Glossary

Accrual recording

The recording of the value of a purchase or other transaction at the time the obligation to pay is incurred, as distinct from the time payment is made.

Additivity

At current prices, the value of an aggregate is equal to the sum of its components. At constant prices, additivity requires this identity to be preserved for the extrapolated values of the aggregate and its components, when their values in some reference period are extrapolated to some other period using a set of interdependent volume index numbers, or, alternatively, when the values of an aggregate and its components in some period are deflated using a set of interdependent price index numbers based on some other period.

Aggregate

A set of transactions relating to a defined flow of goods and services, such as the total output produced by resident establishments in a given period, or the total purchases of intermediate inputs made by resident establishments in a given period. The term "aggregate" also is used to mean the value of the specified set of transactions.

Aggregation

The process of combining, or adding, different sets of transactions to obtain larger sets of transactions. The larger set is described as having a higher *level* of aggregation than the sets from which it is composed. The term "aggregation" also is used to mean the process of adding the values of lower-level aggregates to obtain higher-level aggregates. It also is used to mean the process by which price indices for lower-level aggregates are averaged, or otherwise combined, to obtain price indices for higher-level aggregates.

Axiomatic approach

The approach to index number theory that determines the choice of index number formula on the basis of its mathematical properties. A list of "tests" is drawn up that require an index to possess certain properties, and the choice of index is made on the basis of the number of tests satisfied. Not all tests may be considered equally important, and the failure to satisfy certain key tests may be considered sufficient grounds for rejecting an index. An important feature of the axiomatic approach is that prices and quantities are considered as separate variables, and no account is taken of possible links between them. Also known as the "test approach."

Base period

The base period generally is understood to be the period with which other periods are compared and whose values provide the weights for a price index. However, the concept of the "base period" is not a precise one and may be used to mean rather different things. Three types of base periods may be distinguished:

(i) the *price reference period*, that is, the period whose prices appear in the denominators of the price relatives used to calculate the index, *or*
(ii) the *weight reference period*, that is, the period, usually a year, whose values serve as weights for the index. However, when hybrid expenditure weights are used in which the quantities of one period are valued at the prices of some other period, there is no unique weight reference period, *or*
(iii) the *index reference period*, that is, the period for which the index is set equal to 100.

The three reference periods may coincide but frequently do not.

Base-weighted index

See "Laspeyres price index."

Basic price

The amount received by the producer from the purchaser for a unit of good or service produced as output. It *includes* subsidies on products and other taxes on production. It *excludes* taxes on products, other subsidies on production, suppliers' retail and wholesale margins, and separately invoiced transport and insurance charges. Basic prices are the prices most relevant for decision making by suppliers.

Basket

The term commonly used for the list of goods and services, together with their relative values of output or input, for which a sample of prices is collected for the purpose of compiling the PPI.

Bias

A systematic error in an index. Bias can arise for a number of reasons, including the design of the sample selected, the price measurement procedures followed, or the index number formula employed.

Book price

See "list price."

Bouncing

The fluctuation or oscillation of prices up and down in a persistent pattern.

Carli price index

An elementary price index defined as the simple, or unweighted, arithmetic average of the current- to base-period price relatives. The Carli index for current period t and price reference period 0 is defined as $P_C \equiv \frac{1}{n}\sum\left(\frac{p^t}{p^0}\right)$.

Carryforward

The situation in which a missing price for a product in the current period is imputed as being equal to the last price observed for that product.

Chain index

An index number series for a given aggregate spanning a long sequence of periods obtained by linking index numbers spanning shorter sequences of periods, each with their own weights. The linking may be made as frequently as the weights change and the data permit, or at specified intervals, such as every 5 or 10 periods. In the limit, the weights may be changed each period, each link in the chain consisting of an index comparing each period with the previous period. See also equation (G.6) of the appendix.

Chain linking

Joining two indices that overlap in one period by rescaling one of them to make its value equal to that of the other in the same period, thus combining them into single time series. More complex methods may be used to link indices that overlap by more than one period. Also known as "chaining."

Chain-linking bias

See "drift."

Characteristics

The physical and economic attributes of a product that identify it and enable it to be classified.

Cif price

Cost, insurance, and freight price. The price of a good delivered at the customs frontier of the importing country, or the price of a service delivered to a resident. It *includes* any insurance and freight charges incurred to that point. It *excludes* any import duties or other taxes on imports and trade and transport margins within the importing country.

Circularity

An index number property such that the algebraic product of the price index comparing period i with period j and the price index comparing period k with period j is equal to the price index that compares period k directly with period i. The property is also known as "transitivity." When the axiomatic approach is used, a price index number may be required to satisfy the "circularity test."

COLI

Cost-of-living index. An index that measures the change between two periods in the minimum expenditures that *would* be incurred by a utility-maximizing consumer, whose preferences or tastes remain unchanged, to maintain a given level of utility (or standard of living or welfare). The COLI is not a fixed-basket index, because consumers may be expected to change the quantities they consume in response to changes in relative prices (see "substitution bias"). The expenditures in one or the other period cannot usually be observed. COLIs cannot be directly calculated but may be approximated by superlative indices. A *conditional cost-of-living index* is one that assumes that all of the factors that may influence the consumer's utility or welfare *other than prices* (such as the physical environment) do not change.

Commensurability test

See "invariance to changes in the units of measurement test."

Commodities

See "products."

Commodity reversal test

A test that may be used under the axiomatic approach, which requires that, for a given set of products, the price index should remain unchanged when the ordering of the products is changed.

Compensation of employees

The total remuneration, in cash or kind, payable by enterprises to employees in return for work done by the latter during the accounting period.

Component

A subset of the goods and services that make up some defined aggregate.

Consistency in aggregation

An index is said to be consistent in aggregation when the index for some aggregate has the same value whether it is calculated directly in a single operation, without distinguishing its components, or it is calculated in two or more steps by first calculating separate indices, or subindices, for its components, or subcomponents, and then aggregating them, the same formula being used at each step.

Constant prices test

See "identity test."

Constant quantities test

See "fixed-basket test."

Consumption of fixed capital

The reduction in the value of the fixed assets used in production during the accounting period resulting from physical deterioration, normal obsolescence, or normal accidental damage.

Continuity

The property whereby the price index is a continuous function of its price and quantity vectors.

Constant elasticity of substitution index

A family of price indices that allows for substitution between products. Within an elementary aggregate, the Jevons index is a particular case of a constant elasticity of substitution index. Another case is the Lloyd-Moulton index.

Contract escalation

See "indexation of contracts."

Contract price

A general term referring to a written sales instrument that specifies both the price and shipment terms. A contract may include arrangements for a single shipment or multiple shipments. Usually it covers a period of time in excess of one month. Contracts often are unique in that the price-determining characteristics in one contract are not repeated exactly in any other contract.

Coverage

The set of price transactions that the index actually measures. Coverage may be narrower than scope for practical reasons.

CPA

Classification of Products by Activity. The classification of products by originating activity favored by the European Union. Originating activities are those defined by NACE.

CPC

Central Product Classification. An internationally agreed classification of products based on the physical characteristics of goods or on the nature of the services rendered. Each type of good or service distinguished in the CPC is defined in such a way that it is normally produced by only one activity as defined in the International Standard Industrial Classification of All Economic Activities.

CSWD index

Carruthers, Sellwood, Ward, Dalén index. A geometric average of the Carli and the harmonic mean of price relatives index. It is defined as $P_{CSWD} \equiv \sqrt{P_C \times P_{HR}}$.

Current cost accounting

A method of accounting for the use of assets in which the cost of using the assets in production is calculated at the current price of those assets rather than using the historic cost (that is, the price at which the assets were originally purchased).

Current period

In principle, the "current" period should refer to the most recent period for which an index has been computed or is being computed. However, the term is widely used to refer to any period that is compared with the price reference or index reference period. It is also widely used simply to mean the later of the two periods being compared. The exact meaning varies according to the context.

Current weighted index

See "Paasche price index."

Cutoff sampling

A sampling procedure in which a predetermined threshold is established with all units in the universe at or above the threshold being included in the sample and all units below the threshold being excluded. The threshold is usually specified in terms of the size of some known relevant variable. In the case of establishments, size is usually defined in terms of employment or output.

Deflation

The division of the value of some aggregate by a price index—described as a "deflator"—to revalue its quantities at the prices of the price reference period or to revalue the aggregate at the general price level of the price reference period.

Discount

A deduction from the list or advertised price of a good or a service that is available to specific customers under specific conditions. Examples include cash discounts, prompt payment discounts, volume discounts, trade discounts, and advertising discounts.

Divisia approach

A price or quantity index that treats both prices and quantities as continuous functions of time. By differentiation with respect to time, the rate of change in the value of the aggregate in question is partitioned into two components, one of which is the price index and the other the quantity index. In practice, the indices cannot be calculated directly, but it may be possible to approximate them by chain indices in which the links consist of period-to-period indices linking consecutive periods.

Domain

See "scope" and "coverage."

Double deflation

A method whereby gross value added at constant prices is derived by subtracting the value of intermediate inputs at constant prices from the value of output at constant prices. The method is feasible only when the values at constant prices are additive.

Drift

An index is said to "drift" if it does not return to unity when prices in the current period return to their levels in the base period. Chain indices may drift when prices fluctuate over the periods they cover. Also known as "chain-linking bias."

Drobisch price index

A price index defined as the arithmetic average of the Laspeyres price index and the Paasche price index. It is a symmetric index and a pseudo-superlative index: $P_{DR} \equiv \frac{1}{2}\left(P_L + P_P\right)$.

Durable input

An input that can be continuously used over a period longer than the time period being used in the index, which is generally a month or a quarter. In practice, an input that can be used for several years.

Dutot index

A price index defined as the ratio of the unweighted arithmetic average of the prices in the current period to the unweighted arithmetic average of the prices in the base period. It is an elementary index, defined as

$$P_D \equiv \frac{\frac{1}{n}\sum p^t}{\frac{1}{n}\sum p^0}.$$

Economically significant prices

Prices that have a significant influence on the amounts producers are willing to supply and on the amounts purchasers wish to buy.

Economic approach

The approach to index number theory that assumes the observed price and quantity data are generated as solutions to various economic optimization problems. The quantities are assumed to be functions of the prices and not independent variables. Also known as the "microeconomic approach."

Edgeworth price index

See "Marshall-Edgeworth price index."

Editing

See "input editing" and "output editing."

Elementary aggregate

The lowest level of aggregation for which value data are available and used in the calculation of the PPI. Elementary aggregates consist of relatively homogeneous sets of goods or services. Their values are used as weights when averaging the elementary price indices associated with them to obtain indices for higher-level aggregates. They also may serve as strata from which the products selected for pricing are sampled.

Elementary price index

Specifically, an elementary price index is a price index for an elementary aggregate. As such, it is calculated from individual price observations and usually without using weights. More generally, the term is also sometimes used to describe any price index calculated without weights. Three examples of elementary index number formulas are the Carli, the Dutot, and the Jevons.

Enterprise

An institutional unit in its capacity as a producer of goods and services consisting of one or more establishments. An enterprise may be a corporation, a quasi-corporation, a nonprofit institution, or an unincorporated enterprise.

Establishment

An enterprise, or part of an enterprise, situated in a single location and in which a single, nonancillary productive activity is carried out, or in which the principal productive activity accounts for most of the value added. Also referred to as "LKAU" or "local kind of activity unit."

Error

The difference between the observed value of an index and its "true" value. Errors may be random or systematic. Random errors are generally referred to as "errors." Systematic errors are called "biases."

Evolutionary goods

Goods similar to or extensions of existing goods. They are typically produced on the same production line using production inputs and processes that are largely the same as those used to produce existing goods. It is possible, at least in theory, to adjust for any quality differences between an evolutionary good and an existing good.

Factor reversal test

Suppose the roles of the prices and quantities in a price index are reversed to yield a quantity index of exactly the same functional form as the price index. The factor reversal test used under the axiomatic approach requires that the product of this quantity index and the original price index be identical with the proportionate change in the value of the aggregate in question. Also known as the "product test."

Factory gate price

A basic price with the "factory gate" as the pricing point, that is, the price of the product available at the factory, excluding any separately billed transport or delivery charge.

Farm gate price

A basic price with the "farm gate" as the pricing point, that is, the price of the product available at the farm, excluding any separately billed transport or delivery charge.

FEPI

Final expenditure price index. A measure of the changes in prices paid by consumers, businesses, and government for final purchases of goods and services. Intermediate purchases are excluded.

FIOPI

Fixed-input output price index. The theoretical model for an output PPI based on the assumption of fixed technology and inputs. It requires the index to reflect changes in revenue resulting from the sale of the same products—although not necessarily the same mix of products—produced under the same circumstances and sold under the same terms. In other words, changes in the index arise solely from changes in output prices and are not influenced by changes in inputs. Revenue-maximizing behavior is assumed on the part of the producer.

Fisher price index

A price index defined as the geometric average of the Laspeyres price index and the Paasche price index: $P_F \equiv \sqrt{P_L \times P_P}$. It is a symmetric and superlative index.

Fixed-basket or fixed-weight price index

The traditional conceptualization of a price index. The index measures the change in value of a fixed set of quantities—commonly described as a "fixed basket of goods and services"—between two periods. Because the quantities or weights remain fixed, any change in the index is due to price changes only. In principle, there is no restriction on the quantities that make up the basket. They may be those of one of the two periods being compared, they may refer to the quantities in some third period, or they may constitute a hypothetical basket, such as an average of the quantities in the two periods. Moreover, the quantities may refer to a much longer period of time than the periods of the index: for example, quantities produced over a period of a year or more may be used for a monthly or quarterly PPI. A fixed-basket or fixed-weight index is sometimes described as a "pure price index."

Fixed-basket test

A test that may be used under the axiomatic approach whereby if all the quantities remain unchanged (that is, the sets of quantities in both periods are identical), the price index should equal the proportionate change in the value of the aggregate. Also known as the "constant quantities test."

fob price

Free on board price. The price of a good delivered at the customs frontier of the exporting country. It *includes* the freight and insurance charges incurred to that point and any export duties or other taxes on exports levied by the exporting country.

FOIPI

Fixed-output input price index. The theoretical model for an input PPI based on the assumption of fixed technology and outputs. It requires the index to reflect changes in costs resulting from the purchase of the same inputs—although not necessarily the same mix of inputs—purchased under the same terms to produce the same output with the same technology. In other words, changes in the index arise solely from changes in input prices and are not influenced by changes in outputs. Cost-minimizing behavior is assumed on the part of the producer.

Geometric Laspeyres price index

A price index defined as the weighted geometric average of the current- to base-period price relatives using the value shares of the base period as weights. Also known as the "logarithmic Laspeyres price index." It is defined as $P_{JW} \equiv \prod \left(\frac{p^t}{p^0} \right)^{s^0}$, where $s^0 \equiv \frac{p^0 q^0}{\sum p^0 q^0}$.

Geometric Paasche price index

A price index defined as the weighted geometric average of the current- to base-period price relatives using the value shares of the current period as weights. Also known as the "logarithmic Paasche price index." It is defined as $\prod \left(\frac{p^t}{p^0} \right)^{s^t}$, where $s^t \equiv \frac{p^t q^t}{\sum p^t q^t}$.

Goods

Physical objects for which a demand exists, over which ownership rights can be established, and whose ownership can be transferred from one institutional unit to another by engaging in transactions on the market. They are in demand because they may be used to satisfy the needs or wants of households or the community or used to produce other goods or services.

Gross sector output

The sum of the sales of output of the establishments in the sector, including the sales of output among themselves, to other sectors in the economy and within the sector. See "net sector output."

Gross value added

The value of output less the value of the intermediate inputs used to produce the output. It is a measure of the contribution to GDP made by an individual producer, industry, or sector.

Harmonic mean of price relatives

An elementary index that constitutes the harmonic average counterpart to the Carli index. It is defined as

$$P_{HR} \equiv \frac{1}{\frac{1}{n}\sum\left(\frac{p^0}{p^t}\right)}.$$

Harmonic means price index (also "ratio of harmonic means")

An elementary index that constitutes the harmonic average counterpart to the Dutot index. It is defined as

$$P_{RH} \equiv \frac{\sum n / p^0}{\sum n / p^t}.$$

Hedonic method

A regression technique in which observed prices of different qualities or models of the same generic good or service are expressed as a function of the characteristics of the goods or services in question. It is based on the hypothesis that products can be treated as bundles of characteristics and that prices can be attached to the characteristics. The characteristics may be non-numerical attributes represented by dummy variables. The regression coefficients are treated as estimates of the contributions of the characteristics to the overall prices. The estimates may be used to predict the price of a new quality or model whose mix of characteristics is different from that of any product already on the market. The hedonic method can therefore be used to estimate the effects of quality changes on prices.

Hidden economy

Those activities hidden or nonobserved because they are underground, illegal, informal, undertaken by households for their own use, or missed because of deficiencies in the basic statistical data collection program. Also known as the "nonobserved economy."

Higher-level index

A term sometimes used to distinguish an aggregate index from an elementary index.

Identity test

A test that may be used under the axiomatic approach and that requires if the prices remain unchanged between the two periods (that is, the sets of prices are identical), the price index should equal unity. Also known as the "constant prices test."

Imputed price

The value assigned to a missing price.

Indexation of contracts

A procedure whereby a long-term contract for the provision of goods or services includes a periodic adjustment to the prices paid for the goods or services based on the increase or decrease in the level of a nominated price index. The purpose of indexation is to take inflationary risk out of the contract. Also known as "index linking" and "contract escalation."

Index item

An elementary or lower-level index with a fixed weight within the upper-level index structure.

Index number problem

How to combine the relative changes in the prices and quantities of various products into (i) a single measure of the relative change of the overall price level and (ii) a single measure of the relative change of the overall quantity level. Or, conversely, how a value ratio pertaining to two periods of time can be decomposed in a component that measures the overall change in prices between the two periods—that is, the price index—and a component that measures the overall change in quantities between the two periods—that is, the quantity index.

Index reference period

The period for which the value of the index is set at 100. See also "base period."

Industry

A general term to describe a group of establishments engaged on the same, or similar, kinds of production activity. Also a specific term used to describe establishments engaged in mining and quarrying, manufacturing, electricity, gas and water (Sections C, D, and E of ISIC, Rev. 3).

Input editing

The process of analyzing the prices reported by an individual respondent and querying price changes that are above a specified level or are inconsistent across product lines. Important objectives of the process are to ensure that actual transaction prices are reported and to detect any changes in the specifications.

Input PPI

A measure of the change in the prices of goods and services bought as intermediate inputs by domestic producers. Covers both domestically produced intermediate inputs and imported intermediate inputs. Valuation is at purchasers' prices.

Institutional unit

A national accounts concept defined as an economic entity that is capable, in its own right, of owning assets, incurring liabilities, and engaging in economic activities and transactions with other entities. Enterprises are institutional units. Other kinds of units include households and governments.

Intermediate basket

A basket derived as the average of the baskets of two time periods, usually the base and current periods. The average can be arithmetic, as in the Marshall-Edgeworth price index, or geometric, as in the Walsh price index.

Intermediate consumption

The value of goods and services used or consumed as intermediate inputs by a process of production.

Intermediate inputs

Goods and services, other than fixed assets, used as inputs into the production process of an establishment that are produced elsewhere in the economy or are imported. They may be either transformed or used up by the production process. Land, labor, and capital are primary inputs and are not included among intermediate inputs. Also called "intermediate products."

Intra-company transfer price

The value assigned on a per unit or per shipment basis to goods transferred from one establishment of an enterprise to another. It may or may not be economically significant. However, it is not a market price since ownership of the good does not change hands. See "transfer price."

Invariance to changes in the units of measurement test

A test that may be used under the axiomatic approach and that requires the price index to not change when the physical, or quantity, units to which the prices of the goods or services refer are changed: for example, when the price of a beverage is quoted per liter rather than per pint. Also known as the "commensurability test."

Invariance to proportional change in current- or base-quantities test

A test that may be used under the axiomatic approach and that requires the price index to remain unchanged when the base-period quantities, or the current-period quantities, are multiplied by a positive scalar.

Inverse proportionality in base-year prices test

A test that may be used under the axiomatic approach and that requires if all base-period prices are multiplied by the positive scalar λ, the new price index is $1/\lambda$ times the old price index.

ISIC

International Standard Industrial Classification of All Economic Activities. An internationally agreed classification that allows enterprises and establishments to be classified according to economic activity based on the class of goods produced or services rendered.

Item

A product selected for pricing. A transaction whose price is collected.

Item or product rotation

The deliberate replacement of a sampled item, or product, for which prices are collected, by another product before the replaced product has disappeared from the market or individual establishment. It is designed to keep the sample of products up to date and reduce the need for forced replacements caused by the disappearance of products.

Item substitution

The replacement of a sampled product, or item, by a new product.

Jevons price index

A price index defined as the unweighted geometric average of the current- to base-period price relatives. It is an elementary index and defined as $P_J \equiv \prod \left(\frac{p^t}{p^0} \right)^{1/n}$.

Laspeyres price index

A price index defined as a fixed-weight, or fixed-basket, index that uses the basket of goods and services of the base period. The base period serves as both the weight reference period and the price reference period. It is identical with a weighted arithmetic average of the current- to base-period price relatives using the value shares of the base period as weights. Also called a "base-weighted index." It is defined as $P_L \equiv \frac{\sum p^t q^0}{\sum p^0 q^0} = \sum s^0 \left(\frac{p^t}{p^0} \right)$, where $s^0 \equiv \frac{p^0 q^0}{\sum p^0 q^0}$.

List price

The price of a product as quoted in the producer's price list, catalogue, Internet site, and the like. The gross price exclusive of all discounts, surcharges, rebates, and the like that apply to an actual transaction. Also known as "book price."

LKAU

Local kind of activity unit. See "establishment."

Lower-level index

See "elementary price index."

Lowe price index

A basket-type family of price indices that compares the prices of period t with those of an earlier period 0, using a certain specified quantity basket q_n. $P_{LO} = \frac{\sum p^t q_n}{\sum p^0 q_n}$. The family of Lowe indices includes, for example, the Laspeyres index ($q_n = q^0$) and the Paasche index ($q_n = q^t$). See Equation (G.1) in the appendix. In practice, statistical offices frequently use a Lowe price index with a quantity basket of period b, where b denotes some period before 0, and hybrid value shares valued at prices in period 0, the price reference period. The share-weighted Lowe index is $P_{LO} = \sum s^{b0} \left(\frac{p^t}{p^0} \right) \left(\frac{p^t}{p^0} \right)$, where $s^{b0} \equiv \frac{p^0 q^b}{\sum p^0 q^b}$.

Lloyd-Moulton price index

A particular case of a constant elasticity of substitution price index. In its weighted form, the Lloyd-Moulton formula is $P_{LM} \equiv \left[\sum s^0 \left(\frac{p^t}{p^0} \right)^{1-\sigma} \right]^{\frac{1}{1-\sigma}}$, where $s^0 \equiv \frac{p^0 q^0}{\sum p^0 q^0}$; in its unweighted form, $P_{LM} \equiv \left[\sum \frac{1}{n} \left(\frac{p^t}{p^0} \right)^{1-\sigma} \right]^{\frac{1}{1-\sigma}}$.

Market price

The amount of money a willing buyer pays to acquire a good or service from a willing seller. The actual price for a transaction agreed on by the transactors. The net price inclusive of all discounts, surcharges, and rebates applied to the transaction. From the seller's point of view the market price is the basic price; from the buyer's point of view the market price is the purchaser's price. Also referred to as "transaction price."

Marshall-Edgeworth price index

A price index defined as the weighted arithmetic average of the current- to base-period price relatives and that uses the quantities of an intermediate basket as weights. The quantities of the intermediate basket are arithmetic averages of the quantities of the base and current periods. It is a symmetric index and a pseudo-superlative index. It is defined as $P_{ME} \equiv \frac{\sum p^t \frac{1}{2}(q^t + q^0)}{\sum p^0 \frac{1}{2}(q^t + q^0)}$.

Matched-products or -models method

The pricing of identical products or models in consecutive periods to ensure that the measured price change cannot be affected by changes in quality. In other words, pricing to constant quantity. Price changes for perfectly matched products may be described as "pure" price changes. See also "specification pricing."

Mean value test for prices

A test that may be used under the axiomatic approach and that requires the price index to lie between the minimum price relative and the maximum price relative.

Mean value test for quantities

A test that may be used under the axiomatic approach and that requires the implicit quantity index to lie between the minimum and maximum rates of growth of the individual quantities.

Microeconomic approach

See "economic approach."

Midperiod price index

A price index that uses either the quantity or value weights from an intermediate period that lies between the base period and the current period when the number of periods between them is odd, or the average of the quantity or value weights for two consecutive intermediate periods that lie between the base period and the current period when the number of periods between them is even.

"Modified," "short-term change," or "two-stage" Laspeyres price index

These often-used descriptions of the Laspeyres index have at least three meanings:
As a short-run modified Laspeyres index. This is an index with weight reference period b and price changes between periods 0 and t, where the latter are decomposed into price changes between period 0 and $t-1$ and period $t-1$ and t:

$$P_{MLAS} \equiv \sum s^b \left(\frac{p^{t-1}}{p^0}\right)\left(\frac{p^t}{p^{t-1}}\right), \text{ where } s^b \equiv \frac{p^b q^b}{\sum p^b q^b}.$$

The decomposition helps in dealing with changes in the sampled products. In the absence of changes in the sample, P_{MLAS} reduces to a Young index between t and 0 with weight reference period b:

$$P_{MLAS} \equiv \sum s^b \left(\frac{p^t}{p^0}\right) = P_Y .$$

As a price-updated version of a Young index. It is a fixed-weight index in which the quantities are those of the weight reference period b, but the price reference period is a later period 0 preceding the current period t. The implicit expenditure weights are obtained by revaluing the quantities of the weight reference period b at the prices of the price reference period 0, a procedure described as "price updating." This modified Laspeyres index between periods 0 and t can be interpreted as a weighted average of the price relatives between 0 and t, using the price-updated expenditure weights. Its definition is $\sum\left(\frac{s^b(p^0/p^b)}{\sum s^b(p^0/p^b)}\right)\left(\frac{p^t}{p^0}\right)$ and corresponds to a Lowe price index between periods 0 and t with weight reference period b. See also "price updating" and "Lowe price index."
As a two-stage Laspeyres index. The two-stage procedure decomposes a Laspeyres price index between b and t into a Laspeyres price index between b and 0 and a Lowe price index between *0* and t:
$\frac{\sum p^t q^b}{\sum p^b q^b} = \frac{\sum p^0 q^b}{\sum p^b q^b}\frac{\sum p^t q^b}{\sum p^0 q^b}$. See also equation (G.3) in the appendix.

Monotonicity in prices

The property whereby if any current-period price increases or any base-period price decreases, the price index increases.

Monotonicity in quantities

The property whereby if any current-period quantity increases or any base-period quantity decreases, the implicit quantity index that corresponds to the price index increases.

Multifactor productivity

Relates a measure of output to a measure of combined primary inputs. Rates of change of multifactor productivity are typically measured residually, because that change in output cannot be accounted for by the change in combined inputs.

NACE

The acronym for the *General Industrial Classification of Economic Activities within the European Communi-*

ties. The classification is basically a more detailed version of ISIC appropriate to European circumstances.

Net sector output

The sum of the sales of output of the establishments in the sector to other sectors of the economy. Gross sector output for the sector less the sales of the sector's output within the sector.

Net value added

Gross value added less the value of consumption of fixed capital.

New-good problem

Difficulty in comparing prices between two periods when a product enters the basket only in period 2, so that a price for the product does not exist in period 1.

New goods

See "evolutionary goods" and "revolutionary goods."

Nominal prices

Prices charged by providers of general government services such as health and education, and prices that are heavily subsidized through government funding or regulated by government policy. Such prices are not economically significant and therefore do not provide signals of market-driven inflation.

Nonmarket transactions

Transactions covering goods or services that their producers supply to others free or at prices that are not economically significant. Examples of nonmarket transactions include own-account production by establishments for the enterprises of which they form a part, own-account production by unincorporated enterprises owned by households (such as the output of owner-occupiers and subsistence farmers), and services supplied to the community as a whole by establishments owned by general government (such as defense and public order and safety).

Nonprobability sampling

The nonrandom selection of a sample of producers and products based on expert knowledge or judgment. Also known as "nonrandom sampling," "purposive sampling," and "judgmental sampling."

Nonresponse bias

The bias that arises when those who do not respond have different price experiences than those who do respond.

Observation

The price collected or reported for a sampled product or item.

Observation point

Usually a product variety in an establishment. A tightly specified item in a specific establishment.

Order price

The price quoted at the time the order is placed by the purchaser.

Other subsidies on production

The subsidies that resident enterprises may receive as a consequence of engaging in production. For example, subsidies on payroll or workforce or subsidies to reduce pollution. They do not include subsidies on products.

Other taxes on production

The taxes that resident enterprises may pay as a consequence of engaging in production. They consist mainly of current taxes on the labor or capital employed in the enterprise, such as payroll taxes or current taxes on vehicles or buildings. They do not include taxes on products.

Outlier

A term generally used to describe any extreme value in a set of survey data. In a PPI context, it is used for an extreme value that requires further investigation or that has been verified as being correct.

Output

The goods or services produced within an establishment that become available for use outside that establishment, plus any goods and services produced for own final use.

Output editing

The process of comparing the price levels and price movements of similar products among different respondents and querying any outliers.

Output PPI

A measure of the change in the prices of goods and services sold as output by domestic producers. Covers both output sold on the domestic market and output sold as exports. Valuation is at basic prices.

Paasche and Laspeyres bounding test

A test that may be used under the axiomatic approach and that requires the price index to lie between the Laspeyres price index and the Paasche price index.

Paasche price index

A price index defined as a fixed-weight, or fixed-basket, index that uses the basket of goods and services of the current period. The current period serves as the weight reference period and the base period as the price reference period. It is identical with a weighted harmonic average of the current- to base-period price relatives using the value shares of the current period as weights. Also called a "current weighted index." It is defined as

$$P_P \equiv \frac{\sum p^t q^t}{\sum p^0 q^t} = \left[\sum s^t \left(\frac{p^t}{p^0}\right)^{-1}\right]^{-1}, \text{ where } s^t \equiv \frac{p^t q^t}{\sum p^t q^t}.$$

Palgrave price index

A price index defined as the weighted arithmetic average of the current- to base-period price relatives using the current-period value shares as weights.

$$P_{Pal} \equiv \sum s^t \left(\frac{p^t}{p^0}\right).$$

Point-in-time prices

Transaction prices prevailing on a particular day of the month.

Positivity

The property whereby the price index and its constituent vectors of prices and quantities are positive.

PPI

Producer price index. A measure of the change in the prices of goods and services either as they leave their place of production or as they enter the production process. A measure of the change in the prices received by domestic producers for their outputs or of the change in the prices paid by domestic producers for their intermediate inputs. See "output PPI" and "input PPI."

PPS

Probability proportional to size. A sampling procedure whereby each unit in the universe has a probability of selection proportional to the size of some known relevant variable. In the case of establishments, size is usually defined in terms of employment or output.

Price index

A measure reflecting the average of the proportionate changes in the prices of the specified set of goods and services between two periods of time. Usually a price index is assigned a value of 100 in some selected base period, and the values of the index for other periods are intended to indicate the average percentage change in prices compared with the base period.

Price reference period

The prices of a period with which prices the prices in the current-period are compared. The period whose prices appear in the denominators of the price relatives. See also "base period."

Price relative

The ratio of the price of an individual product in one period to the price of that same product in some other period.

Price reversal test

A test that may be used under the axiomatic approach and that requires the quantity index to remain unchanged after the price vectors for the two periods being compared are interchanged.

Price updating

A procedure whereby the quantities in the weight reference period are revalued at the prices of a later period that serves as the price reference period, typically the period preceding the current period. In other words, revaluing the weights to ensure that they are effectively based on the underlying quantities or volumes of the price reference period. The revaluing is achieved by multiplying the expenditure on each product in the weight reference period by the cumulative price change for that product between the weight reference period and the price reference period. Also known as "value updating."

Pricing point

The point in the production or distribution process to which the price refers. For an output PPI, the pricing point is generally where the product leaves its place of production—farm gate or factory gate price. For an input PPI, the pricing point is generally where the product enters the production process; that is, when it is delivered to the customer—purchaser's price.

Pricing to constant quality

See "specification pricing."

Probability sampling

The random selection of a sample of producers and products from a universe of industrial activity in which each producer and product has a known nonzero probability of selection. It ensures that the items to be priced are selected in an impartial and objective fashion, and permits the measurement of the quality of survey results through estimates of the variance or sampling error. Also known as "random sampling."

Producer's index

An index constructed from price data supplied by producers.

Producer's price

The amount received by the producer from the purchaser for a unit of good or service produced as output. It *excludes* any VAT (or similar deductible tax on products) invoiced to the purchaser. It also *excludes* supplier's retail and wholesale margins and separately invoiced transport and insurance charges. (A producer's price for a product is the basic price *plus* any nondeductible tax on products paid by the producer *less* any subsidies on products received by the producer.)

Production

An activity that transforms or combines material inputs into other material outputs—as in agricultural, mining, manufacturing, or construction activities—or transports materials from one location to another. Production also includes storage activities—which, in effect, transport materials in the same location from one time period to another—and the creation of services of all types.

Product line

A group or class of products relatively homogeneous in use and in price behavior.

Product line specification

A statement of the characteristics of the range of products included in a product line. Its purpose is to provide the frame within which individual products may be selected as part of the sample for pricing. It also may describe the products included in a subindex.

Products

Goods and services that are the result of production. They are exchanged and used for various purposes: as inputs in the production of other goods and services, as final consumption, or for investment. Also referred to as "commodities."

Product specification

A detailed list of the characteristics that identify an individual sampled product. Its purpose is to ensure that a consistent price is collected from period to period relating to a consistent product with the same terms of sale in each period. Hence, the characteristics listed cover both the product (name, serial number, description, etc.) and the transaction (class of customer, size of shipment, discounts, payment terms, delivery details, etc.).

Product test

See "factor reversal test."

Proportionality in current prices test

A test that may be used under the axiomatic approach and that requires that if all current-period prices are multiplied by the positive scalar λ, the new price index is λ times the old price index.

Pseudo-superlative index

An index that approximates any superlative index to the second order around an equal price and quantity point.

Purchaser's index

An index constructed from price data supplied by purchasers.

Purchaser's price

The amount paid by the purchaser to take delivery of a unit of a good or service at the time and place required by the purchaser. It *excludes* any VAT (or similar deductible tax on products) that the purchaser can deduct from his or her own VAT liability invoiced to customers. It *includes* suppliers' retail and wholesale margins, separately invoiced transport and insurance charges, and any VAT (or similar deductible tax on products) that the purchaser cannot deduct from his or her own VAT liability. (A purchaser's price for a product is the producer's price *plus* suppliers' retail and wholesale margins, separately invoiced transport and insurance charges, and nondeductible taxes on products payable by the purchaser.) Purchasers' prices are the prices most relevant for decision making by buyers.

"Pure" price change

The change in the price of a good or service whose characteristics do not change over time. When some characteristics do change, that is, a change in quality occurs, the "pure" price change is the price change remaining after eliminating the contribution of the change in quality to the observed price change.

"Pure" price index

A price index based on pricing a constant representative basket of products at the prices of the base period and at the prices of the current period. Because the products and their weights remain constant, any change in the index is due to price changes only. An index that measures "pure" price change. Also called "unequivocal price index."

Quality adjustment

The process—or the result of the process—of estimating what the market price of a replacement product would be if it had the characteristics of the product it replaces and with whose price its price is to be compared. The process requires estimating the market value of any differences in the price-determining characteristics of the two products and adjusting—by addition, subtraction, or multiplication by a coefficient—the observed price of the replacement product. The adjustment is made so that the price comparison between the two products reflects "pure" price change only.

Quantity index

A measure reflecting the average of the proportionate changes in the quantities of a specified set of goods and services between two periods of time. Usually a quantity index is assigned a value of 100 in some selected base period, and the values of the index for other periods are intended to indicate the average percentage change in quantities compared with the base period. See "volume index."

Quantity relative

The ratio of the quantity of a specific product in one period to the quantity of the same product in another period.

Quantity reversal test

A test that may be used under the axiomatic approach and that requires the price index to remain unchanged after the quantity vectors for the two periods being compared are interchanged.

Quantity weights

Weights defined in terms of physical quantities, such as the number or total weight of goods or the number of services. Quantity weights are feasible only at the detailed product level because meaningful aggregation of product weights requires them to be commensurate. See "value weights."

Ratio of harmonic means price index

See "Hamonic means price index."

Rebasing

There is some ambiguity in the concept of the base year. Rebasing may mean

- Changing the weights in an index,
- Changing the price reference period of an index number series, or
- Changing the index reference period of an index number series.

The weights, the price reference period, and the index reference period may be changed at the same time, but not necessarily so.

Rebate

A discount paid to the customer after the transaction has occurred.

Replacement product

The product chosen to replace a sampled product either because it has disappeared completely from the market or because its market share has fallen either in a specific establishment or in the market as a whole.

Representative item

A product selected for pricing within an elementary aggregate because purchases of the product account for a significant proportion of the total purchases of all products within the aggregate or because the price change for the product is close to the average for all products within the aggregate.

Revenue

The value of output sold. The value of invoiced sales of goods or services supplied to third parties during the reference period. Used interchangeably with "sales" and "turnover."

Revolutionary goods

Goods that are significantly different from existing goods. They are generally produced on entirely new production lines using production inputs and processes considerably newer than those used to produce existing goods. It is virtually impossible, both in theory and in practice, to adjust for any quality differences between a revolutionary good and any existing good.

Reweighting

Introducing a new set of weights into the index.

RMSE

Root mean square error. A measure of total error defined as the square root of the sum of the variance and the square of the bias.

Sample augmentation

Maintaining and adding to the sample of establishments in the survey panel to ensure it continues to be representative of the population of establishments. A fixed sample of establishments tends to become depleted as establishments cease producing or stop responding. Recruiting new establishments also facilitates the inclusion of new products in the PPI.

Sample rotation

Limiting the length of time that establishments stay on the survey panel by dropping a proportion of them after a certain period of time and replacing them with a new sample of establishments. Generally done only with the smaller respondents, for whom it is felt that responding to surveys imposes a significant burden. Rotation is designed to keep the sample up to date. It also helps to alleviate the problems caused by sample depletion.

Sampling error

A measure of the chance of a difference between the results obtained from the units sampled and the results that would have been obtained from a complete enumeration of all units in the universe.

Sampling frame

The list of the units in the universe from which a sample of units is to be selected. It provides for each unit the details required to pick the sample, such as the unit's location, size, and activities.

Sauerbeck price index

A price index defined as the weighted arithmetic average of the current- to previous-period price relatives using the values of the base period as weights. The price reference period is the previous period (that is, the period immediately before the current period), and the weight reference period is some other fixed period before the previous period. A time-series index is derived by chaining, which, because the weight reference period remains fixed, can result in a serious upward drift in the index when price changes are large and erratic.

Scope

The domain of price transactions that the PPI aims to measure. The conceptual boundaries of the PPI in terms of the products, transactions, geographical areas, and producers to which it refers.

Seasonal products

Products that are either not available on the market during certain seasons or periods of the year or are available throughout the year but with regular fluctuations in their quantities and prices that are linked to the season or time of the year.

Sector

A general term used to describe a group of establishments engaged in similar kinds of economic activity. A sector can be a subgroup of an economic activity—as in "coal mining sector"—or a group of economic activities—as in "service sector"—or a cross-section of a group of economic activities—as in "informal sector." Also a specific term used in the *1993 SNA* to denote one of the five mutually exclusive institutional sectors that group institutional units on the basis of their principal functions, behavior, and objectives, namely: nonfinancial corporations, financial corporations, general government, nonprofit institutions serving households, and households.

Services

Outputs produced to order that cannot be traded separately from their production. Ownership rights cannot be established over services, and by the time their production is completed, they must have been provided to the consumers. However, as an exception to this rule, there is a group of industries, generally classified as service industries, some of whose outputs have characteristics of goods. These are the industries concerned with the provision, storage, communication, and dissemination of information, advice, and entertainment in the broadest sense of those terms. The products of these industries, where ownership rights can be established, may be classified either as goods or services depending on the medium by which these outputs are supplied.

Shipment price

The price at the time the order is delivered to the purchaser.

SNA

System of National Accounts. A coherent, consistent, and integrated set of macroeconomic accounts, balance sheets, and tables based on a set of internationally agreed concepts, definitions, classifications, and accounting rules.

Specification pricing

The pricing methodology whereby a manageable sample of precisely specified products is selected, in consultation with each reporting establishment, for repeat pricing. Products are fully defined in terms of all characteristics that influence their transaction prices. The objective is to price to constant quality to produce an index showing "pure" price change.

Splicing

The introduction of a replacement item and attributing any price change between the replacement item in the period it is introduced and the replaced item in the period before the introduction to the change in quality.

Spot market price

A generic term referring to any short-term sales agreement. Generally it refers to single-shipment orders with delivery expected in less than one month. Goods sold on this basis are usually off the shelf and not subject to customization. Spot market prices are subject to discounting and directly reflect current market conditions.

Stage of processing

The classification of goods and services according to their position in the chain of production. However, unlike the classification by stage of production, a product is allocated to only one stage, even though it may occur in several stages. Goods and services are classified either as primary products, intermediate products, or finished products.

Stage of production

The classification of goods and services according to their position in the chain of production but allowing for the multifunction nature of products. Unlike the classification by stage of processing, a product is allocated to each stage to which it contributes and not assigned solely to one stage. Goods and services are classified as primary products, intermediate products, or finished products.

Stochastic approach

The approach to index number theory that treats each price relative as an estimate of a common price change. Hence, the expected value of the common price change can be derived by the appropriate averaging of a random sample of price relatives drawn from a defined universe.

Subsidies on products

The subsidies on goods or services produced as the outputs of resident enterprises that become payable as the result of the production of those goods or services. They are payable per unit of good or service produced.

Subsidized prices

Prices that differ from market prices in that some significant portion of variable or fixed costs are covered by a revenue source other than the selling price.

Substitution bias

The bias that arises when the index number formula used for an output PPI systematically understates average price increases because it does not take into account that producers seeking to maximize revenue from a given technology and inputs may shift production to items with above-average relative price increases. Or, the bias that arises when the index number formula used for an input PPI systematically overstates average price increases because it does not take into account that producers seeking to minimize costs with a given technology and output may shift purchases of inputs to items with below-average relative price increases.

Superlative index

Indices that are "exact" for a "flexible aggregator." A flexible aggregator is a second-order approximation to an arbitrary cost, production, utility, or distance function. Exactness implies that a particular index number can be derived directly from a specific flexible aggregator. The Fisher price index, the Törnqvist price index, and the Walsh price index are superlative indices. Superlative indices are generally symmetric.

Surcharge

An addition to the list price of a good or a service. Generally of short duration reflecting unusual cost pressures affecting the producer. For example, a fuel surcharge for transport operators.

Symmetric index

An index that treats the two periods being compared symmetrically by giving equal weight, or importance, to the price and value data in both periods. The price and value data for both periods enter into the index number formula in a symmetric or balanced way.

Taxes on products

The taxes on goods or services produced as the outputs of resident enterprises that become payable as the result of the production of those goods or services. They are payable per unit of good or service produced.

Test approach

See "axiomatic approach."

Time reversal test

A test that may be used under the axiomatic approach and that requires if the prices and quantities in the two periods being compared are interchanged, the resulting price index is the reciprocal of the original price index. When an index satisfies this test, the same result is obtained whether the direction of change is measured forward in time from the first to the second period or backward from the second to the first period.

Törnqvist price index

A price index defined as the weighted geometric average of the current- to base period-price relatives in which the weights are the simple unweighted arithmetic averages of the value shares in the two periods. It is a symmetric index and a superlative index. Also known as the "Törnqvist-Theil price index."

It is defined as $\ln P_T \equiv \sum ½\left(s^0 + s^t\right)\ln\left(\frac{p^t}{p^0}\right)$,

where $s^j \equiv \frac{p^j q^j}{\sum p^j q^j}$; $j = t, 0$. Also written as

$$P_T \equiv \left(\frac{p^t}{p^0}\right)^{\frac{\left(s^0+s^t\right)}{2}}.$$

Total factor productivity

See "multifactor productivity."

Transaction

The buying and selling of a product on terms mutually agreed by the buyer and seller.

Transaction price

See "market price."

Transfer price

A price adopted for bookkeeping purposes used to value transactions between affiliated enterprises integrated under the same management at artificially high or low levels to effect an unspecified income payment or capital transfer between those enterprises. See "intra-company transfer price."

Transitivity

See "circularity."

"True" index

A theoretically defined index that lies between the Laspeyres price index and the Paasche price index. For a theoretical output price index, the Laspeyres output price index is the lower bound and the Paasche output price index is the upper bound. For a theoretical input price index, the situation is reversed: the Paasche output price index is the lower bound and the Laspeyres output price index is the upper bound. See "FIOPI" and "FOIPI."

Turnover

See "revenue."

Unequivocal price index

See "'pure' price index."

Unique product

A product that is manufactured only once to the specification of an individual customer.

Unit-value index

A "price" index that measures the change in the average value of units. These may not be homogeneous, and the unit-value index therefore may be affected by changes in the mix of items as well as by changes in their prices.

Unit-value "mix" problem

The change in the value of a unit-value index, thereby implying a "price change," that arises from a change in the relative quantities of the items covered without any change in their prices.

Universe

The population of producers and products to be sampled.

Upper-level index

An index constructed from elementary or lower-level indices. Weights are used to combine them.

Value

At the level of a single homogeneous good or service, value is equal to the price per unit of quantity multiplied by the number of quantity units of that good or service. Unlike price, value is independent of the choice of quantity unit. Values are expressed in terms of a common unit of currency and are commensurate and additive across different products. Quantities, on the other hand, are not commensurate and additive across different products even when measured in the same kind of physical units.

Value added

Gross value added is the value of output less the value of intermediate consumption; it is a measure of the contribution to GDP made by an individual producer, industry, or sector; gross value added is the source from which the primary incomes of the *SNA* are generated.
Net value added is the value of output less the values of both intermediate consumption and consumption of fixed capital.

Value-added PPI

The weighted average of an output PPI and an input PPI.

Value updating

See "price updating."

Value weights

The measures of the relative importance of products in the index. The weight reference period values or shares of the various components of output (or input) covered by the index. Being commensurate and additive across different products, value weights can be used at aggregation levels above the detailed product level. See "quantity weights."

VAT

Value-added tax. A wide-ranging tax usually designed to cover most or all goods and services. It is collected in stages by enterprises obliged to pay the government only the difference between the VAT on their sales and the VAT on their purchases for intermediate consumption or capital formation. VAT is not usually charged on exports.

Virtual corporation

A partnership among several enterprises sharing complementary expertise created expressly to produce a product with a short perspective life span, with the production of the product being controlled through a computerized network. The corporation is disbanded with the conclusion of the product's life span.

Volume index

The weighted average of the proportionate changes in the quantities of a specified set of goods and services between two periods of time. The quantities compared must be homogeneous, while the changes for the different goods and services must be weighted by their economic importance as measured by their values in one or the other, or both, periods.

Walsh price index

A price index defined as the weighted arithmetic average of the current- to base-period price relatives that uses the quantities of an intermediate basket as weights. The quantities of the intermediate basket are geometric averages of the quantities of the base and current periods. It is a symmetric index and a superlative index and is represented as $P_W \equiv \dfrac{\sum p^t \left(q^t q^0\right)^{\frac{1}{2}}}{\sum p^0 \left(q^t q^0\right)^{\frac{1}{2}}}$.

Weights

A set of numbers between zero and one that sum to unity and are used when calculating averages. Value shares sum to unity by definition and are used to weight price relatives, or elementary price indices, when these are averaged to obtain price indices or higher-level indices. Although quantities are frequently described as weights, they cannot serve as weights for the prices of different types of products whose quantities are not commensurate and use different units of quantity that are not additive. The term "quantity weights" generally is used loosely to refer to the quantities that make up the basket of goods and services covered by an index and included in the value weights. See "quantity weights" and "value weights."

Weight reference period

The period whose value shares serve as weights for a set of price relatives or elementary price indices. It does not have to have the same duration as the periods for which the index is calculated and, in the case of a PPI, is typically longer—a year or more, rather than a month or quarter. Nor does it have to be a single period as in the case of symmetric indices such as the Marshall-Edgeworth, the Walsh, and the Törnqvist price indices.

Wholesale price index

A measure that reflects changes in the prices paid for goods at various stages of distribution up to the point of retail. It can include prices of raw materials for intermediate and final consumption, prices of intermediate or unfinished goods, and prices of finished goods. The goods are usually valued at purchasers' prices. For historical reasons some countries call their PPI a "wholesale price index" even though the index no longer measures changes in wholesale prices.

Young index

Specifically, a weighted average of price ratios between the current year t and the price reference year 0, where the weights are value shares (s_n) that sum to 1.

The Young index is thus defined as $P_{YO} \equiv \sum s_n \left(\dfrac{p^t}{p^0}\right)$.

Special cases include the Laspeyres index when $s_n = s^0 = \dfrac{p^0 q^0}{\sum p^0 q^0}$ and the Paasche index when s_n are hybrid weights using period t quantities valued at period 0 prices, that is, $s_n = s^{0t} \equiv \dfrac{p^0 q^t}{\sum p^0 q^t}$.

Appendix G.1: Some Basic Index Number Formulas and Terminology

1. A *basket(-type)* price index (called here a *Lowe* price index after the index number pioneer who first proposed this general type of index) is an index of the form[1]

$$\text{(G.1)}\quad \frac{\sum p_n^t q_n}{\sum p_n^0 q_n},$$

which compares the prices of period t with those of (an earlier) period 0, using a certain specified quantity basket. The family of Lowe indices includes some well-known indices as special cases:

[1]The sums are understood to be running over all items n.

- When $q_n = q_n^0$, we get the Laspeyres index;
- When $q_n = q_n^t$, we get the Paasche index;
- When $q_n = (q_n^0 + q_n^1)/2$, we get the Marshall-Edgeworth index; and
- When $q_n = (q_n^0 q_n^t)^{1/2}$, we get the Walsh index.

In practice, statistical offices frequently work with a Lowe index in which $q_n = q_n^b$, where b denotes some period before 0.

2. A useful feature of a basket price index for period t relative to period 0 is that it can be decomposed, or factored, into the product of two, or more, indices of the same type: for instance, as the product of an index for period $t - 1$ relative to period 0 and an index for period t relative to period $t - 1$. Formally,

$$\text{(G.2)}\quad \frac{\sum p_n^t q_n}{\sum p_n^0 q_n} = \frac{\sum p_n^{t-1} q_n}{\sum p_n^0 q_n} \frac{\sum p_n^t q_n}{\sum p_n^{t-1} q_n}.$$

The index on the right side of equation (G.2) is described as a two-stage index. It is identical to the single-basket index that compares period t directly with period 0, provided the same set of prices is available and used in all three periods 0, $t - 1$, and t.

In particular, when $q_n = q_n^0$, equation (G.2) turns into

$$\text{(G.3)}\quad \frac{\sum p_n^t q_n^0}{\sum p_n^0 q_n^0} = \frac{\sum p_n^{t-1} q_n^0}{\sum p_n^0 q_n^0} \frac{\sum p_n^t q_n^0}{\sum p_n^{t-1} q_n^0}.$$

The left side of equation (G.3) is a direct Laspeyres index. Note that only the first of the indices that make up the two-stage Laspeyres index on the right side is itself a Laspeyres index, the second being a Lowe index for period t relative to period $t - 1$ that uses the quantity basket of period 0 (not $t - 1$). Some statistical offices describe the two-stage Laspeyres index given in equation (G.3) as a "modified Laspeyres" index.

3. In a time-series context, say, when t runs from 1 to T, the series

$$\text{(G.4)}\quad \frac{\sum p_n^1 q_n}{\sum p_n^0 q_n}, \frac{\sum p_n^2 q_n}{\sum p_n^0 q_n}, \ldots, \frac{\sum p_n^T q_n}{\sum p_n^0 q_n}$$

is termed a series of *fixed*-basket price indexes. In particular, when $q_n = q_n^0$, we get a series of Laspeyres indexes.

4. At period T, one could change to a new quantity basket q' and calculate from this period onward

$$\text{(G.5)}\quad \frac{\sum p_n^{T+1} q_n'}{\sum p_n^T q_n'}, \frac{\sum p_n^{T+2} q_n'}{\sum p_n^T q_n'}, \frac{\sum p_n^{T+3} q_n'}{\sum p_n^T q_n'}, \ldots .$$

To relate the prices of periods $T + 1$, $T + 2$, $T + 3$, …. to those of period 0, *chain linking* can be used to transform (G.5) into a series of the form

$$\text{(G.6)}\quad \frac{\sum p_n^T q_n}{\sum p_n^0 q_n} \frac{\sum p_n^{T+1} q_n'}{\sum p_n^T q_n'}, \frac{\sum p_n^T q_n}{\sum p_n^0 q_n} \frac{\sum p_n^{T+2} q_n'}{\sum p_n^T q_n'}, \frac{\sum p_n^T q_n}{\sum p_n^0 q_n} \frac{\sum p_n^{T+3} q_n'}{\sum p_n^T q_n'}, \ldots .$$

This could be termed a series of *chain-linked* fixed-basket price indexes. In particular, when $q_n = q_n^0$ and $q_n' = q_n^T$, we get a series of chain-linked Laspeyres indexes. Since the basket was changed at period T, the adjective "fixed'" applies literally over only a certain number of time intervals. The basket was fixed from period 1 to period T and is fixed again from period $T + 1$ onward. When the time intervals during which the basket is kept fixed are of the same length, such as one, two, or five years, this feature can be made explicit by describing the index as an annual, biannual, or five-yearly chain-linked fixed-basket price index.

5. A *weighted arithmetic*[2]*-average (-type)* price index (called here a *Young* price index after another index number pioneer) is an index of the form

$$\text{(G.7)}\quad \sum w_n (p_n^t / p_n^0),$$

which compares the prices of period t with those of period 0, using a certain set of weights adding up to 1. Note that any basket price index in the form of equation (G.1) can be expressed in the form of equation (G.7), since

$$\text{(G.8)}\quad \frac{\sum p_n^t q_n}{\sum p_n^0 q_n} = \sum \frac{p_n^0 q_n}{\sum p_n^0 q_n} \frac{p_n^t}{p_n^0}.$$

In particular, when

(i) $\text{(G.9)}\quad w_n = s_n^0 \equiv p_n^0 q_n^0 / \sum p_n^0 q_n^0,$

[2]To distinguish from geometric or other kinds of average.

that is, period 0 value shares, equation (G.7), turns into the Laspeyres index. When

(ii) (G.10) $w_n = p_n^0 q_n^t / \sum p_n^0 q_n^t$,

that is, hybrid period (0,*t*) value shares, we get the Paasche index. One could also think of setting

(iii) (G.11) $w_n = s_n^b \equiv p_n^b q_n^b / \sum p_n^b q_n^b$,

that is, period *b* value shares. In practice, however, instead of working with equation (G.11), one frequently works with

(iv) (G.12) $w_n = s_n^b (p_n^0 / p_n^b) / \sum s_n^b (p_n^0 / p_n^b)$
$= p_n^0 q_n^b / \sum p_n^0 q_n^b$;

that is, *price-updated* period *b* value shares.

Note that hybrid value shares, such as equation (G.10) or (G.12), typically are not constructed by multiplying sums of prices of one period with quantities of another period. They must be constructed using price relatives and actual expenditure shares as in the first part of equation (G.12).

6. In a time-series context, when t runs from 1 to T, the series

(G.13) $\sum w_n (p_n^1 / p_n^0)$, $\sum w_n (p_n^2 / p_n^0)$,
….., $\sum w_n (p_n^T / p_n^0)$

is termed a series of *fixed* weighted arithmetic-average price indexes. In particular, when the weights are equal to the period 0 expenditure shares, we get a series of Laspeyres indexes, and when the weights are equal to the price-updated period *b* expenditure shares, we get a series of Lowe indices in which the quantities in the basket are those of period *b*.

7. In period T one could change to a new set of weights w' and calculate from this period onward

(G.14) $\sum w_n' (p_n^{T+1} / p_n^T)$, $\sum w_n' (p_n^{T+2} / p_n^T)$,
$\sum w_n' (p_n^{T+3} / p_n^T)$, …. ,

or, using chain linking to relate the prices of periods $T+1$, $T+2$, $T+3$, …. to those of period 0,

(G.15) $\sum w_n (p_n^T / p_n^0) \sum w_n' (p_n^{T+1} / p_n^T)$,
$\sum w_n (p_n^T / p_n^0) \sum w_n' (p_n^{T+2} / p_n^T)$, …. .

This could be termed a series of *chain-linked* fixed-weight arithmetic-average price indexes. In particular, when $w_n = s_n^0$ and $w_n' = s_n^T$, we get a series of chain-linked Laspeyres indices. When $w_n = s_n^b (p_n^0 / p_n^b) / \sum s_n^b (p_n^0 / p_n^b)$ and $w_n' = s_n^{b'} (p_n^T / p_n^{b'}) / \sum s_n^{b'} (p_n^T / p_n^{b'})$ for some later period b', we get a series of chain-linked Lowe indices.

8. Again, since the weights were changed at period T, the adjective "fixed" applies literally over only certain time intervals. The weights were fixed from period 1 to period T and are again fixed from period T + 1 onward. When the time intervals during which the weights are kept fixed are of the same length, this feature can be made explicit by adding a temporal adjective such as annual, biannual, or five-yearly.