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Working group on survey frameworks

Notes on representativity

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SOME NOTES ON REPRESENTATIVITY

BACKGROUND

Eurostat first made the distinction between representative and unrepresentative products when calculating the basic heading PPPs for consumer goods and services during the 1975 comparison. The distinction was not made for government services and capital goods. It was introduced for capital goods in the 1990s (but it is now only retained for equipment goods, all construction being treated as representative).

Representative products were called “characteristic products” and were defined as products that are typically associated with a country’s household final consumption expenditure. For example, cheddar and stilton are characteristic of the United Kingdom; Roquefort and camembert are characteristic of France; and mozzarella and parmesan are characteristic of Italy. At the time, there were only nine countries participating in the comparison and their domestic markets were far from being as open as they are today. The definition was satisfactory and workable. However, as more countries joined the European Union and participated in the comparison programme and as the openness of the domestic markets of EU member states increased, the definition was no longer sufficient. Characteristic products are usually representative, but not all representative products are necessarily characteristic.

Characteristicity has two other meanings in PPP parlance of which only the first is relevant to the current discussion. These are:

- A characteristic product is a product that has a relatively low market share but which is actively competing on price in their segment of the market and as such can be representative. (See *italicised* sentence in paragraph 2.13 of extract from Eurostat-OECD manual.)
- Characteristicity is the property that requires transitive multilateral comparisons between members of a group of countries to retain the essential features of the intransitive binary comparisons that existed between them before transitivity. A transitive multilateral comparison between a pair of countries is influenced by the price and quantity data of all other participating countries. Characteristicity requires that the impact of these influences should be kept to a minimum when they are introduced into the intransitive binary comparison. In other words, the multilateral PPP between two countries should deviate as little as possible from their binary PPP.

The move to a broader concept of representativity has made application more difficult. In the early days, application tended to be subjective and products identified as representative in one comparison were often identified as unrepresentative in the next, reflecting more the turnover in personnel responsible for the pricing of products than a change in market conditions. Even today, it is clear that countries participating in Eurostat-OECD comparisons do not apply

representativity uniformly. Some countries are clearly parsimonious in their assignment of asterisks (the indicator used to identify representative products), other countries are positively liberal. While this could be a reflection on the product list, it is generally perceived not to be. Although representativity has been discussed on numerous occasions at meetings organised by Eurostat and the OECD, there have been no formal training sessions.

The Eurostat-OECD definition of a representative product can be found in the extract from the Eurostat-OECD manual reproduced below. This is followed by an extract from the ICP handbook giving the ICP definition.

EUROSTAT-OECD MANUAL

Chapter 2 (Representativity)

2.12. Representativity is a concept that relates to individual products within a basic heading. It is a necessary concept because, by definition, there are no explicit expenditure weights below the basic heading level. Without such expenditure weights the relative importance of the various products priced for a basic heading cannot be determined. To make a comparison, participating countries have to price both representative products and unrepresentative products for a basic heading. Representative products generally have a lower price level than unrepresentative products. Unless this is taken into account when calculating the PPPs for a basic heading, the PPPs will be biased. To avoid this, countries participating in Eurostat-OECD comparisons are required to do two things. The first is to ensure that there are representative products they can price in each basic heading when the product list is being finalised prior to price collection. The second is to identify which of the products they have priced within a basic heading are representative when reporting their prices.

2.13. Representativity is defined in terms of an individual country within a basic heading. A product is either representative or unrepresentative of the price level in country A for a given basic heading. It is representative, if in country A, its price level is close to the average for all products within the basic heading. Usually, though not necessarily, the purchases of the product will account for a significant proportion of the total purchases of all products covered by the basic heading. *If not, the product will at least be sold in sufficient quantities for its price level to be typical for the basic heading.* Basic headings can cover a heterogeneous mixture of goods or services, but this only becomes a consideration if there are significant disparities in their price levels. In these circumstances, representativity is defined in two stages. First in terms of the product types comprising the basic heading – representative product types are those that account for the bulk of the expenditure on the basic heading. And then in terms of products within the representative product types – representative products are those whose price level is close to the average for all products of its type.

2.14. The decision as to whether or not a product is representative of the price level of a basic heading is made independently of the relative importance of the basic heading with respect to other basic headings. For example, assume that in country A the expenditure shares of the three basic headings that comprise the expenditure group “alcoholic

beverages” are: “beer” 60 per cent, “wine” 35 per cent and “spirits” 5 per cent. The fact that beer and wine are considerably more representative of the type of alcoholic beverages consumed in country A than are spirits does not mean that all spirits sold in country A are to be treated as unrepresentative. If vodka has the largest market share of the spirits sold in country A, it is likely to be representative of the price level for “spirits” in country A and this should be recognised when calculating the PPPs for “spirits”. Vodka is probably not representative of the price level of “alcoholic beverages”, but this is reflected by the 5 per cent expenditure share of “spirits” that will be used in the calculation of PPPs for “alcoholic beverages”. If “alcoholic beverages” consisted of a single basic heading, with no breakdown into “beer”, “wine” and “spirits”, it is unlikely that vodka would be considered a representative product.

2.15. It has been mentioned already that the price levels of representative products are usually lower than the price levels of unrepresentative products. A comparison based on products that are not equally representative of all participating countries will result in biased price relatives. Price levels for countries pricing a smaller number of representative products will be overestimated, while price levels for countries pricing a larger number of representative products will be underestimated. When putting together the product list for a comparison, it is important to ensure that it is equally representative – or “equi-representative” - of all participating countries for each basic heading identified in the common expenditure classification. This does not mean that each country should have the same number of representative products for each basic heading because the method used by Eurostat and the OECD to calculate PPPs for a basic heading treats representative and unrepresentative products differently. What it does mean is that each country should be able to price that number of representative products which is commensurate with the heterogeneity of the products and price levels covered by the basic heading and its expenditure on the basic heading.

2.16. The responsibility that the product list is equi-representative is shared by participating countries on the one hand and by Eurostat and the OECD on the other. Each country has to ensure that it is able to price the appropriate number of representative products for each basic heading by proposing products it wishes to see added to the list. Products proposed by one country may not be available or, if available, not representative in other countries. At least one other country has to agree to price them if they are to be included on the list. Eurostat and the OECD have to oversee the “horse trading” that will be necessary between countries if the list is to be equi-representative. At the same time, they have to guard against the product list becoming too large and unmanageable. It is important that countries, when proposing products for the list, define them precisely so that other countries can identify them correctly in their markets and price comparable products.

Chapter 4 (Assigning representativity indicators)

4.57. For each basic heading, participating countries are required to price both representative products and unrepresentative products. Representative products normally have lower price levels than unrepresentative products. If this is not taken into account when calculating the PPPs for a basic heading, the PPPs will be biased. Either they will be too high and give volume indices that are too low. Or they will be too low and give volume indices that are too high. By definition, there are no expenditure weights below the basic heading level and other means are necessary to distinguish representative

products from unrepresentative products when calculating PPPs at the basic heading level. As explained in Chapter 8, and demonstrated in Annex V, the method of calculation used by Eurostat and the OECD assigns quasi expenditure weights to representative and unrepresentative products. This requires participating countries to indicate which of the products they have priced are representative when reporting their prices. Representative products are designated by a “representativity indicator”. The indicator currently employed by Eurostat and the OECD is an asterisk (*). So participating countries have to “assign asterisks” to representative products and representative products are called “asterisk products”.

4.58. Representativity is defined in terms of a product’s share of the expenditure on the basic heading. In Chapter 2, paragraph 2.13, it is written that:

“A product is either representative or unrepresentative of the price level in country A for a given basic heading. It is representative, if in country A, its price level is close to the average for all products within the basic heading. Usually, though not necessarily, the purchases of the product will account for a significant proportion of the total purchases of all products covered by the basic heading. If not, the product will at least be sold in sufficient quantities for its price level to be typical for the basic heading. Basic headings can cover a heterogeneous mixture of goods or services, but this only becomes a consideration if there are significant disparities in their price levels. In these circumstances, representativity is defined in two stages. First in terms of the product types included in the basic heading – representative product types are those that account for the bulk of the expenditure on the basic heading. And then in terms of products within the representative product types – representative products are those whose price level is close to the average for all products of its type.”

4.59. When applying this definition, a distinction has to be made between the products in the universe covered by the basic heading and the products in the sample selected for its product list. The products in the sample represent a wider group of products in the universe. They have been chosen to represent the price level of the wider group. It is not required that they are among the volume sellers for the group, even though they often are. It is just necessary that they are sold in sufficient quantities for their price levels to be typical for the product group they represent. For this reason it is possible that they can appear to be unrepresentative when their volume of sales is compared to the volume of sales of other products in the sample. For example, take the basic heading “wine”. It consists of three product groups - still wine, sparkling wine and fortified wine. Assume that the shares of household expenditure on these three product groups in a country are 75 per cent, 20 per cent and 5 per cent respectively. Assume as well that the country has elected to price two still wines and one sparkling wine from the sample of wines selected for the basic heading’s product list. It is not inconceivable that the sparkling wine priced could have considerably larger sales than either of the two still wines priced, thereby suggesting that it, and not the still wines, should be assigned an asterisk. Clearly this is incorrect when the universe of the basic heading is considered. Still wine accounts for 75 per cent of household expenditure on the basic heading, and providing the price levels of the still wines selected are representative of the average price level for still wine, it is the still wines and not the sparkling wine that should be assigned asterisks. The sparkling wine priced could also be representative, but that is not the point being made here. Asterisks should be assigned within the wider perspective of the basic heading’s universe and not within the narrower context of the sample selected for its product list.

- 4.60. Participating countries have problems identifying representative products and assigning asterisks to them. This is because the reason why representative products have to be identified – namely, the lack of expenditure weights below the basic heading level – is also the reason why it is difficult to identify them. The problem is not with products that countries themselves have proposed for the final group product list because these products are supposed to be representative. The problem lies with products that other countries have proposed. The openness of domestic markets, particularly in the European Union, has progressively increased the availability of many of these products. The question is: To what extent are they being purchased? Are they being sold in large enough numbers to be representative? The absence of reliable expenditure or sales data by product within basic headings makes it a difficult question to answer objectively. Other sources of data have to be investigated. For motor cars, registration statistics detailing the brands and models registered can be consulted. For products such as major household appliances, audio-visual equipment, and the like, detailed market research is available from various organisations. There are also a growing number of internet sites providing country-specific information on “best sellers” for a whole range of products and product types.
- 4.61. Two other sources are the pre-survey and the price survey itself. By interviewing experienced sales personnel at the outlets visited during the pre-survey, it should be possible to determine the representativity of the products specified on the pre-survey questionnaire. But not all these products will remain on the final group product list. Some will have been discarded. Others will have been retained, but with their definitions altered. And new products, not on the pre-survey questionnaire, such as overlap products, will have been added. It will still be necessary to establish the representativity of many of the products on the final group product list. As for products on the pre-survey questionnaire, this should be done by asking sales persons at the outlets visited during the price survey.
- 4.62. The price survey can also be used in other ways. Both the number of outlets at which a product is priced and the number of prices collected for the product are indicators of availability and possible representativity. Asterisks can be provisionally assigned using such criteria. Later, the allocation can be verified during validation by comparing the price level indices of the different products priced within a basic heading. Products with price level indices that are significantly higher or lower than the price level indices of other products priced for the basic heading are probably not representative and should have their asterisk removed if one has been assigned. Conversely, products designated “unrepresentative” can be re-designated “representative” and assigned an asterisk if their price level indices are close to those of other products, specifically the representative products, priced for the basic heading. In this way, validation provides a general fall back position, making it possible to rectify any misallocation of asterisks, even those based on objective information. This is a particularly important consideration given that the decision on whether or not a product is representative has, in the absence of any relevant data or informed opinion, to be subjective. Opinions should be solicited from a number of different persons when the decision is subjective.

ICP HANDBOOK

Chapter 4 (The calculation of the PPP for a basic heading)

5. The methodology can be explained by means of a simple worked example. In Table 1, the rows refer to different products within the same basic heading and the columns refer to different countries. The entry in each cell denotes the national average price of that product in that country. The prices with an asterisk refer to products that countries identify as being representative of their country. A representative product is one that accounts for a significant share of the expenditures within a basic heading in the country in question. The concept of representativity is explained in more detail later.
6. Patterns of consumption can vary greatly from country to country. Products that are representative in some countries may be unrepresentative in others, because of differences in supply conditions, income levels, tastes, climate, customs, etc. Economic theory suggests that one reason why some products are consumed in relatively greater quantities in some countries than others is simply that their prices are relatively low in those countries. Relative prices and relative quantities tend to be negatively correlated therefore. There is ample empirical evidence to support this hypothesis. The relative prices of representative products tend to be low as compared with the relative prices of the same products in other countries in which they are not representative. This factor must be taken into account when drawing up the lists of products for pricing and calculating the basic PPPs.

Chapter 4 (Representativity)

46. One of the first and most important tasks of the regional coordinators is to establish the list of products for which prices have to be collected by the various participating countries in the region. The same list is used for all the countries in the same region, but different regions use different lists. This section is concerned with the criteria used to select products for inclusion on the list. Any given basic heading may contain a very large number of individual products, but for practical and resource reasons only a small number of them can be selected for inclusion on the list of products for which prices are to be collected. Similarly, in inter-temporal CPIs, it is also feasible to price only a quite limited selection of individual products.
47. As a CPI measures changes in prices within a single country, a desirable method of selecting products within a basic heading for CPI purposes would be random selection with probabilities proportional to the expenditures on the products within the country. The resulting sample of products could be expected to be representative of the products within the heading. In practice, the requisite sampling frames and detailed information about expenditures are usually not available, so that this kind of random sampling cannot generally be used and countries have to resort to some kind of purposive sampling instead. The purposive selection is intended to result in the same kinds of products being selected as would be chosen with random selection with probabilities proportional to expenditures. However, in the case of the ICP, many countries are involved, each with

its own expenditure pattern. Even if it were feasible to select products with probabilities proportional to the expenditure pattern in each country, the difficulty is that each country would come up with its own separate list. With n countries, there would be n different lists, but the ICP has to work with a single list. All countries have to try to price the same products even though each country will find that there are some products on the list which are not to be found on its markets and cannot be priced. As there has to be a common list for ICP purposes, it may not match the pattern of expenditure in any one of the countries covered.

48. The objective for ICP purposes is therefore to arrive at a common list that is as representative as possible of expenditures in all the countries covered. Such a list might be described as one that is equi-representative of all countries even though it may not be representative of any one country. From the perspective of an individual country, however, such a list may contain products that are rarely purchased or even not available at all in the country. They have to be on the list because they are important in other countries and needed for comparisons between other pairs of countries.
49. The ICP arrives at its common list of products for pricing by a lengthy and complex iterative process that is described in some detail in the following chapter. The objective is to ensure that the final common list of products contains enough products that are representative of each individual country participating in the comparisons. As explained in section B above, each country is expected to price at least all its own representative products. The PPP based on its own representative products is then an essential input into the process of calculating the final PPPs. There must be enough representative products for each country on the overall list therefore. As already noted, the overall list may not be representative of any single country and all countries will have to price some products that are representative of other countries even though they are not products of a kind that they would select themselves for their own CPI.
50. It is necessary to clarify what is meant by a representative product in an ICP context, as representative products have a critical role to play in the comparisons. Representative products figure prominently in the expenditures within a basic heading within a country. They are therefore products that are frequently purchased by resident households and are likely to be widely available throughout the country. Suppose the products within a basic heading are ranked by order of the size of the expenditures on each product. The n most representative products are then the first n products in this ranking. If it is desired to include at least n representative products for a country on the overall list, then ideally the first n products should be selected.
51. As already explained, a country will have to price some products that are representative of other countries. Such products may come well down in the ranking of products for that country and would not be selected as representative by that country. They are therefore described as unrepresentative products.
52. A representative product does not have to account for a certain minimum share of the expenditures within a basic heading. If only five products can be distinguished within a basic heading, it follows that a representative product selected in the way just described must account for at least 20 per cent of the expenditures within the heading. If twenty products can be distinguished, however, a representative product might not account for much more than 5 per cent of the expenditures.

53. In practice, the requisite detailed information enabling expenditures on individual products within a basic heading to be ranked will not be available. Statistical offices have therefore to make a purposive selection of the products that they deem to be representative. The method of selection outlined above is merely intended to provide guidance to statistical offices about the kinds of criteria they should use in selecting representative products.

DISCUSSION POINTS

The main difference between the manual and the handbook is that the manual recognises the possibility that products that are not volume sellers can be representative. Otherwise the two texts are basically in agreement. Both emphasise that the representativeness of products has to be taken into account when selecting products for the product list and when calculating PPPs for basic headings.

There appears to be no major problems with the first application, though a review of product list selection procedures may be useful to see if enough is done to ensure that ICP product lists are “equally” representative.

It is the second application which seems to give rise to problems. Countries have difficulties assigning asterisks consistently. So much so, that in ICP 2005 only the Eurostat-OECD and CIS comparisons took representativity into account when calculating basic heading PPPs. However, as mentioned already, neither Eurostat nor OECD is fully convinced that their countries assign asterisks uniformly. This could lead to a bias greater than the one that is being avoided.

This raises the question: should the ICP be distinguishing, or trying to distinguish, between representative and unrepresentative products when calculating basic heading PPPs? If the answer is “yes”, then the next question is: what can be done to assist countries assign asterisks uniformly in the absence of information on how expenditure is distributed within a basic heading? Would drawing up some type of check list of questions to be asked when deciding on whether or not a product is representative be useful?