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### CPI TERMINOLOGY

Invited paper submitted by Eurostat\*\*

#### Summary

The purpose of the following text is to suggest, by using them in context, the meanings of some technical terms for international discussions. Suggestions for additions will be welcome.

1. The conceptual **scope** of a Consumer Price Index is the range of **products** (consumer goods and services) consumed by the **target population** within the geographical area to which the index relates, i.e. all the consumption whose prices should ideally be measured in the index. The actual **coverage** of the index may be narrower than its scope for practical reasons.
2. The value or cost of **Consumption** may be defined in terms of **payments, transactions**<sup>1</sup> or **use** with prices correspondingly regarded as prices paid, prices agreed or accepted and as prices some of which are **user costs**.
3. The target population consists of:

**Households**, and may or may not include

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\* This document has been re-issued for technical reasons.

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**non-profit institutions serving households**, which provide non-market services to households and whose main resources are contributed by households,

**non-resident households** in respect of their consumption purchases within the area,

**collective households** such as rest homes for the aged.

4. All of the above within scope can also be called **consumer units**. **Index households** are those resident households that are covered by an index whose scope does not include all such households.

5. The product components of the range of products within scope or covered are categorised hierarchically into **product groups**, each of which may consist of a number of **product subgroups**, known as "sections" in some countries. These may be further subdivided. A complete collection of all products covered is sometimes called the **basket**.

6. The geographical area within scope or covered may be broken down by **location**, into either contiguous areas of the country or, for example, rural areas, large towns or shopping areas.

7. **Aggregates** and their **sub-indexes** are all defined in terms of product components and, in many cases, also by region and by type of **outlet**, an outlet being anywhere where products are purchased. When at the lowest level of aggregation there are no internal weights the aggregates and sub-indexes are called **elementary aggregates** and **elementary aggregate indexes**, all of these being defined by product category and many of them by region and by outlet type as well. They are computed using only (sample) price data. The **overall index**, which may be loosely called the **all products index** is a weighted average of all elementary aggregate indexes.

8. A subindex for the  $i^{th}$  component of consumption is denoted  $I_{-/-}^i$  where the part after the slash indicates the current period and the part of the subscript before the slash indicates the **price reference-period**. This is the period or date with whose prices current prices are compared in computing the index. Thus, if this were denoted  $b$ , and the current period were denoted  $t$ ,

the overall index would be  $\sum_i w^i I_{bt}^i$  [0 in subscript altered to  $b$ ] where the  $w^i$

are the **weights** expressed as fractions. These are value shares of the components of consumption in the **weight reference-period**, and may be **price-updated** from the weight reference-period to the price reference-period by multiplying each by its sub-index and then rescaling so that their sum again equals unity. Most Consumer Price Indexes are not true Laspeyres indexes as their weight and price reference-periods do not coincide; they may be called **Laspeyres-type indexes**. A **Cost of Living index**, on the other hand,

is the change in household expenditure required to maintain a constant level of utility, a theoretical economics concept.

9. **Rescaling** means multiplying or dividing all values of an index series by a constant. If an index series is rescaled by dividing all values by its value in period  $t$ , this makes  $t$  the **index reference-period** with a value of unity or 100. Linking and Chaining both mean joining together two consecutive time-series by rescaling one of them to make its value for a **link period** equal to the value of the other for that period, thus combining them into a single time-series. **Linking** should be used when individual price series are joined together, while **Chaining** should be used when indexes are joined together.

10. Prices **collected** and used in compilation relate to one or more **product-types**<sup>2</sup>, types of product chosen to represent a category of goods or services for which prices are to be collected, whose **specifications** are laid down by **Head Office**. In each outlet, the particular product selected, either **purposively** or **randomly**, as falling within the specification of a product-type is a **sampled product**<sup>3</sup> whose **description**<sup>4</sup> necessarily contains more detail than specification. Its price, when the meaning is not otherwise clear, is a **sampled price**<sup>5</sup>. In the case of cars and some other durable goods, the concepts of **model range**, **model and variant** are appropriate terms. **Local price collection** is the collection of prices from retail outlets by **collectors** living in the region who transmit the data they obtain to Head Office either directly or via a **Regional Office**. **Centrally collected prices** are those collected directly by Head Office, for example postage rates.

11. In describing formulas used in computing elementary aggregate price indexes, the division of one price or average by another should be called a **ratio**, not a "relative"<sup>6</sup>. Two sets of sampled prices for one set of sampled products constitute **matched prices**.

12. When a **replacement product** is selected to supersede a **replaced product** because the latter is no longer available, a **forced replacement** is made. **Optional replacement** is undertaken to increase or preserve the representativity of a product sample, usually when a sample is revised. In such cases there is usually an **overlap** period. Overlap exists when the prices of replaced sampled products and of their replacements are both collected in at least one month. It is convenient to distinguish replacement, *which is done by the statistician*, from **substitution**, which is *what consumers do* in response to changes in price ratios.

13. The process of scrutinising reported prices is called **editing**. An **estimated price** may be imputed for **missing observations** or to replace recorded **price observations** which are judged to be in error and are rejected. Imputation methods include **carry forward** of the last price observed and, in the case of products which have been on Sale, **reversion to the last regular price**.

14. The **characteristics** of a sampled product are those attributes which serve to identify it and/or which are **price-relevant**. If none of the differences between the characteristics of two sampled products are judged to be price-relevant, these sampled products are **essentially equivalent**.<sup>7</sup> Essential equivalence is sometimes said to allow "direct comparison" between their prices, but this term should be avoided as it also has two other meanings:- (1) "making a quality judgement." and (2) "comparison with price reference-period price", as opposed to comparison with last month's price. When the meaning is (2), the term **fixed base index** or **fixed base price ratio** should be used instead.

15. When there is a forced replacement a **quality judgement** may be made, meaning either the *process* of estimating the market value of any differences in the characteristics of sampled products, or the resulting *estimate*. A **quality adjustment** is the *process* or the *result* of using such an estimate to add to, subtract from or multiply a price by a coefficient to impute what its market price would be if it had the characteristics of the other sampled product. When the quality judgement is one of essential equivalence, a zero additive or unit multiplicative adjustment counts as a quality adjustment. When a quality judgement is made the procedure is **judgmental**, otherwise a **mechanistic** procedure is followed instead<sup>8</sup>. Examples of mechanistic procedures are:

- Use of overlap price ratios;
- **Extrapolating** forward the last sampled price of the replaced product to create a fictional overlap with the replacement and treating the resulting overlap price ratio as reflecting the value of the quality difference;
- **Retrapolation** of the price of the replacement product to estimate a price reference-period price for it.

END NOTES

<sup>1</sup> "Acquisition" was the term used in the 1989 ILO Manual.

<sup>2</sup> "Representative product" was the term used in the 1989 ILO Manual. "Generic product" would be a better term had it not unfortunately acquired a specialist meaning with regard to pharmaceutical products.

<sup>3</sup> The term "Variety", formerly used, does not translate well; in French "Variété" is used to signify "Representative product".

<sup>4</sup> Note that in some countries "specification" or "definition" and "description" are used the other way round.

<sup>5</sup> Sometimes called a "quote".

<sup>6</sup> "Relative" does not translate well.

<sup>7</sup> The term "comparable" has been used in this sense, but since it can also mean "capable of comparison" it is ambiguous and should be avoided.

<sup>8</sup> Methods of making or avoiding quality adjustment are set out in detail in the chapter on elementary aggregate indexes in [www.turvey.demon.co.uk](http://www.turvey.demon.co.uk)

## ANNEX

### GLOSSARY

**Aggregation.** The process of combining lower level price indexes or values to produce higher level indexes or values.

**Basket.** Commonly used term for the set of goods and services priced for the purpose of compiling the CPI

**Carry forward.** The current price is imputed as equal to the last price observed

**Centrally collected prices.** prices collected directly by Head Office, for example postage rates.

**Chain index.** A continuous index number series formed by linking new index series, which reflect a changed weighting pattern, to previous index series, on a regular and frequent basis (e.g. annually).

**Chaining** Joining together consecutive indexes by rescaling one of them to make its value for an overlap period equal to the value of the other for that period, thus combining them into a single time-series.

**Characteristics.** Attributes of a product which serve to identify it and/or which are price-relevant.

**Component.** The very generic term used to signify a subset of aggregate consumption, identified by type of consumption and/or location or outlet type.

**Cost of Living index.** A theoretical economics concept, is the ratio to the actual value of consumption in a base period of what, if current prices had then ruled, its value would then have had to be to maintain the level of utility unchanged.

**Cost weight.** Used in the USA to signify the price-updated expenditure on some component of consumer expenditure.

**Coverage** the range of consumer goods and services for which prices are collected and the geographical areas where they are collected. Coverage may be narrower than scope for practical reasons.

**Current period.** The period, usually a month, for which the Consumer Price Index has most recently been computed or is now being computed.

**Democratic index.** An index where each household has equal weight in the calculations.

**Description**<sup>1</sup> List of the product characteristics that identify an individual sampled product; it necessarily contains more detail than the specification of the product-type.

**Discount.** Deduction from the price of a good or service.

**Editing** The process of scrutinising reported prices; estimated prices may be imputed for missing observations.

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<sup>1</sup> Note that in some countries "specification" or "definition" and "description" are used the other way round.

**Elementary aggregate** Component of consumption at the lowest level of aggregation within which there are no internal weights, being defined by product category and often by region and by outlet type as well.

**Elementary aggregate index.** Sub-index computed using only (sample) price data.

**Essentially equivalent.** None of the differences between the characteristics of two sampled products are judged to be price-relevant. Essential equivalence is sometimes said to allow "direct comparison" between their prices, but this term should be avoided as it also has two other meanings:- (1) "making a quality judgement." and (2) "comparison with price reference-period price", as opposed to comparison with last month's price.

**Extrapolation.** Forward estimation by adjusting a previous price proportionately to the movement in some sub-index.

**Fisher index.** The geometric mean of a Laspeyres and Paasche index.

**Fixed base index** or **fixed base price ratio.** A comparison with the price reference-period prices or price.

**Forced replacement.** because the latter is no longer available

**Household expenditure survey** A sample survey conducted to determine the expenditure patterns of private households.

**Households** A small group of persons who share the same living accommodation, who pool some of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food.

**Implicit price deflator.** The ratio, expressed as an index number, between the current price values and constant price values of broad national accounting aggregates.

**Imputation.** Estimation of a price which has not been collected, either an actual missing price or a user cost.

**Index households** are those resident households within the scope of an index whose scope does not include all households.

**Index points change** The change in an index number series from one period to another expressed in terms of the difference in the number of index points in each index number.

**Index reference-period** The period for which the value of the index is set at unity or 100.

**Indexation** The periodic adjustment of a money value (eg, wages, pensions, rents) according to changes in a selected price index.

**Indirect taxes.** Taxes assessed on producers, on the production, sale, purchase, or use of goods and services.

**Institutional households** Groups of people living permanently in an institution such as rest homes for the aged.

**Item stratum (strata)** A term used in the USA for the lowest level partition of the set of all goods and services within the CPI.

**Laspeyres index.** The ratio of the value at current period prices of base-period consumption to its actual base-period value, where the base-period is both the price reference-period and the weight reference-period.

**Laspeyres-type index.** Fixed-weight index which would be a true Laspeyres index if the price reference-period and the weight reference-period coincided.

**Link month** The last month that an old product/outlet sample is used in computing an index and the month used as the price reference-period for the index computed using the new product/outlet sample

**Linking** The technique used to join a new index series (eg, one having a changed composition and weighting pattern) to an old index series to form a continuous series. The technique ensures that the resultant linked index reflects only price variations (ie, the introduction of the new items and weights does not of itself affect the level of the index).

**Linking.** Joining together consecutive individual price series by rescaling one of them to make its value for a link period equal to the value of the other for that period, thus combining them into a single time-series.

**Local price collection.** Collection of prices from retail outlets by **collectors** living in the region who transmit the data they obtain to Head Office either directly or via a Regional Office.

**Matched prices.** Two sets of sampled prices for one set of sampled products

**Missing observations** A sampled price that could not be collected.

**Net price index.** A price index from which the effects on prices of changes in indirect taxes and subsidies have been removed

**Non-profit institutions serving households** Institutions which provide non-market services to households and whose main resources are contributed by households.

**Optional replacement.** A replacement product is selected to supersede a replaced product increase or preserve the representativity of a product sample, usually when a sample is revised. In such cases there is usually an overlap.

**Outlet** A business or organisation or branch of a multi-branch business or organisation at or from which prices can be collected.

**Overall index,** which may also be called the **all products index** is a weighted average of all sub-indexes.

**Overlap.** The prices of replaced sampled products and of their replacements are both collected in at least one month.

**Paasche index.** The ratio of actual current period value of consumption to its value at base-period prices, where the current-period is both the price reference-period and the weight reference-period.

**Payments approach** Weights reflect the value of payments in the weight reference-period, and prices enter the CPI in the period or periods when consumers pay prices, regardless of when consumption or delivery takes place.

**Percentage change.** The change in an index series from one period to another expressed as a percentage of its value in the first of the two periods.

**Pivot month.** A term used in the USA, where a procedure called "Update, link, and pivot" is used to convert the final estimates of the expenditure-population weights for the weight reference-period into the weights used and produced each month during aggregate index calculation.

**Plutocratic index.** An index where each household contributes to the weights by an amount proportional to its expenditure

**Price reference-period.** This is the period or date with whose prices current prices are compared in computing the index.

**Price-updated weights.** Consumption values of the weight reference-period are updated to the price reference-period by multiplying each by the ratio of its sub-index for the latter period to its value for the former period and then rescaling so that their sum, when expressed as fractions, again equals unity.

**Product groups** Consumption categories defined as part of a classification of consumption. Each may consist of a number of product subgroups, known as "sections" in some countries, and may be further subdivided.

**Product.** Any type of consumer good or service that can be purchased,

**Product-types<sup>2</sup>** types of product chosen to represent a category of goods or services for which prices are to be collected.

**Pure price change.** The change in the price of a good or a service after any quality adjustment has been made.

**Purposive sampling.** Intelligent selection of outlets and products

**Quality adjustment** is the process or the result of using such a quality judgement to add to, subtract from or multiply a price by a coefficient to impute what its market price would be if it had the characteristics of the other sampled product. When the quality judgement is one of essential equivalence, a zero additive or unit multiplicative adjustment counts as a quality adjustment.

**Quality judgement.** Either the process of estimating the market value of any differences in the characteristics of sampled products, or the resulting estimate.

**Rebase.** To change the Index reference-period of an index number series.

**Regimen.** An old-fashioned equivalent of "basket".

**Replacement.** The statistician selects a replacement product to supersede a replaced product

**Rescaling.** Multiplying or dividing all values of an index series by a constant.

**Retrapolation.** Backward estimation by adjusting a previous price proportionately to the movement in some sub-index. of the price of the replacement product to estimate a price reference-period price for it.

**Sampled price<sup>3</sup>.** The price of a sampled product

**Sampled product<sup>4</sup>** A product whose price is collected.

**Sampling frame.** A complete list of the products or outlets to be sampled, together with sufficient information on each to stratify if required.

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<sup>2</sup> "Representative product" was the term used in the 1989 ILO Manual. "Generic product" would be a better term had it not unfortunately acquired a specialist meaning with regard to pharmaceutical products.

<sup>3</sup> Sometimes called a "quote".

<sup>4</sup> The term "Variety", formerly used, does not translate well; in French "Variété" is used to signify "Representative product".

**Scope** of a Consumer Price Index The conceptual boundaries of the CPI in terms of goods and services and of the population group and geographic areas to which it relates.

**Seasonal adjustment.** A mechanistic statistical technique for smoothing out the effects of seasonal and calendar influences on a series.

**Seasonal products.** Products which are only available, or are in very much greater supply and/or demand, at certain times of the year.

**Section.** A UK term for about 80 components on which significant amounts of money are spent, each belonging to 14 more aggregative "groups".

**Specification** the range of products included in a product-type

**Stratum, Strata.** A component of consumption. The data within each stratum are combined to produce a sub-index.

**Substitution.** Consumers alter the composition of their consumption in response to changes in price ratios

**Superlative index.** An index which will provide an exact cost of living index when the utility functional form is capable of providing a second-order differential approximation to an arbitrary twice continuously differentiable linearly homogeneous utility function

**Target population** The population group within scope.

**Törnkvist index.** A weighted geometric mean of the ratios of product prices in two periods, where the weights are the arithmetic means of product expenditure shares in the same two periods.

**Transactions approach** Weights reflect the value of transactions in the weight reference-period, and prices enter the CPI in the period when consumers accept or agree prices, regardless of when payment or delivery takes place.

**User-cost approach** Weights reflect the opportunity costs of consumption in the weight reference-period, and prices or opportunity costs enter the CPI in the period or periods of consumption, regardless of when payment or delivery takes place.

**Utility.** An unobservable maximand implicit in consumer choices.

**Weight reference-period.** The period, usually a whole year, to which the estimates of the value of consumption and its components used to calculate weights relate.

**Weights.** The measures of the relative importance of products in the index; the weight reference-period values of the various components of consumption within scope, or, when expressed as fractions, the shares of the components of consumption. These values may be price-updated.

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