WEIGHTS IN THE HARMONISED INDEX OF CONSUMER PRICES: SELECTED ASPECTS FROM A USER'S PERSPECTIVE[1]

Martin Eiglsperger and Daniela Schackis

European Central Bank (ECB)

1 Introduction

One of the most intensively discussed issues in the context of compiling consumer price indices is how frequently the index weights should be updated and for which time spans weights may be kept constant.[2] While it is widely accepted by producers and users of consumer price indices that weights should reflect current household consumption expenditures,[3] it is in practice not straightforward to achieve weights that are at the same time sufficiently up-to-date, accurate and reliable, and which are not significantly affected by structural shifts that might impact on measuring pure price changes over time. Given these conflicting desirable properties for the index weights, statistical institutes have to strike a balance in order to create the best possible weights, serving the needs of several users.

The Harmonised Index of Consumer Prices (HICP) has been created by the European Statistical System[4] as a chained Laspeyres-type index[5] which uses fixed expenditure weights in the course of a calendar year, but allows updating the weights – as well as the basket of goods and services - on an annual basis. Therefore, the HICP measures pure price changes within a calendar year, while significant changes in

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[2] See, e.g., International Labour Organization et al. (2008), revised Chapter 9 of the "Consumer Price Index Manual", p. 32-33.

[3] For a more critical view on the up-to-dateness of weights used in consumer price indices see von der Lippe, P. (2001), p. 5.

[4] The European Statistical System comprises Eurostat and the national statistical institutes of the 27 Member States of the European Union.

[5] The Consumer Price Index Manual uses the term "Lowe index" instead of "Laspeyres-type index" (See International Labour Organization et al. (2008), revised Chapter 9 of the Consumer Price Index Manual, p. 27). Laspeyres-type or Lowe price indices differ from true Laspeyres price indices since the quantity data stem from a weighting reference period which differs from the price reference period.

consumption patterns can be taken into account in a timely manner. The actual practices of updating weights differ across the national statistical institutes compiling HICPs, ranging from annual updates to general reviews of weights conducted in five-year intervals. These different practices have been made congruent for HICP purposes in order to allow national HICPs to be aggregated, but only in formal terms, i.e. by introducing a price-updating of weights to the December of the respective previous year. The volume data underlying national HICP weights still represent, to a different degree, current consumption patterns. This implies that the comparability of HICP weights might be negatively affected by the different periods to which the quantity components refer across countries.

The HICP plays a key role in the ECB's monetary policy, serving as a yardstick for the definition of price stability in the euro area. In the context of the ECB's conjunctural analysis, a key input to monetary policy decision making, the ECB highly appreciates that the euro area HICP flash estimate for the current month is released at the end of that month with a full release two weeks later. It might be argued that the achieved timeliness of HICP data and the tradition of revising the HICP only in exceptional cases may imply some restrictions as regards the use of weights reflecting current consumption expenditures. The best possible estimates of current weights may in practice only be achieved ex post, i.e. by using information which typically becomes available several months after the release of the respective HICP. Investigations of revising weights by using more detailed and up-to-date information certainly provide useful insights. Nevertheless, we would not consider the implementation of a policy of frequent revisions to weights following their initial publication as desirable.

The HICP framework and HICP practices, as they are currently in place, require measures to be taken by statistical institutes in order to adequately reflect structural shifts in HICP weights in a sufficiently timely manner, in particular in the course of the annual review of HICP weights. However, it is not fully clear to which extent these measures have led to a synchronised treatment of weights which change more rapidly over time. Some differences in the age of baskets[6] across countries seem to have remained relevant. Therefore, tighter HICP standards may help to further improve the principles of weight updating.

This paper presents some views on estimating and updating HICP weights, taking the perspective of a user for whose conjunctural analysis the HICP plays an important role. It refers very closely to current discussions within the European Statistical System, in particular the HICP Working Group. The HICP conceptual framework on weights and current country practices are presented in chapter 2. Some general considerations on weights and techniques which may be used for the compilation of chain-linked consumer price indices are outlined in chapter 3. Chapter 4 discusses selected aspects in updating weights of consumer price indices from a user point of view. Chapter 5 presents a summary and some conclusions.

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[6] According to the Consumer Price Index Manual the basket of a consumer price index is made up by the individual quantities in the weight reference period. (See International Labour Organization et al. (2008), revised Chapter 9 of the Consumer Price Index Manual, p. 27).

2 HICP weights: Conceptual framework and implications

2.1 Weights in the conceptual framework of the HICP

The Council Regulation No 2494/95[7] establishing the HICP defines it in Article 9 as a Laspeyres-type index. While HICPs present a set of consumer price indices harmonised in terms of concept and output-relevant compilation practices, detailed methods of calculating national HICPs are usually based on, or at least closely linked to, the techniques applied to the non-harmonised national consumer price indices which currently exist in parallel. This implies that the weight reference period, i.e. the period from which households' expenditure patterns are derived, of the national HICPs is often that of the underlying national consumer price indices, and these periods may differ across countries. To allow for the aggregation of national HICPs and their sub-indices to European aggregates, the HICP is expressed as a chain-linked Laspeyres-type index with December as linking month. The HICP price reference period is defined as December of the previous year (t - 1). For the aggregation of national HICPs with different weight reference periods, national expenditure weights are expressed in prices of the common price reference period, i.e. previous year's December. This is done by "price updating" (and normalising) the national expenditure weights, derived from expenditure values observed in a past period, which vary across countries, to prices in December of the year t - 1. Price updating is a rescaling exercise for which the national weights referring to the "annual household final monetary consumption expenditure incurred on the economic territory of a country", as derived from a national household survey, National Accounts and other sources in a past reference year, are updated with the movements of the respective item's price index covering the period between the weight reference year and December of the year t - 1.

2.2 Minimum standards for the quality of HICP weights and country practices

Commission Regulation (EC) No. 2454/97[8] sets out the minimum standards for the national weights used for compiling the HICP. These weights have to refer to a 12-months period ending not more than seven years prior to December of the year t - 1. This means in practice that the Household Expenditure Surveys (HESs, also called "Household Budget Surveys") or any other source from which the national weights are derived may reflect the household expenditure patterns of the year t - 7 or more recent years.

To ensure the national weights used for compiling the HICP are still representing current expenditure patters, an annual review of the weights is requested at the level of sub-indices[9] and their major components. Adjustments to the weights referring to t - 7 or more recent years need to be made for any

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[7]   Council Regulation (EC) No 2494/95 of 23 October 1995 concerning harmonised indices of consumer prices. (See European Communities (2001), p. 201-206.)

[8]   Commission Regulation (EC) No. 2454/97 of 10 December 1997 laying down detailed rules for the implementation of Council Regulation (EC) No 2494/95 as regards minimum standards for the quality of HICP weightings. (See European Communities (2001), p. 249-252.)

[9]   Equivalent to the four-digit-level or class-level of the COICOP/HICP (classification of individual consumption by purpose adapted to the needs of HICPs) classification. The latest version of this classification is laid down in Commission Regulation (EC) No 1749/1999 of 23 July 1999 amending Regulation (EC) No 2214/96, concerning the sub-indices of the harmonized indices of consumer prices. (See European Communities (2001), p. 281-318.)

significant changes in expenditure patterns since the data collection. In this context, a significant change is defined as an impact of 0.1 percentage points on the annual rate of HICP inflation.[10] Weights for which the likelihood is high that such significant changes may have occurred are considered to be "critical weights".[11] In more general terms, the existing minimum standards require that weights which do not sufficiently represent anymore current expenditure shares, have to be newly estimated and to be included in the HICP weighting scheme with the January index in the year t.

The minimum standards set out in Commission Regulation (EC) No. 2454/97 achieve minimum requirements for aggregating national HICPs. It allows compiling national HICPs either as annually chained indices or as direct price indices whose quantities are fixed for some years ("fixed basket index"[12]).

While the majority of national statistical institutes in the EU has implemented an annual update of HICP subindex weights, Belgium, Denmark, Germany, Ireland, Greece, Cyprus, Malta, Austria and Finland conduct a general update of the volumes underlying HICP weights at three to five-year intervals. Discussions in the HICP Working Group have revealed that harmonising the frequency of weight updating is not the only issue which might limit comparability of HICP weights across countries. Therefore, Eurostat aims at implementing a more comprehensive approach to the update of HICP weights.

2.3 Tighter standards for the quality of the HICP weights

In the second half of 2008, Eurostat started discussing with the national statistical institutes of the EU Member States tighter standards regarding the quality of the national weights used to compile the HICP and hence an amendment of Commission Regulation (EC) No. 2454/97. The defined aim is to have for the compilation of the HICP national weights reflecting as close as possible the "annual household final monetary consumption expenditure incurred on the economic territory of a country" in the year t - 1. In practice, this can be achieved by estimating a weighting structure at sub-index level from volume information that refers to the year t - 2. It is suggested to derive this weighting structure from the private consumption data from National Accounts and any other relevant and sufficiently reliable sources.

As in Commission Regulation (EC) No. 2454/97, weights below the sub-index level may be up to seven years old, acknowledging that in several countries the only reliable source of such detailed weight data are HESs which – at least in their most comprehensive and detailed form – are only conducted at five-year intervals. However, the annual review of critical weights would remain in place – also at the detailed

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[10] Although this may appear sufficient to give comparable weighting schemes, at least some national statistical institutes interpret this requirement as relating to each individual weight in isolation. Since in most cases weight updates for individual products are unlikely to lead to an impact of 0.1 percentage points or more on the overall index, the number of updates of such "critical weights" has been limited.

[11] Paragraph 7.5 in Eurostat (2001): "On the Calculation of Harmonized Indices of Consumer Prices (HICPs)" defines critical weights "as those weights which present a significant risk of affecting the comparability, relevance or reliability of the HICP given the actual divergence of the movement in the corresponding price index from the movement in the overall HICP over any 12 month period." (See European Communities (2001), p. 186.)

[12] International Labour Organization et al. (2008), revised Chapter 9 of the Consumer Price Index Manual, p. 27.

level - in order to ensure recent significant changes are reflected in the national weights used for compiling HICPs. This review should focus on the weights for HICP sub-indices which may be affected by administrative decisions and for sub-indices comprising fast evolving markets. In this context it should be mentioned that using more up-to-date data to derive HICP weights still requires that weights are price-updated from average prices for year t - 1 to prices in December of the year t - 1.

We expect that tighter quality standards for the HICP weights may significantly improve the comparability of the HICP across countries as well as the relevance and reliability of the HICP and hence very much appreciate Eurostat's initiative.

3   Weights and annual chaining of consumer price indices: Some general considerations

Annually chained consumer price indices compiled in practice usually refer to December or January as linking periods. The HICP uses December as the linking month. An example of linking in January is the Retail Price Index for the United Kingdom.

In a more general context, using a single month as the linking period is not the only option of compiling annually chained indices. In analogy to the chain-linking as applied in National Accounts the entire previous year ("annual overlap technique") or the respective month in the previous year ("over-the-year technique") could be used as the linking period. Each of these linking techniques may require a specific set of weights in order to bring in line the price reference period and the period to which the price component of the weights refers. For linking over December, weights are used which are expressed in December prices, while weights valued at annual average prices would be chosen when the annual overlap technique is applied. Since December prices can differ significantly from the respective annual averages, different linking techniques may – ceteris paribus – produce different results.

The annual overlap technique has the advantage that monthly or quarterly series and independently compiled annual data are consistent, which is a desirable property in National Accounts, since annual accounts play an important role. The over-the-year technique produces year-on-year rates of change which are not affected by changes in the weighting scheme, whereas linking price indices over December produces month-on-month rates of change which reflect pure price changes within a calendar year. While the latter property is important for conjunctural analysis, year-on-year rates of change are the most prominent form of presenting and analysing inflation in Europe and many other countries. In this context, it might be considered important to have year-on-year inflation rates not affected by any structural changes in expenditure patterns, as it would be realised if the over-the-year technique were applied rather than linking over December. However, this would come at the high cost of severely affecting the short-term properties of an HICP series annually chain-linked by the over-the-year approach.[13] These short-term properties play an important role in conjunctural analysis. Therefore, we do not consider a change to the linking technique already implemented in the HICP to be desirable.

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[13]   See Bloom, A. M. et al. (2001), p. 158 and Eurostat and ECB (2008), p. 24.

While we are not aware of any country which generally applies the over-the-year technique to price indices, this approach to chain-linking has been suggested as an option for the treatment of seasonal items, comparing a basket of seasonal items in a certain month with the respective month in the previous year (the so-called "year-on-year monthly chained indices").[14]

According to our information also the annual overlap technique is not generally used for linking price indices. Yet, there are some special cases in which price indices are linked over an entire year. The German statistical institute, for example, linked the series of package holiday prices to its 2005 annual average, when it revised its national consumer price index to 2005 as a new reference year.[15] However, this was a case-specific treatment and the linking was conducted only for linking the 2000 base index with the 2005 base index and not in form of an annual chain linking.

When compiling a seasonally adjusted series of a consumer price index, which may be used as an additional tool for short-term analysis,[16] it could be considered to aggregate seasonally adjusted series obtained at a more detailed level of breakdown.[17] In this context it could be argued that the statistical properties of chain-linked series might benefit from constellations in which the prices in the linking month are more similar to both the prices in the reporting month and the comparison month, while the difference between the two latter prices is larger.[18] Whenever prices show a seasonal peak or trough in the linking month (e.g. prices for package holidays in December), seasonally adjusted data serve better the similarity criterion.[19] When intending to compile a seasonally adjusted series of a chained price index by aggregating its seasonally adjusted components, adjusting the price-component of weights for seasonal effects may change the weighting structure considerably. For example, estimates of the seasonal factors of the euro area price index for package holidays indicate that the impact of seasonal effects on package holiday prices in December is more than 9% higher than on average on December figures of the overall euro area HICP.[20] As a consequence, applying the weight of package holidays that is price-updated by using seasonally adjusted December prices rather than non-adjusted December prices, would lower the weight of package holidays by the corresponding relative amount.

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[14] See, e.g., International Labour Organization et al. et al. (2007b), corrected Chapter 22 of the Consumer Price Index Manual.

[15] See Statistisches Bundesamt (2009).

[16] In the majority of the Member States of the European Union seasonally adjusted consumer price indices are currently not calculated. Where consumer price indices are adjusted for seasonal effects, often the national central bank compiles the series, in several cases for internal purposes. In the Czech Republic, France and Hungary the statistical institutes compile and publish seasonally adjusted series of the national consumer price index or of a core inflation measure derived from the national consumer price index, while seasonally adjusted data of national HICPs are currently not produced, neither by national statistical institutes nor by national central banks. Seasonally adjusted series of the euro area HICP are compiled and published by the ECB.

[17] For the United States, e.g., the seasonally adjusted consumer price index, as calculated by the Bureau of Labor Statistics, is aggregated from more than 70 seasonally adjusted components, see, e.g.: http://www.bls.gov/cpi/cpisapage.htm.

[18] On this similarity criterion see, e.g., Hill, P. (1988), p. 137. However, as shown by R. J. Hill (2006), similarity of prices is neither necessary nor sufficient for reducing the Laspeyres-Paasche spread. Rather, the spread depends on the correlation between price and quantity relatives.

[19] This similarity criterion is also met by the German statistical institute when it linked the package holiday price index to its average in 2005.

[20] Based on own estimates using the seasonal adjustment program X-12-ARIMA, version 0.2.10.

4 Updating HICP weights: Some thoughts from a user's perspective

4.1 Conceptual and practical considerations

The two main principal sources of weighting information are HESs and National Accounts, both of them are usually used by national statistical institutes, the latter at least in order to align HES-based expenditure shares with the domestic concept. Only a few countries conduct HESs on an annual basis. By contrast, annual National Accounts data on private consumption are available with a short publication lag, but these data are preliminary, usually revised to a significant extent until they become (semi-)definite. Concerns about the general use of National Accounts data as a principal source have been put forward by some national statistical institutes, arguing that timely National Accounts data may be revised substantially, while revising HICP weights accordingly may not be desirable. HES data, adjusted in well-known areas of underreporting, e.g. on consumption of alcoholic beverages and tobacco, are considered the most reliable source, also providing sufficiently detailed information for deriving weights at a detailed level. However, not updating HES-based weights for changes in volumes until a new household survey is conducted might negatively impact on the statistical properties of HICP weights. HES-based weights which are not adjusted for changes in volumes are typically price-updated until the December previous to the reporting period, which implies that this price-updating may comprise a time span of several years. When changes in volumes identified in the newly conducted HES are implemented into HICP weights, the new value of a certain HICP weight might show a shift compared to its previous, purely price-updated values. Such structural shifts in weights impact on the measured level of inflation whenever volume shifts occur and newly estimated weights are applied from the reporting month, but not retrospectively to previous index periods – at least the previous year. This is the current HICP practice, while, for example, the German statistical institute, when updating the weight reference period, introduces the newly compiled weights also backwards into its national consumer price index to avoid structural shifts in weights.[21]

The different timeliness of reflecting structural changes in HICP weights, caused by the fact that weights from different previous weight reference periods may for up to 7 years be purely price-updated before new volume data are introduced, may limit the comparability of the respective weights across countries. This issue seems to become more relevant the more the age of HICP baskets differ across countries. According to Eurostat's considerations the age of HICP item weights may possibly impact to some extent on the comparability of national HICPs in the short-term, while the relevance of such effects seems to become more likely in the long-term.[22] A general strategy towards an annual volume-updating of weights could improve the comparability of HICPs in this respect. However, it has to be investigated to which extent available information on current volume structures may allow deriving reliable estimates of weights. The reliability of estimated HICP weights deserves special attention, since weights are

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[21] See, e.g., Statistisches Bundesamt (2008a), p. 3.

[22] See European Communities (2004), p. 9.

"cumulative"[23] when indices are chain-linked, i.e. weights from each weight reference period may have an effect on the resulting chain index.

Overall, the differences in the age of national HICP baskets has the potential to negatively affect the comparability of HICP weights across countries and may in this respect also impact on the statistical quality of HICP weights at the euro area level. Another relevant aspect is to consider, country by country, which impact a more frequent update of the basket may have on the total consumer price index. Empirical evidence indicates that the impact of applying weight reference periods from different previous years on the aggregate consumer price index may be limited. The 2005-update of the national consumer price index for Germany revealed that annual inflation rates in 2006 and 2007 obtained by using 2005-based weights instead of those referring to 2000 differed only once by a bit more than 0.1 percentage points in absolute terms.[24] The absolute effects were slightly higher, when the basket was updated from 1995 to 2000, showing in 2001 annual changes which were on average 0.2 percentage points lower than those calculated with 1995 as a weight reference period.[25] For the US consumer price index test calculations with alternative one-year weight reference periods for the period December 1986 through December 1995 showed only small variations in the year-on-year changes of the respective Laspeyres price indices.[26] A comparison of the Canadian consumer price index, using 2000 weights expressed in 2005 prices and 2005 weights, revealed that the update of volumes generally reduced inflation rates to some extent, amounting to a difference of 0.5 index points in terms of index levels in April 2007, the last period of the investigation.[27] Statistics Japan has estimated the impact of volume updates on its consumer price index for each of the five-yearly index revisions since 1970.[28] When the baskets were updated to 1970, from 1965, and 1980, from 1975 the Laspeyres and the Paasche index of the respective "old" and "new" weight reference year differed significantly, while the relative importance of those differences, in terms of annual inflation rates, may be considered limited in the light of the high inflation rates prevailing in those years. On the other hand, the fact that the Paasche index was 2.5 percentage points smaller relative to its Laspeyres counterpart for the period from 2000 to 2005, when respective annual rates of change were mainly small and negative, indicates a sizable impact of the respective volume update.

The Australian Bureau of Statistics analysed to which extent weights of selected consumption categories have to change in order to create a significant impact on annual consumer price inflation.[29] Referring to prices and weights for motor vehicles and tobacco products it was found that even for these categories with relatively high consumption expenditure shares only changes of weights between 20% and 30% would impact on the aggregate consumer price index by more than 0.1 percentage points. In more general

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[23] Von der Lippe, P. (2007), p. 140.

[24] Elbel, G. and Egner, U. (2008), p. 343.

[25] See Statistisches Bundesamt (2003), p. 18.

[26] See Greenlees, J. S. (1997), p. 4.

[27] See Chaffe, A. et al. (2007), p 23-24.

[28] For this and the following see Statistics Bureau Japan (2006), p. 10.

[29] For this and the following see Australian Bureau of Statistics (2000), p. 13-14.

terms, according to the Consumer Price Index Manual, Eurostat studies have shown, that consumer price indices "are fairly insensitive to changes in weights."[30]

Current practices of those national statistical institutes which derive HICP weights primarily from National Accounts data and recent discussions within the HICP Working Group reveal that $t – 2$ data could be considered the most current information to be used for annually updating HICP weights, since $t – 1$ are not available in time for deriving weights to be used for HICP calculations from January of year t. While it can not be expected that more timely alternative sources of data for HICP weights will become available in the medium term, the general strategy could be to explicitly target to produce the best possible estimate of $t – 1$ weights, given the timeliness requirements, e.g. by combining available HES and National Accounts information and making justified adjustments – using sufficiently reliable empirical evidence rather than pure judgements - in areas in which weights can be expected to change more substantially. Several data sources might be considered as candidates that could contribute to a more frequent update of weights such as tax revenue statistics, statistics on car registrations and turnover statistics (e.g. from industry associations) as well as scanner data (e.g. on communication and electronic entertainment devices, clothing).

4.2   Identification of areas prone to weight shifts

Reaching the goal of annually updating HICP weights by producing best possible estimates of $t – 1$ weights requires most additional efforts by those national statistical institutes which currently conduct their general update of weights in three- to five-year intervals. However, by identifying those subindices whose weights tend to follow more pronounced trends or are more prone to structural shifts and then focussing on updating those weights compilers could strike a balance between up-to-dateness of weights and the resources needed for annual weight updates.

Identifying areas in which weights change more rapidly and more substantially over time seems complex, but might not require too many additional resources. Moreover, the current HICP conceptual framework already requires the identification of "critical weights". While the identification and adjustments of significant shifts in weights are a core aspect of this requirement, it could also be expected that more pronounced trends in product weights could be adequately monitored in this context. Recent investigations by Statistics Canada, which updates the weights of its consumer price index every four to five years, revealed that the number of substantial changes in the volumes of the 2000 and the 2005 basket was limited.[31] By conducting a so-called Bortkiewicz-Szulc decomposition Statistics Canada found out that major contributions to quantity-related changes in weights between the 2000 and the 2005 basket occurred for tobacco, for communication goods and services and for traveller accommodation. Investigations by the national statistical institute of Germany, conducted when the national consumer price index was rebased to 2005 = 100, revealed that more significant changes in the volume component

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[30]   International Labour Organization et al. et al. (2007a), corrected Chapter 4 of the Consumer Price Index Manual.

[31]   For this and the following see Chaffe, A. et al. (2007).

of weights also occurred only in a limited number of groups,[32] indicating that consumers bought more telecommunication goods and services and spent more on computers, also for higher-quality desktops and laptops. This evidence differs somewhat from the comparison of volumes in the 1995- and the 2000-baskets of the German consumer price index which revealed some relatively higher differences in the areas of food and housing,[33] while, as outlined in Section 4.1, the impact of volume updates on annual rates of change in consumer prices did not exceed 0.2 percentage points.

Concerning shifts in weights the following areas might deserve special attention:

- Categories in which items have become relevant for the HICP coverage ("newly significant"). While the HICP conceptual framework requires introducing such products on an annual basis, the regulations do not necessarily require an update of the weights for the associated product category. However, since the incorporation of newly significant products might indeed go along with increased expenditures in the related product category and since quantitative data are usually used to decide whether the expenditures of a product have become significant for HICP purposes, this information could also be applied to recalculate the respective weights.

- Health and social care services for which changes in the supply might increase household expenditure to be covered by the HICP, e.g. increasing population share covered by private health insurances or health care reforms which may increase the share of services that fall outside the public health and social system.

- Areas in which price-updating might produce biased results due to substantial shifts in volumes, e.g. goods and services for which changes in price administration or changes in excise duties induce substantial changes in consumed volumes. Another example is the area of package holidays and transportation by air for which demand might tend to increase substantially as a reaction to price reductions. Consumption of transportation goods and services might also react to significant price changes.

- Areas with significant quality adjustment. If quality-adjusted indices are used for price updating of products with significant quality improvements, actual expenditures would be underestimated, e.g. in the areas of information processing equipment, photographic and cinematographic equipment. Comparability across countries may suffer substantially, whenever the period to which the description of a product's quality refers differ across countries, changes in quality are substantial over time, and a price-updating with quality-adjusted price indices is conducted in order to estimate $t-1$ weights. A common reference period for the description of products is urgently required in such a context.

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[32] For this and the following see Elbel, G. and Egner, U. (2008), p. 342-343.

[33] See Egner, U. (2003), p. 427.

4.3 Identification of areas prone to irregular weight movements

While an annual update of weights is desirable in areas in which significant structural changes are identified, there are also product categories in which an annual update of weights might imply the risk to reflect more irregular movements. This could be the case when weights are derived by "netting" expenditures, e.g. for used cars whose weight excludes purchases within the household sector, while the shifts between purchases from professional car dealers and private households can be significant, or, more important, for insurances whose weight excludes reimbursements which may vary substantially from one year to the next. Such net weights strictly compiled by only using information from the respective year may reflect one-off effects, while longer-term averages or smoothed weights might be a better representation of the generally underlying consumption structures. HICP Regulation 1617/1999 already established the use of three-year averages for insurance weights.[34]

It has to be stressed that weights in a conceptual framework of Laspeyres indices do not – and shall not - represent consumption patterns of the current year. However, if expenditures show a strong and timely reaction to short-term fluctuations in the economy, the representativity of consumption expenditures of the previous year for actual current development might be limited. Typical areas in which such phenomena might become relevant are major durable goods like cars, furniture or luxury products.[35] At conjunctural turning points, purchases of a certain product in the year preceding the reporting period might be in sharp contrast to current consumption. It might even happen that, at the same time, prices show changes in the opposite direction. Then using the best possible estimate which strictly refers to the $t-1$ situation could produce extreme results, implying certain challenges for conjunctural analysis.

Prices and quantities may oscillate over business cycles or in shorter-term periods. When prices and quantities are "bouncing" (Szulc, 1983) the properties of chain-linked indices can differ substantially from those obtained when prices and quantities change smoothly over time.[36] While it is impossible – also for price statisticians - to foresee sharp economic upturns or downturns when weights are compiled, it could be considered to use smoothed weights for products for which demand tends to react sharply. In the case of energy prices, in which it may be difficult to discriminate more erratic price movements from trend increases, it could be considered to adjust weights for volatile demand, e.g. by referring to

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[34] Council Regulation (EC) No 1617/1999 of 23 July 1999 laying down detailed rules for the implementation of Council Regulation (EC) No 2494/95 – as regards minimum standards for the treatment of insurance in the Harmonized Index of Consumer Prices and modifying Commission Regulation (EC) No 2214/96. (See European Communities (2001), p. 279.)

[35] See ILO et al. (2007), revised Chapter 9 of the Consumer Price Index Manual, p. 33. The weights of the net acquisition of owner-occupied dwellings, whose inclusion into the HICP is currently investigated by the European Statistical System, are prone to be affected by the "netting concept", i.e. the exclusion of purchases within the household sector, and might be significantly affected by sharp changes in transactions. For this reason, the Eurostat pilot group suggested that longer-term averages should be used for compiling weights of net acquisition indices on owner-occupied housing.

[36] See Hill, P. (1988), p. 136. However, it has to be said that referring to the "bouncing" of prices and quantities is somewhat imprecise since the oscillations may take different forms, which may have different effects on the relationship between chain indices and direct indices. Against this background R. J. Hill (2006) elaborated sufficient conditions for chaining to reduce the Paasche-Laspeyres spread. According to von der Lippe (2007, p. 483) the amount of drift between a chain and a direct index "depends on the cumulated change of quantities associated with the change of prices" and the way the prices and the quantities series change over time.

temperature-adjusted energy consumption.[37] Obviously, such a "loose" approach is not perfectly in line with the strict conceptual requirements implemented when targeting to estimate $t-1$ weights. Hence, in order to find a viable compromise, it could be thought about defining the target of weight updating less strictly, e.g. that weights should represent "normal" current consumption expenditures, referring to $t-1$ whenever appropriate.

Overall, the number of cases in which smoothed weights seem to be preferable when weights are updated on an annual basis is limited. However, since the expenditure shares of these categories can be significant, it could be argued that a specific treatment of those weights is justified in terms of its potential quantitative impact on the overall result.

4.4 Treatment of "non-critical" weights

In areas in which weights are typically not affected by structural shifts, a more general strategy for weight updating might be applied. In order to obtain an appropriate estimate of "non-critical" $t-1$ weights, based on weight information from past years, while $t-1$ information is not available, the most critical issue seems to be whether or not weight information from previous years should be price-updated to average $t-1$ prices, while – as explained earlier – the price-updating of estimated $t-1$ weights to December $t-1$ is a technical requirement of the HICP index formula. Recently, the Czech Statistical Office, Statistics Netherlands and Eurostat have conducted investigations in this area. The general approach of these test calculations was to compare price-updated and not price-updated weights with a benchmark weighting scheme, by referring, for example, to concurrent years, obtained by using National Accounts data on private consumption for those years. By using concurrent information the benchmark weights could be considered "optimal" in the sense that they reflect expenditure shares of the same periods for which the price developments are compiled. In most cases it turned out that, in general terms, weights not price-updated to $t-1$ are on average closer to the benchmark. However, this might differ across product categories.

In cases in which recent weight information is not available, a reference to typical quantity reactions to price changes (price elasticity of demand) might help identify the preferable strategy, whenever it is justified to assume that price-related reactions are predominant, while income effects could be considered insignificant.[38] The following two prototype cases might provide guidance in this respect:

- If the quantities consumed change significantly as a response to price changes, then keeping the expenditure shares and not to price-update should be preferred.

- If, however, quantity reactions to price changes can be assumed to be small (fairly price-inelastic demand) this suggests that price-updating is preferable.

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[37] See, e.g., Statistisches Bundesamt (2008b), p. 3.

[38] The underlying considerations are presented in detail in Hansen, C. (2006), p. 8-9.

However, these two cases represent only the two extremes of a continuum of possible volume reactions to price changes. In addition, it has to be stressed that consumption expenditures change over time not only in consequence of a reaction to price changes. Changes in incomes, consumption habits and tastes and reactions to changes in the infrastructure are also relevant and may start becoming relevant in parallel, while the speed and the persistence of their impact might differ from typical price-related reactions. In this context it has to be borne in mind that the total effects on expenditure shares, and not only expenditures, are relevant for estimating weights. This implies that changes in expenditures on a certain product have to be accounted according to their relative importance compared to changes for other products and changes in overall consumption expenditures.

4.5 Case-by-case approach to weight updating vs. a general strategy

Section 4.2 argued that weights might be adjusted case-by-case for certain subindices when weights are annually updated, while Section 4.3 identified some areas in which smoothing weights might be preferable. This approach to achieve the best possible treatment in each relevant case does not necessarily produce the best overall outcome of the total weighting scheme. A particular issue is the implicit treatment of those weights which are not explicitly adjusted. The Australian Bureau of Statistics explains this issue as follows: "In principle, adjusting for any significant change in expenditures between the HES collection time and inclusion of the weights into the CPI is appropriate. However, this raises a methodological issue. The adjustments to expenditures are generally made without compensating adjustments to other expenditures in the CPI basket. In other words it is implicitly assumed that increased expenditure on health insurance, for example, comes from savings and not from reductions in expenditure on other items."[39]

There is no straightforward solution to this issue. It could be thought about referring to National Accounts data which might provide some insights to estimate to which extent consumption expenditure, in total and by categories, and income have changed over time. In addition, the breakdown in National Accounts private consumption might at least serve as a guideline in order to better integrate case-by-case adjustments of weights into a more general approach which takes account of structural considerations. However, further investigations are required in this area. In this context we would like to refer to the example of volume adjustment of weights which was conducted in the context of updating the consumer price index in New Zealand in 2006. In our view, Statistics New Zealand managed to give due account to consistency requirements by conducting a broadly based volume adjustment, while implications in total expenditures have been taken into consideration.[40]

When creating a general strategy of weight-updating the robustness of weight estimates could be investigated in order to get quantitative insights to which extent different values of weights might impact on HICP results. We could imagine that national statistical institutes have collected information which

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[39] Australian Bureau of Statistics (2005), p. 55.

[40] See Pike, C. (2007).

could be used for such investigations, when conducting the "critical weights" exercise. Based on price data, formulae on contributions to HICP rates of changes could be used in order to find out to which extent weights have to change from one year to the next for creating a significant impact on HICP inflation.

5   Summary and some conclusions

Weights applied for compiling HICPs should reflect current expenditure patterns, using baskets whose weight reference periods do not limit comparability across countries. However, for the timely compilation of consumer price indices weights have to be used which refer to information from past periods. For HICP purposes the most promising source in terms of timeliness and level of detail are National Accounts data on private consumption which stem from the year $t-2$. While price-updating of expenditure shares to December of $t-1$ is a requirement of the HICP formula concept, price-updating over several years might produce weight estimates which do not best reflect current consumption patterns. Therefore, it could be envisaged to not generally conduct a price-updating over several years. Rather, it could be investigated how to adjust expenditure shares from past periods in order to make them as representative as possible for current patterns. In this context, a case-by-case approach could be advocated, arguing that changes in consumption expenditures vary significantly across product categories. Identifying those categories which show more rapid trend changes or structural shifts in consumption patterns and focussing weight updating efforts in these areas would allow statistical institutes to strike a reasonable balance between up-to-dateness of weight data and the amount of resources required for implementing frequent updates of weighting schemes. Moreover, there are also product categories in which it might be the better strategy to smooth weights over a certain time span, thereby limiting the potential risk of contaminating the analysis of pure price changes via irregular movements over time in weights.

Since HESs are the most comprehensive and reliable source for deriving HICP weights, statistical institutes sometimes argue against a more general adjustment of weights in-between two HESs. However, this implies the risk that the weights are affected by structural breaks when new HES-derived weights are introduced. Therefore, adjustments should be conducted in cases in which it is justified in terms of better representativity, while taking into account that the adapted weighting scheme may not be as consistent as the purely HES-based scheme, unless a sufficiently comprehensive and more timely source for obtaining structural information on weights has become available.

From our point of view, it would be desirable to create an implementation strategy for annual updates of weights which takes into account on the one hand that data availability and reliability can vary across countries, while general criteria are required in order to achieve a harmonised approach. In addition, it could be considered to create a centralised expert group which provides support in annual updating of weights and safeguards a common strategy.

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