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Editing procedures for aggregation below the basic heading level

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EDITING PROCEDURES FOR AGGREGATION BELOW THE BASIC HEADING LEVEL

(A note by the OECD¹)

1. Ryten in his report on the ICP recommends the use of measures of central tendency and variability in the editing of price and expenditure data². He points out that if such measures were calculated and shared with participating countries they would be assured of the transparency of the process, they would be better placed to assess the balance between comparability and characteristicity and they would have a good idea of the variation within each published aggregate. This note describes the editing procedures based on such measures that are employed to edit the price data provided by countries participating in the Eurostat-OECD PPP Programme. These procedures were developed in the late 1980s and have been in place since the early 1990s. They require the active involvement of participating countries as neither Eurostat nor the OECD have the knowledge of individual national circumstances these procedures demand.

2. Two tables are prepared to edit the price data: one table covers basic headings³, the other covers products. Within Eurostat and the OECD these tables are called “Quaranta tables” after their originator Vincenzo Quaranta of ISTAT, Italy. Quaranta tables are designed

(to) facilitate quick consultation for a general appreciation of consistency with respect to the basic heading (to) provide a fairly in-depth analysis of surveyed prices and (to) permit pinpointing those cases which are to be controlled further. (The) main aim of such quality control is highlighting those prices which generate values of indices of price levels which fall outside given ranges. This may happen with prices calculated according to exchange rates or according to (the) parity of (the) basic heading (this latter consideration gives rise to greater concern). The basic hypothesis posits a degree of homogeneity of products which represent any basic heading with regard to the structure of relative prices on a spatial level.⁴

3 Table 1 shows a Quaranta table for a basic heading and Table 2 shows a Quaranta table for a product. Each table contains two versions. The first version is that proposed by Quaranta; it is the version used by Eurostat. The second is the simplified version used by the OECD.

4. Data collection for a Eurostat or OECD comparison takes place over three years. There are twelve surveys in all. Each survey covers a unique set of basic headings and editing is organised by survey. Quaranta tables, however, are only prepared for the nine surveys covering consumer goods and services. Their application to the price data collected by the surveys of compensation of employees, equipment goods and construction projects has proved to be of limited value. Different editing procedures are employed for these three surveys.

5. The prerequisites for Quaranta tables are exchange rates (XR) for the survey period and basic heading purchasing power parities (BHPPP) for the basic headings surveyed. The BHPPP are unweighted purchasing power parities calculated by the EKS method. In the first instance, they are estimated using the unedited prices. However, as editing is an iterative process, the BHPPP for subsequent Quaranta tables are computed using partially edited and then fully edited prices. Editing is complete when participating countries accept the Quaranta tables for the survey under review. Acceptance of the Quaranta tables indicates acceptance of the survey’s BHPPP and their use in the overall comparison.

¹ This note draws heavily on “A data quality control approach in price surveys for PPP estimate”, V. Quaranta, *Improving the Quality of Price Indices: CPI and PPP*, (proceedings of an international seminar held in Florence, December 1995), Eurostat and University of Florence, Luxembourg, 1996.

² Appendix III Editing Tables, *The Evaluation of the International Comparison Project (ICP)*, Jacob Ryten for International Monetary Fund, United Nations and World Bank, September 1998.

³ In principle, a basic heading consists of a group of similar well-defined products for which a sample of products can be selected that are both representative of their type and of the purchases made in participating countries. In practice, a basic heading is defined by the lowest level of final expenditure for which explicit expenditure weights can be estimated. Thus, an actual basic heading can cover a broader range of goods or services than is theoretically desirable.

⁴ Quaranta 1996 (paper cited in footnote 1).

6. The XR and the BHPPP are used to derive basic heading price level indices (BHPLI in Table 1)⁵ and to convert the average prices to be edited (PRICE in Table 2) into a common currency⁶ (XR-PRICE and BHPPP-PRICE in Table 2). The BHPLI facilitate the comparison of price levels both across basic headings and within basic headings. In making such comparisons for editing purposes, it has to be remembered that the differences may be real and that they do not necessarily arise from error. For example, within a basic heading, the product price level indices (see below) of transition economies can vary widely depending on whether the product priced is imported or domestically produced.

7. In their turn, the XR-PRICE and the BHPPP-PRICE are used to obtain product price level indices (XR-PLI and BHPPP-PLI in Table 2)⁷. Product price level indices that fall outside specified ranges⁸ are flagged accordingly (Flag B and Flag C in Table 2). In the first instance, both the indices are considered together, but with more consideration being given to the BHPPP-PLI. If the XR-PLI is flagged, but the BHPPP-PLI is not, then usually the BHPPP-PLI is accepted. Conversely, if the BHPPP-PLI is flagged, but the XR-PLI is not, it still needs to be investigated.

8. When the BHPPP-PLI of a country is flagged, it is then necessary to establish whether or not the average price underlying the index (that is PRICE) accurately reflects the country's price level for the type of products covered by the basic heading. This is done by looking at the country's BHPPP-PLI of other products in the basic heading. If the flagged BHPPP-PLI is different from the BHPPP-PLI of the other products priced by the country, it then has to be ascertained whether this is because the product is unrepresentative or whether it is due to some other reason such as a quality difference, the outlet mix, a failure to convert the price to the specified unit or a misinterpretation of the product specification. However, throughout this process of verification, it has to be borne in mind that the difference may not be due to any of these reasons and that the product, though representative, has an average price that does not provide the same price level index as other products in the basic heading.

9. All prices considered suspect are sent back to countries for verification. Usually countries either change the price or suppress it. Sometimes countries confirm the price but indicate that the product should be considered as unrepresentative. Sometimes both price and representativeness are changed. Countries may also supply more information about the product priced. This can lead to the product specification being further refined and prices rematched - the so-called "splittings".

10. To assist the editing process, the tables contain additional information. Table 1 shows the weight of the basic heading both for individual countries and overall⁹; it also shows the number of products and number of representative products priced by each country. These are useful indicators of the importance and coverage of the basic heading and can influence the decision as to whether to accept or reject a price supplied by a country. Table 2 shows for which countries the product is representative. This also has to be taken into consideration when judging whether the price level is acceptable or not.

11. The Eurostat versions of the tables also contain coefficients of variation(CV)¹⁰, namely:

- CV 1.1 (Table 1): This is the average of the coefficients of variation for product price levels derived using the basic heading purchasing power parities. In other words it is the average of COEFF. VAR.2.1 (see below). It provides an indicator of the overall reliability of the basic heading. It can be used to compare this reliability across basic headings.

⁵ BHPLI = BHPPP / XR

⁶ The unit of common currency used by Eurostat used to be the Ecu, it is now the Euro. The OECD usually uses the US dollar; it depends on the group of countries under review.

⁷ XR-PLI = XR-PRICE of country divided by the geometric mean of XR-PRICE of all countries; BHPPP-PLI = BHPPP-PRICE of country divided by the geometric mean of BHPPP-PRICE of all countries.

⁸ Eurostat uses the three ranges proposed by Quaranta: 82 to 120, 65 to 150 and 50 to 200. The OECD uses one range either 80 to 120 or 50 to 150 depending on the group of countries under consideration.

⁹ The weights are taken from the previous comparison and are not necessarily the most up to date. They will also be incomplete if new countries have joined the Programme in the meantime.

¹⁰ $CV = (\sqrt{\Sigma(u - \bar{u})^2 / n}) / \bar{u}$, where $\bar{u} = \Sigma u / n$

- CV 1.2 (Table 1): This refers to the BHPPP-PLI of all the products priced by a country for the basic heading. It serves as an indicator of the reliability of a country's basic heading price level (BHPLI). It can be used to compare this reliability across basic headings.
- CV 2.1 (Table 2): This refers to the product price levels obtained when basic heading purchasing power parities (BHPPP) are used to convert product prices in national currency to the common currency. In other words, it is the coefficient of variation of the BHPPP-PLI. It provides a means of comparing the variation of price levels among countries for a product with the variations of price levels among countries of other products covered by the basic heading.
- CV 2.2 (Table 2): This refers to the prices collected by a country for the product. Its usefulness as an editing tool depends on the number of price quotations underlying the average price. However, a high coefficient of variation vis-à-vis those of other countries is an indication that a country should review its price quotations again - hence Flag A.

12. Except for CV 2.2, none of these coefficients of variation are essential to the editing process, though they do provide useful measures of reliability of the purchasing power parities at the product, country and basic heading levels and in doing so provide a background against which editing decisions can be made. Since the OECD is provided with average prices by countries and not, as is Eurostat, the price quotations on which the average price is based, it cannot calculate CV 2.2. Also, as countries co-ordinated by the OECD, particularly the non-European countries, price only a few products per basic heading, the OECD does not calculate CV 1.1, CV 1.2 and CV 2.1. either.

13. To date both Eurostat and the OECD have found the Quaranta tables to be useful tools in identifying and correcting outliers. Experience has also shown that the tables by themselves are not enough. As already noted, participating countries have a central role in the editing process, but they can find the wealth of information presented in the tables overpowering, making it difficult for them to see the wood from the trees. To overcome this, Quaranta tables need to be accompanied by a commentary which guides countries around them, pointing out to each country what it should be checking. When Eurostat or the OECD have circulated Quaranta tables without such a commentary, their effectiveness as an editing tool has been noticeably blunted.

Table 1: QUARANTA TABLE FOR A BASIC HEADING

EUROSTAT VERSION

Country	XR (1 Ecu =)	BHPPP (1 Ecu =)	BHPLI (BHPPP/XR)	Weight (per 100000)	Products priced (number)	Represent- ative products (number)	CV 1.2 (BHPPP-PLI of products priced by country)
A	1.93039	1.90343	98.60	176.4	13	11	12.90
B	6.53269	5.27261	80.71	213.0	14	14	18.34
C	1932.35	1518.44	78.58	233.7	11	8	19.57
D	2.16519	2.06700	95.46	131.3	12	10	24.92
E	39.7800	37.8511	95.15	150.9	13	11	14.10
F	39.7800	33.2624	83.62	116.4	13	11	18.12
G	0.768050	0.613833	79.92	70.2	7	6	20.30
H	0.767100	0.610746	79.62	366.3	10	9	29.97
I	7.41390	9.79006	132.05	266.4	9	6	13.64
J	304.419	251.039	82.46	433.6	12	12	25.28
K	162.498	114.187	70.27	400.2	13	11	25.41
L	195.164	157.153	80.52	353.8	10	10	23.88
M	13.5839	13.1695	96.95	117.4	10	8	16.87
N	1.62727	1.80127	110.69	154.1	10	9	22.52
O	8.46235	15.9887	188.94	121.2	11	8	20.13
P	5.81200	11.2359	193.32	112.3	15	11	26.25
Q	3.55299	2.54178	71.54	323.0	11	10	32.42
R	84.5893	95.8697	113.34	265.1	12	6	16.45
S	8.11739	13.7145	168.95	39.7	12	6	24.28
Average weight:				195			
				Products specified:	23		
				CV 1.1 (average of CV 2.1)			19.27

OECD VERSION

Country	XR (1 Ecu =)	BHPPP (1 Ecu =)	BHPLI (BHPPP/XR)	Weight (per 100000)	Products priced (number)	Represent- ative products (number)
A	1.93039	1.90343	98.60	176.4	13	11
B	6.53269	5.27261	80.71	213.0	14	14
C	1932.35	1518.44	78.58	233.7	11	8
D	2.16519	2.06700	95.46	131.3	12	10
E	39.7800	37.8511	95.15	150.9	13	11
F	39.7800	33.2624	83.62	116.4	13	11
G	0.768050	0.613833	79.92	70.2	7	6
H	0.767100	0.610746	79.62	366.3	10	9
I	7.41390	9.79006	132.05	266.4	9	6
J	304.419	251.039	82.46	433.6	12	12
K	162.498	114.187	70.27	400.2	13	11
L	195.164	157.153	80.52	353.8	10	10
M	13.5839	13.1695	96.95	117.4	10	8
N	1.62727	1.80127	110.69	154.1	10	9
O	8.46235	15.9887	188.94	121.2	11	8
P	5.81200	11.2359	193.32	112.3	15	11
Q	3.55299	2.54178	71.54	323.0	11	10
R	84.5893	95.8697	113.34	265.1	12	6
S	8.11739	13.7145	168.95	39.7	12	6
Average weight				195		
				Products specified	23	

Table 2: QUARANTA TABLE FOR A PRODUCT

EUROSTAT VERSION

Country (1)	PRICE (national currency)	Repre- sent- ative (*)	Quotat- ions (number)	CV 2.2 (prices collected)	Flag A	XR- PRICE (Ecu using XR)	XR-PLI (XR- PRICE/ GM)	Flag B (2)	BHPPP- PRICE (Ecu using BHPPP)	BHPPP- PLI (BHPPP- PRICE/ GM)	Flag C (2)	
B	5.90	*	17	45	>	0.90	72	<	1.12	90		
D	2.20	*	17	51	>	1.02	81	<	1.06	86		
E	44.23	*	13	10		1.11	89		1.17	94		
F	28.00	*	4	4		0.70	56	<<	0.84	68	<	
G	0.83	*	10	4		1.08	86		1.35	109		
H	0.60	*	4	2		0.78	62	<<	0.98	79	<	
I	12.95	*	3	11		1.75	139	>	1.32	107		
J	388.25	*	12	12		1.28	102		1.55	125	>	
K	193.60	*	15	12		1.19	95		1.70	137	>	
L	181.67	*	15	13		0.93	74	<	1.16	93		
M	12.90	*	2			0.95	76	<	0.98	79	<	
N	2.34	*	4	12		1.44	114		1.30	105		
O	23.20		1			2.74	218	>>>	1.45	117		
P	23.58	*	18	14		4.06	323	>>>	2.10	170	>>	
Q	2.04	*	7	17		0.57	46	<<<	0.80	65	<<	
R	107.00		6	15		1.26	101		1.12	90		
S	23.64	*	11	5		2.91	232	>>>	1.72	139	>	
GM (geometric mean):						1.255			1.237			
						CV 2.1 (BHPPP-PLI for product)						26.84

(1) Countries A and C did not price the product. (2) <82 - >120; <<65 - >> 150; <<<50 - >>>200.

OECD VERSION

Country (1)	PRICE (national currency)	Repre- sent- ative (*)	XR- PRICE (Ecu using XR)	XR-PLI (XR- PRICE/ GM)	Flag B (2)	BHPPP- PRICE (Ecu using BHPPP)	BHPPP- PLI (BHPPP- PRICE/ GM)	Flag C (2)
B	5.90	*	0.90	72	#	1.12	90	
D	2.20	*	1.02	81	#	1.06	86	
E	44.23	*	1.11	89		1.17	94	
F	28.00	*	0.70	56	#	0.84	68	#
G	0.83	*	1.08	86		1.35	109	
H	0.60	*	0.78	62	#	0.98	79	#
I	12.95	*	1.75	139	#	1.32	107	
J	388.25	*	1.28	102		1.55	125	#
K	193.60	*	1.19	95		1.70	137	#
L	181.67	*	0.93	74	#	1.16	93	
M	12.90	*	0.95	76	#	0.98	79	#
N	2.34	*	1.44	114		1.30	105	
O	23.20		2.74	218	#	1.45	117	
P	23.58	*	4.06	323	#	2.10	170	#
Q	2.04	*	0.57	46	#	0.80	65	#
R	107.00		1.26	101		1.12	90	
S	23.64	*	2.91	232	#	1.72	139	#
GM (geometric mean)			1.255			1.237		

(1) Countries A and C did not price the product. (2) Either <80 - >120 or <50 - > 150 depending on country group.

