionary unemployment.

Wall Street. The street in lower Manhattan, New York, which runs through the heart of the city's financial quarter. The New York Stock Exchange is on Wall Street and the street is sometimes used as a synonym for that market.

Walras, Léon (1834–1910). Born in France, Walras was the first holder in 1870 of the Chair of Political Economy in the University of Lausanne in Switzerland. Walras is remembered for two major contributions to economics.

The first was his independent development of the marginal utility approach to the theory of value in 1873, an achievement which had already been anticipated by Jevons.

His second and greater claim to fame lies in his development of the theory of general equilibrium, in which all the markets in an economy are examined, and in which all prices of goods and factors and all goods' outputs and factor supplies are simultaneously determined. He set out this approach in the first edition of his Éléments d'économie politique pure (1874-77), by laying the groundwork for a unified model, comprising theories of exchange, production, capital formation and money. In subsequent revisions he strengthened the logic of the model by applying the principle of the maximization of utility in all sectors. He called the process of automatic adjustments towards equilibrium in the network of markets, tatonnement, i.e. groping without conscious direction, though he did introduce the Walrasian auctioneer as the agent, who quoted prices to which the buyers and sellers responded. He thought on the basis of intuition that on the assumptions made the process would culminate in a stable equilibrium but was unable to show this rigorously.

In short, he developed a pioneer model with primitive mathematical tools. Cournot, a better mathematician and one of the influences on Walras, had shied away from the problem because of its difficulty. Though the model and its properties have been and still are being refined and polished, its general conception still remains untouched. Of Walras, Schumpeter has written in his History of Economic Analysis (1954): 'Walras is in my opinion the greatest of all economists'.

Walras' law. The general form of Walras' law is that given \( n \) markets, if \( n-1 \) markets are in equilibrium then the last one must also be in equilibrium because there cannot be a net excess of demand or supply for goods (including money). (See general equilibrium.)

want creation. The identification by firms of latent consumer needs and their conversion into conscious wants, by the active marketing of products so designed to meet the identified latent needs.

warrant. The buying of an agreement which gives the owner the opportunity to purchase equity capital. It is similar to buying a long-term option, but is issued by a company on a new share issue, whereas options per se relate to shares already in existence. For example, W Ltd issues 100,000 warrants; each warrant will entitle the owner to purchase 5 ordinary £1 shares for a total cost of £20, at any time, or on specific dates, until the warrant lapses, if not exercised. The exercise price of £20 can vary throughout the life of the warrant. This type of option is often issued by companies whose business is of a speculative nature, e.g. gold-
mining. The purchasers of the warrants can buy the shares if the company proves profitable and let the warrant lapse if it does not.

**warranted rate of growth.** The rate of growth of NATIONAL INCOME which maintains equality of planned saving with planned investment through time, thereby extending the Keynesian idea of EQUILIBRIUM income to the dynamic context. The warranted rate of growth is given by the ratio of the MARGINAL PROPENSITY TO SAVE to the CAPITAL-OUTPUT RATIO, and forms a central element of the HARROD-DOMAR GROWTH MODEL.

**warranted unemployment rate.** See the NATURAL RATE OF UNEMPLOYMENT.

**waste.** An inevitable by-product of economic activity. As materials and energy are used up in the manufacture of GOODS and the provision of SERVICES, SO the activities of resource extraction, manufacturing and consumption generate waste. In turn the waste is disposed of to the environment unless recycled for further use. The rate of resource extraction, the level of economic activity and the composition of that activity therefore determine the amount of waste and its nature. In turn the relationship between waste and the capacity of the environment to assimilate it may be such as to generate EXTERNALITIES. (See MATERIALS BALANCE PRINCIPLE.)

**ways and means advances.** Advances of money by the BANK OF ENGLAND to the government to meet the expenditure needs of departments in the short term. The amount outstanding at any time is kept small since advances are rapidly funded by issues of TREASURY BILLS or other government SECURITIES.

**weakly stationary.** See STATIONARITY.

**wealth.** Anything which has a market VALUE and can be exchanged for MONEY or goods can be regarded as wealth. It can include physical goods and ASSETS, financial assets and personal skills which can generate an income. These are considered to be wealth when they can be traded in a MARKET for goods or money. Wealth can be subdivided into two main types; tangible, which is referred to as CAPITAL or non-human wealth; and intangible which is HUMAN CAPITAL. All wealth has the basic property of being able to generate INCOME which is the return on wealth. Thus, whereas wealth is a stock, income is a flow concept. The PRESENT VALUE of this income flow constitutes the VALUE of the stock of wealth.

**wealth effect.** An increase in AGGREGATE EXPENDITURE due to a fall in the price level and interest rates. Any fall in aggregate demand will, it is argued, be reversed by the induced effects of falls in the price level and interest rates.

The notion of the wealth effect was introduced by G. HABERLER (Prosperity and Depression, Geneva, 1941) as a possible way out of the less than full employment equilibrium situation indicated by KEYNES in his General Theory (1936). Concentrating on monetary wealth it was pointed out that the real value of this wealth would increase as prices fell; thus wealth holders would seek to reduce their increasing real money balances, by spending excess money thus raising aggregate demand towards the full employment level. This effect has also been described under the REAL BALANCE EFFECT. The theoretical validity of this price-induced wealth effect is acknowledged at least for monetary wealth of the OUTSIDE MONEY variety, but it is disputed that the effect would be sufficiently strong to cancel out fully any fall in aggregate demand which caused the price fall in the first place. Also if EXPECTATIONS are incorporated into the model any fall in prices may give rise to expectations of further falls and thus further reduce aggregate demand. It is currently enjoying a revival in much of the neo-classical microfoundations approach to macroeconomics and monetarism but with a strong flavour of déjà vu.

In 1951 (L.A. Metzler, 'Wealth, Saving and the Rate of Interest' Journal of Political Economy, 1951), the interest rate induced wealth effect, operating mainly through the equity market, was added to the debate. Thus the argument was, that in a recessionary fall in demand not only would prices fall but also interest rates, raising the wealth of equity holders. The wealth notion employed is that of the capitalized value of
an income stream \( (Y) \) using the interest rate \( (r) \).

\[
\omega = \frac{Y}{r}.
\]

This however raised the problem of INSIDE MONEY, as those who had initially borrowed money by selling bonds would now feel correspondingly worse off unless MONEY ILLUSION is significant.

Many economists consider the wealth effect to be theoretically valid but empirically weak. (See INSIDE MONEY.)

**wealth tax.** A tax levied on net WEALTH. It is normally levied at regular intervals - usually one year - on the net ASSETS of individuals though in some countries such as Norway it is payable by companies as well. The idea is that the ownership of wealth constitutes taxable capacity over and above the income which it generates. It gives security, and property may be used as COLLATERAL when a loan is required. The case for taxing wealth is thus based on EQUITY and the desirability of REDISTRIBUTION of income and wealth. It is also argued that a wealth tax at moderate rates will not have significant undesirable DISINCENTIVE effects. It could be argued that it is superior to the existing system in the UK which levies high taxation on investment income and none on the wealth kept in cash or current bank accounts. Risk-taking is heavily penalized and the liquidity and convenience gains of cash go untaxed. A wealth tax would not discriminate against the holding of any particular type of asset and this neutrality is arguably an advantage. Opponents of this form of taxation say that it would discourage INVESTMENT and lead to increased CONSUMPTION. Like other taxes there will be a SUBSTITUTION and INCOME EFFECT on work and the outcome will depend on the rate structure employed. There are problems regarding the appropriate definition of wealth for tax purposes, e.g. whether it should include pension rights. A wealth tax could cause particular problems in agriculture, forestry and small businesses. In these sectors the annual income could be small in relation to the value of the assets. At worst the effect of the tax could be to cause all or part of the assets to be sold to pay the tax.

**wear and tear.**
See DEPRECIATION.

**Weberian location theory.**
See LOCATION THEORY.

**weighted average.** An average in which each of the observations is multiplied (or 'weighted') by a factor before calculation, and in which these factors sum to unity. It can thus be defined by

\[
\text{where } X_i \text{ is the } i\text{th observation on the variable } X, \\
W_i \text{ is the weighting factor associated with the } i\text{th observation, and} \\
N \text{ is the number of observations.}
\]

Weighted averages are often used to take care of the problem of OUTLIERS, in that a small weight can be attached to extreme observations. (See LINEAR COMBINATION)

**weighted least squares.** A version of ORDINARY LEAST SQUARES in which all of the variables are multiplied by some factor, possibly a function of one of the variables in the equation. The effect is to give some observations more weight in the determination of the parameter estimates than others, and is often used to take care of the problem of OUTLIERS. It is also a special case of the GENERALIZED LEAST SQUARES procedure, and can be used to correct for the problem of HETEROSEDASTICITY.

**weighted mean.**
See WEIGHTED AVERAGE.

**welfare economics.** The generic term for the normative aspect of economics. The basic assumptions underlying welfare economics are VALUE JUDGEMENTS that any economist is free to accept or reject. There is no scope for testing the truth of such assumptions, as compared with POSITIVE ECONOMICS where in principle they can be subjected to empirical testing. Welfare economics is concerned with policy recommendations. It explores the ways of arriving at conditions such as social state A is to be preferred to social state B. The dominant school is the Paretian one, sometimes described as the...
New Welfare Economics. The most important departure of Paretian welfare economics from the Pigovian tradition was the rejection of the idea that UTILITY was cardinally and interpersonally measurable. As a result of denying that it is possible to compare the utility or welfare of one individual with that of another many pairs of social states cannot be ranked. In order to extend the applicability of the PARETO RULE, hypothetical COMPENSATION TESTS have been introduced. In order to locate the optimum optimorum some economists have proposed the use of a Bergsonian SOCIAL WELFARE FUNCTION. However, this requires that utility be cardinally and interpersonally measurable. For further reading see Johansson, Per-Olov, An Introduction to Modern Welfare Economics, Cambridge University Press, (1991).

welfare function. For an individual, the relationship between his level of wellbeing, welfare or UTILITY and the things that contribute to it. Synonymous with UTILITY FUNCTION. For society, the SOCIAL WELFARE FUNCTION is a relationship between the welfare of society as a whole and all the variables affecting the state of the economy and the 'quality of life'. A social welfare function can also be defined as a relationship between SOCIAL WELFARE and the welfare (or utility) of the individuals comprising that society. This meaning effectively requires some rule for saying how individuals' utilities are to be combined - e.g. whether each individual's utility is to be counted for what it is, or whether some should be 'weighted' to reflect some concept of fairness or distributive justice.

welfare state. The most general interpretation is a state in which the government plays a positive role in the promotion of SOCIAL WELFARE. All activities of government can thus be counted as part of the welfare state in that it is likely to be claimed that they promote social welfare. The term is more specifically used to refer to the provision of education, health-care and housing at zero or subsidized prices; the personal social services provided for the old, the handicapped and children in care; and the cash transfers to particular groups, such as, the sick and the unemployed. Many of the post-war developments in the welfare state in the UK have been influenced by the BEVERIDGE REPORT.

well-behaved. A property of PRODUCTION (and UTILITY) FUNCTIONS. It requires that production (utility) is zero if one of the inputs (commodities) is zero, that the MARGINAL PRODUCT (utility) is always positive, but diminishes smoothly with increasing amounts of a given factor (commodity). This notion plays a crucial role in the NEO-CLASSICAL theories of growth and distribution (See CAPITAL-LABOUR SUBSTITUTION).

Wharton model. A seventy-six equation econometric model of the US economy developed from the KLEIN-GOLDBERGER MODEL (K-G) but different from it in four main ways.

(1) It is estimated using quarterly data where the K-G model uses annual data.
(2) It is primarily designed to be used to forecast economic activity in particular NATIONAL INCOME and the level of EMPLOYMENT.
(3) It is disaggregated to a much greater degree and has a much better developed monetary sector.
(4) Production is modelled using functions of the COBB-DOUGLAS type.

The Wharton model also includes a PHILLIPS CURVE relationship. It was estimated using TWO STAGE LEAST SQUARES. The Wharton model has a reasonably good record for the accuracy of its forecasts outperforming both larger and smaller models.

whipsawing. A technique employed by some unions to extract a concession from an employer by threatening to strike while his competitors continue to operate, and, after he has conceded, to attempt to force a second employer to grant the same or even enhanced terms and conditions of employment or face a strike. Employers may meet this tactic by co-ordinating their COLLECTIVE BARGAINING activities and perhaps by negotiating as a single group. STRIKE INSURANCE may form a plank in this response.

white-collar worker. Employees and employers who are not engaged in physical
work and who perform duties which appear to be functionally related to authority. The notion is vague and for practical purposes is usually interpreted to mean non-manual workers plus shop sales persons and shop assistants.

**white noise.** A description of variation which is purely random and contains no systematic elements. The ideal property of the stochastic disturbance term in a regression equation is that it should be white noise. (See stationarity.)

**White Plan.** The US plan for an International Stabilization Fund, proposed at the United Nations Monetary and Financial Conference held at Bretton Woods, New Hampshire in 1944. The plan, commonly called the White Plan after its chief author, Harry D. White of the US Treasury, recommended that member countries contribute currencies and gold to a central reserve fund which would in turn be used to help finance short-term balance of payments deficits experienced by members. The main objective of the fund was to provide a means of establishing stability and order in foreign exchange transactions so as to encourage the re-establishment and maintenance of multilateral trade. Unlike the rival UK or Keynes plan, the White Plan did not provide for the establishment of a new international means of payment or the extension of credit facilities, especially automatic and unlimited American credits to members experiencing persistent balance of payments difficulties. Although the Conference eventually established the International Monetary Fund along the lines suggested by the White Plan, the Fund has since evolved into an institution which resembles a compromise between the original UK and US proposals considered at Bretton Woods.

**wholesale.** The intermediate stage in the chain of distribution. Wholesalers specialize in the process of distribution, purchasing the output of firms for resale and distribution to retailers.

**wholesale banking.** The large-scale dealing in money deposits centred in the closely interrelated group of money markets which have developed strongly since the mid-1960s - the interbank, local authority, certificate of deposit and eurocurrency markets. The sums lent and borrowed in these markets are large, not less than £1/4 million; they are placed at various terms from 'overnight' up to several months; and specialist money brokers play an important part in them. Before 1971 the main institutions involved were the merchant banks and the London offices of foreign and British overseas banks. The British domestic banks, inhibited by credit policies, participated through subsidiaries set up for the purpose. However, with the freedom introduced by the 1971 credit control regime, the clearing banks now participate directly in the wholesale money markets. (See competition and credit control, money market, retail banking.)

**Wicksell, Knut** (1851-1926). A Swedish economist, Wicksell studied mathematics and philosophy. He was appointed to the Chair of Economics at the University of Lund in 1904. His work provides a masterly exposition, synthesis and extension of the neoclassical theory of production and distribution. This is contained largely in volume I of Lectures on Political Economy (1901). Wicksell bridged the gap between the Austrian school and the lausanne school. He formulated in a multi-sector model a version of the marginal productivity theory of capital similar to that of Bohm-bawerk and a theory of wages and rent contingent on the marginal products of labour and land. In this context he discussed the return to capital and its relationship with the rate of interest. This would be the case because the aggregate effect of individual additions to the stock of capital would be to raise the value of the whole capital stock and thus lower the value of a marginal addition. This has become known as the WICKSELL EFFECT.

In the second volume of Lectures, Wicksell made important contributions to monetary theory. This largely consists of a re-statement of the mechanism which links money to prices indirectly through the interest rate and directly through what has become known as the REAL BALANCE EFFECT.
Interest and Prices (1898, but not translated into English until 1936), he suggested a new theory of interest and prices which attempted to solve the classical QUANTITY THEORY dilemma over the relationship between interest rates and prices. Wicksell explained the existence of high rates of interest in times of inflation by means of an analysis of the determinants of the MONEY SUPPLY under various monetary institutions. He argued that the control of the money supply by the monetary authorities may prevent the swift restoration of monetary equilibrium consequent upon a fall in the rate of interest. A self-generating inflation may be occasioned in a pure credit system where banks' reserve limits do not present a check on credit creation. Wicksell in this way extended the classical QUANTITY THEORY OF MONEY from a theory of the demand for money to a fuller explanation of the relationship between the price level and the determinants of monetary equilibrium. He distinguished between the market or money rate of interest (subject to control by the banking system) and the 'natural' or real rate of interest (dependent upon the physical productivity of capital). A money rate set below the natural rate would, he said, push up prices by lowering the cost of investment. This would cause a shift upwards in the demand for capital goods in conditions of full employment pushing prices up further until the shortage of loanable funds had depleted the gap between the market rate of interest and the natural rate. Wicksell, while defending the quantity theory of money, advocated active MONETARY POLICY. The role of the monetary authorities was to check investment, if it induced inflation, by increasing the BANK RATE. The cumulative process of inflation has* much in common with the INFLATIONARY GAP of M. KEYNES. Indeed, G. MYRDAL and Lindahl, the intellectual heirs of Wicksell, developed the distinction between planned and realized investment implicit in Wicksell's distinction between time periods of investment and saving.

Wicksell effects. The Wicksell effect demonstrates that contrary to the marginal productivity theory of capital the real rate of interest in the economy may differ from the aggregate MARGINAL PRODUCT of capital. Wicksell argued that an increase in the supply of capital (INVESTMENT) affects not only the price of new capital, but also alters the units in which the existing stock of capital is valued. He argued that the net effect of a rise in wages and a fall in the RATE OF INTEREST is to raise the value of existing capital. This implies that the value of capital in two economies may differ according to the level of wages and the rate of interest although the stock of real capital is identical and the techniques in use are the same. This effect has been termed the Price Wicksell effect. The Real Wicksell effect refers to a change in techniques consequent upon a change in the rate of interest. A negative Real Wicksell Effect is in fact what the CAMBRIDGE SCHOOL has called CAPITAL-REVERSING. A less CAPITAL-INTENSIVE technique may be chosen at a lower rate of interest. This is contrary to neo-classical marginal productivity of capital theory which says that as the rate of interest (the price of capital) falls more capital intensive techniques will be chosen.

Wieser, Friedrich von (1851-1926). Austrian economist, politician and member of the AUSTRIAN SCHOOL. He further refined the doctrine of MARGINAL UTILITY, introduced by Menger, but his major contribution lay in his elaboration of the doctrine of 'imputation' or 'attribution'. In the Austrian view goods of the first order (consumer goods) obtain value directly from an estimate of their marginal use. To all goods of a higher order (production goods) value is reflected back; they have no value until a value is imputed to them. Wieser's theory is an analysis of the working of this process of imputation. Wieser was also the first to see that the general logic of economic behaviour of maximization of utility and minimization of costs and attention to marginal rates yielded a theory of the socialist economy. His major works were Natural Value (1889) and Social Economics (1913).

wildcat strike. A STRIKE that is called by local groups of union members, ostensibly without the authorization of the official union leadership and in contravention of established procedures. Such strikes may receive the de facto support of the union leadership as a method of pressurizing the
employer; most obviously when an authorized strike would not have legal sanction and might result in legal penalties. Equally, wildcat strikes might be directed against the union leadership because of, say, dissatisfaction with wage settlement provisions, remoteness, and failure to consider and adequately represent the interests of particular groups within the union.

willingness to pay. The valuation placed by an individual on a GOOD or SERVICE in terms of money. Its use as an indicator of valuation is controversial in two respects. First, it will be constrained by ABILITY TO PAY so that those with higher incomes will appear to value goods more highly than those with lower incomes. This may contradict some concept of fairness or justice. Secondly, it is open to moral objection when the good in question is the removal of a nuisance such as noise or pollution, since it might be argued that it is unjust that the sufferer should have to pay for the removal of the nuisance, when most people would expect that the sufferer should be compensated by the wrong-doer.

Wilson Committee. The 'Committee to Review the Functioning of Financial Institutions' set up in 1977 by the Labour Administration, under the chairmanship of Lord (Harold) Wilson, the former Prime Minister, with a wide remit to enquire into the role and functioning of UK financial institutions and the provision of funds for industry and trade, and to recommend any changes considered to be required in the arrangements for the supervision of these institutions. The Committee reported in June 1980 (in two volumes, Report and Appendices, Cmnd.7937) and its report presents a wide-ranging and authoritative description and analysis of the UK financial system in the late 1970s. Among the reasons for the setting up of the Committee was the view, prevalent in some political circles, that the performance of the economy, particularly the level of investment and growth, was being impaired by shortages of finance consequent on the conduct and operation of financial institutions and markets. One of the major conclusions of the Committee was that the evidence did not support this contention, though they pointed out that the price at which such finance was obtainable at any given time might not be favourably desirous levels of investment. They concluded that at the time of their report in 1980, the price of finance in relation to expected profitability which was the financial constraint on real investment, Committee emphasized that the pervasive effects of high and variable inflation on the system, but also drew attention to the way in which taxation and controls imposed for monetary or prudential reasons (e.g. on the BANKS) also affected the operation of financial institutions and competition between them. The Committee made a number of recommendations on removal or amelioration of these influences. Like the MACMILLAN and RADCLIFFE COMMITTEES before them, the Wilson Committee found continuing difficulties in the provision of finance for small firms and made recommendations on this score. Other recommendations included the dismantling of the 'recommended rate system' of the BUILDING SOCIETIES; the strengthening of the system of supervisory arrangements over the STOCK EXCHANGE and activities such as takeovers, which affect the SEC market; and the setting up of a publicly accountable body to review arrangements for the regulation of the financial system in the light of developments. Finally, and not least, the Committee recommended against nationalization of any existing financial institutions, though some members believe there was a role for publicly-owned finance companies and a greater role for publicly-owned banks.

windfall gain. An unanticipated addition to income. (See TRANSITORY INCOME.)

windfall loss. An unanticipated reduction in income. (See TRANSITORY INCOME.)

winding up. See LIQUIDATION, RECEIVERS.

window dressing. In the UK, the practice abandoned in 1946, by which the CLEARING BANKS 'called' loans from the DISCOUNT MARKET on the days when they made up their weekly (monthly after 1960) statements, in order to show a higher position than on average they maintained.
As the banks had different making-up days, the money called by one bank was simply made good by others drawing down their cash positions on that day; thus in the aggregate statistics, as well as individually, the banks' CASH RATIO was overstated. In 1946 the banks agreed to make up their monthly statements on the same day of the month, and also to maintain a daily cash ratio of eight per cent. Window dressing has by no means disappeared: at certain times some continental banks take MONEY MARKET funds for this purpose.

withdrawals (also known as leakages). Any income that is not passed on in the CIRCULAR FLOW OF INCOME, and therefore is not available for spending on currently produced goods and services. In the simple INCOME-EXPENDITURE MODEL withdrawals are magnified by the actions of the MULTIPLIER and result in a multiple CONTRACTION of NATIONAL INCOME. Withdrawals exert contradictory pressure on national income. The three broad categories that are usually considered are SAVINGS, TAXATION and IMPORTS. (See INJECTIONS.)

withholding tax. Generally a tax levied on dividends and interest paid by a company to an overseas destination. Most Western countries have such a tax. Frequently they are a subject of discussion when double tax agreements are being made. It is a special form of INCOME TAX. Its existence can mean that there is a tax incentive for a company to retain its profits in a country rather than remit dividends overseas.

workable competition. The construction and refinement of the concept of workable competition was brought about by the view that the abstract model of PERFECT COMPETITION is an unattainable ideal which could not provide an operational base for competition policy. Workable competition is a set of relevant criteria which purport to provide guidance on the competitive nature of markets, and can thereby instruct the formulation and execution of competition policy. These criteria are derived from the STRUCTURE - CONDUCT - PERFORMANCE framework of analysis in industrial economics. However, this framework is frequently criticized for lacking a rigorous theoretical base. Economists have therefore revealed a considerable disparity of views as to the appropriate criteria which should be satisfied if an industry is to be considered workably competitive. A representative set of criteria could be specified as follows: there are sufficiently low BARRIERS TO ENTRY such that potential entrant firms can readily enter the market in response to the attraction of SUPER-NORMAL PROFITS; there is a sufficiently large number of firms to ensure that each competes independently, there is therefore an absence of collusion and restrictive agreements; well-informed customers choose rationally between alternative suppliers; firms exhibit patterns of performance consistent with the preceding structure and conduct criteria; long-run profits will be reasonable in relation to the degree of risk in the industry; surviving firms will be efficient and progressive with regard to product and process innovations; situations of excess capacity and insufficient reserve capacity will be avoided.

workers' co-operative. An enterprise whose share capital is owned by those who are workers in the organization. The number of shares each cooperative member can hold is limited. These features enable workers to exert control over the enterprise's activities and policies.

workers' participation. See INDUSTRIAL DEMOCRACY.

working capital. This generally refers to the amount of current ASSETS which is financed from long-term sources of finance. Gross working capital is alternatively defined as the sum of all current assets while net working capital is the amount by which current assets exceed current liabilities. The size of working capital is an indicator of the LIQUIDITY and solvency of a company particularly when related to other financial indicators in the form of financial ratios.

working capital ratio. This is found by dividing current liabilities into current assets. It is a measure of a firm's LIQUIDITY. If the ratio exceeds unity the company can meet its current liabilities in full as they fall due. The ratio may frequently be
writing-down allowance

misleading, however, as the constituent figures are taken from the balance sheet of the company. The data on the latter are only past values and do not represent the present. Neither is information presented about the timing of receipts and payments. (See QUICK ASSETS RATIO.)

**working population.** All those willing and able to work and either in employment or registered as unemployed. In the UK this total comprises employees in employment, employers and the self-employed, the armed forces and the REGISTERED UNEMPLOYED. (See LABOUR FORCE PARTICIPATION RATE.)

**work in progress.** Production that remains uncompleted at the end of the accounting period.

**work-leisure model.** This constitutes straightforward application of the theory of consumer behaviour to the allocation of time question. The individual worker is assumed to devote time both to market work and to non-marketable activities called leisure. He maximizes his UTILITY by choosing combinations of goods (obtained by working) and leisure hours subject to time and price constraints, which can be combined into a single budget or income constraint, the slope of which measures the wage rate. Equilibrium exists where the MARGINAL RATE OF SUBSTITUTION of leisure for goods in consumption is equal to the slope of the budget line (the wage rate). The effect of a rise in the wage rate can be decomposed into INCOME SUBSTITUTION EFFECTS although the direction of the total effect cannot be determined PRIORI but depends on whether the negative income effect (assuming leisure to be a mal good) outweighs the positive substitution effect.

**work sharing.** A means of maintaining employment levels by reducing hours per employee. Although work sharing was at one stage much favoured by unions, it now appears that unions layoffs as a means of accepting real labour costs in the cyclical downturn, resisting cuts in nominal wages. This development is explained in part by the proportionate influence of senior union councils.

**work to rule.** A partial form of slowdown resulting in a slowdown of production, than complete cessation. Workers in producing only in accordance with the rules of some written job description and departmental rule and can usually not seriously to impair productive efficiency. Adherence to some written rules avoids application of sanctions by employers.

World Bank. See INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT.

**writing-down allowance.** See DEPRECIATION.
X-efficiency. A situation in which a firm's total costs are not minimized because the actual output from given inputs is less than the maximum feasible level. This outcome is also termed a situation of 'technical inefficiency'. X-efficiency is a direction function of monopoly or market power in which competitive pressures are weakened. The term was originally applied to the manager-worker relationship but can be extended to deal with the manager-owner relationship. (See SEPARATION OF OWNERSHIP AND CONTROL.)
Y-efficiency. The effectiveness with which existing profitable market opportunities are exploited. It is conceivable that the lack of competitive market pressures induces a failure by firms to supply potential customers who are willing to pay a price which yields a profit. Thus though a firm may be minimizing the cost of producing a given output, and therefore be X-EFFICIENT, it can be failing to maximize profits due to this slackness with regard to market opportunities. Though in principle this could be the case, Y-efficiency and X-efficiency are likely to occur together given their similar origins.

yield. The annual return on a SECURITY calculated as a percentage of its current market price. In the case of EQUITIES, there is a distinction between earnings yield and DIVIDEND YIELD, the former being calculated on net profits and the latter on declared dividends. The dividend yield is normally below earnings yield because of retained profits. (See FLAT YIELD, REDEMPTION YIELD, YIELD GAP, TERM STRUCTURE OF INTEREST RATES, INTEREST RATE, RATE OF RETURN.)

yield gap. The difference between an average YIELD on EQUITIES and a corresponding yield on long-dated fixed-interest SECURITIES. Traditionally equities were on the upper side of this gap, reflecting the risk element involved, but since the late 1950s a 'reverse yield gap' has existed, with the dividend yield on equities falling below that of debt securities. This was caused first by the expected growth element in equities, then increasingly by the effect of inflation in raising the nominal yields on debt. If one takes the earnings yield on equities, the reverse yield gap is a more intermittent phenomenon. (See TERM STRUCTURE OF INTEREST RATES.)
Z

Zellner-Giesel. The name of a procedure specifically designed for the CONSISTENT ESTIMATION of the parameters of a DISTRIBUTED LAG equation after a KOYCK TRANSFORMATION, which takes into account the fact that the transformation may introduce SERIAL CORRELATION of the DISTURBANCE term.

Zero-rated goods.
See VALUE-ADDED TAX.

Z variable.
See NORMAL DISTRIBUTION.
List of Acronyms

ACT: Advance Corporation Tax
ADR: American Depository Receipt
AFL-CIO: American Federation of Labour/Congress of Industrial Unions
ARIMA: Autoregressive Integrated Moving Average
ASE: American Stock Exchange
ASEAN: Association of South East Asian Nations
BIS: Bank for International Settlements
BLUE: Best Linear Unbiased Estimators
CAP: Common Agricultural Policy
CBA: Cost Benefit Analysis
CBI: Confederation of British Industry
CIF: Cost, Insurance, Freight
COLA: Cost of Living Adjustment
COMECON: Council for Mutual Economic Assistance
CSO: Central Statistical Office
DCE: Domestic Credit Expansion
DCF: Discounted Cash Flow
DIDMCA: Depository Institutions Deregulation and Monetary Control Act
D-W: Durbin-Watson
EC: European Community
ECGD: Export Credits Guarantee Department
ECSC: European Coal and Steel Community
ECU: European Currency Unit
ECC: European Economic Community
EFTA: European Free Trade Association
EMS: European Monetary System
EPU: European Payments Union
ERM: Exchange Rate Mechanism (of the EMS)
FAO: Food and Agricultural Organisation
FASB: Financial Accounting Standards Board
FED: Federal Reserve System
FIML: Full Information Maximum Likelihood
FNMA: Federal National Mortgage Association
FOB: Free on Board
FT-SE 100: Financial Times-Stock Exchange 100 Shares
GAB: General Arrangements to Borrow
GATT: General Agreement on Tariffs and Trade
GDP: Gross Domestic Product
GNMA: Government National Mortgage Association
GNP: Gross National Product
GSP: Generalized System of Preferences
G7: Group of Seven
G10: Group of Ten
IBRD: International Bank for Reconstruction and Development
IDA: International Development Association
IDC: Industrial Development Certificate
ILO: International Labour Office
ILS: Indirect Least Squares
IMF: International Monetary Fund
ISIC: International Standard Industrial Classification
IS-LM: Investment/Saving-Liquidity/Money Minimum Lending Rate
MLR: Marginal Propensity to Consume
MPC: Marginal Physical Product
MPS: Marginal Propensity to Save
MRP: Marginal Revenue Product
MRS: Marginal Rate of Substitution
MTFS: Medium Term Financial Strategy
NAIRU: Non-Accelerating Inflation Rate of Unemployment
NEDC: National Economic Development Council
NEDO: National Economic Development Office
OAPEC: Organisation of Arab Petroleum Exporting Countries
OECD: Organisation for Economic Co-operation and Development
OFT: Office of Fair Trading
OLS: Ordinary Least Squares
OPEC: Organisation of Petroleum Exporting Countries
PESC: Public Expenditure Survey Committee
PRT: Petroleum Revenue Tax
PSBR: Public Sector Borrowing Requirement
PSDR: Public Sector Debt Repayment
R&D: Research and Development
RPI: Retail Price Index
SDR: Special Drawing Right
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### Tables

#### Table 1 Growth of Real National Income (%)

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#### Table 2 Rate of Inflation (%)

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Table 4 Balance of Payments Current Account as Percentage of National Income

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