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Directorate C: Macro-economic statistics
Unit C-4: Price statistics. Purchasing Power Parities. Housing statistics

HICP Compliance Monitoring Report

Denmark

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1. Introduction

In April 2021 Eurostat reviewed the compilation of the harmonised index of consumer prices (HICP) for Denmark. The review was done against the existing legal framework, established HICP recommendations and other guidelines and good practices in the field of consumer price indices (CPI).

The current report is based on:

- The 2021 inventory containing details of data sources, definitions and methods used in the HICP for Denmark.
- The discussion at the compliance monitoring meeting with Statistics Denmark, which was held via videoconference on 22 April 2021.
- The information note on the previous compliance monitoring exercise, which was published in [August 2010](#).

For all main methodological topics related to the HICP, this report briefly summarises the Danish compilation practices followed by Eurostat's appraisal of compliance and, if applicable, requirements and recommendations for improvement. The report concludes with Eurostat's overall assessment of compliance of the HICP for Denmark.

2. Coverage and classification

The target universe of the Danish HICP follows the household final monetary consumption expenditure (HFMCCE) concept as it is defined in Article 2(20) of Regulation (EU) 2016/792 (framework regulation) and the Annex to Regulation (EU) 2020/1148 (implementing regulation).

In line with this concept, the HICP reflects household consumption on the territory of Denmark, including the consumption incurred by institutional households. The domestic principle is applied by covering expenditures made by both resident and non-resident households, while excluding expenditures made by resident households abroad.

The Danish HICP does not take into account purchases made by residents from foreign internet shops. According to the HICP recommendation on the treatment of cross-border internet purchases in the HICP ⁽¹⁾, the expenditure and the prices for goods purchased through the internet shall be recorded in the HICP of the country where the goods are delivered. Similarly, the expenditure and the prices for digital services shall be recorded in the HICP of the country where the consumer usually resides.

Household final consumption of financial services (FISIM), games of chance and the remaining three product categories listed in Article 5(8) of the implementing regulation are precluded from the coverage of the Danish HICP. Imputed rentals of owner-occupiers are excluded from total HFMCCE figures used in the HICP ⁽²⁾. The consumption of own products is not excluded from

⁽¹⁾ The [recommendation](#) is available in HICP dedicated section on Eurostat's website..

⁽²⁾ The inclusion of the owner-occupied housing consumption component, through the rental equivalence approach, constitutes the main coverage difference between the Danish HICP and Consumer Price Index (CPI).

the index. However, these are estimated to account for around 0.06 percent of expenditure on food products (2018 figures) and to have a negligible impact on the HICP.

Dwelling allowances, which are part of European System of Accounts' (ESA 2010) aggregate D.632 ⁽³⁾ and that are identified in the Annex of the implementing regulation as part of HFMCE, are not included in the Danish HICP. Although almost all transfers in kind of market products in Denmark are associated with health insurance benefits ⁽⁴⁾, there is no explicit estimate of the importance and magnitude of this HFMCE component.

Statistics Denmark classifies products and calculates the HICP according to the European Classification of Individual Consumption according to Purpose (ECOICOP), which was implemented in January 2016. After the reclassification of the media license from fees into taxes, the media license was correctly removed from the scope of the Danish HICP in 2019.

Recommendations

- Statistics Denmark should include purchases made on the internet by resident households on foreign websites in the HICP in line with the HICP recommendations on cross-border internet purchases.
- Statistics Denmark should make explicit estimates of dwelling allowances with a view of adjusting the HFMCE figures.

3. Sampling and representativity

The sample of outlets used in the compilation of the HICP is drawn without any geographical representativity concern in mind. Instead, outlets are purposively selected to ensure that the sample is representative for the whole country.

Field price collection activities is carried out in 20 urban areas, which include the biggest and a selection of medium-sized cities in Denmark. Prices collected through digital questionnaires collect prices from outlets located not only in urban areas but also in the countryside. Scanner data, which is obtained from the four biggest supermarket chains (80% of the market share for food and beverage products), contain information from outlets located in different parts of the country. Administrative data sources, which are used for rents, electricity and pharmaceutical products, are either comprehensive or representative for the whole country.

The Danish HICP also uses prices that are collected from websites. These represent e-commerce transactions but also purchases made in outlets that have an online presence. According to Statistics Denmark, the prices observed on the internet are usually the same as the prices charged in the outlets.

The field survey covers approximately 1 650 outlets. The selection of outlets is done to account for different types of commerce (e.g. specialised stores, supermarkets and discount stores) and based on the outlet's turnover values, which are obtained from the Danish business register (DBR). Whenever an outlet needs to be replaced, another reporting unit is chosen using turnover figures from the DBR and selected, to the extent possible, from the same geographical area.

⁽³⁾ Social transfers in kind - market production purchased by general government and non-profit institutions serving households (NPISHs).

⁽⁴⁾ See page 163 of the Danish national accounts' description of [methods and sources](#) on GDP and GNI.

The product specifications are defined in a relatively broad way, using the Household Budget Survey (HBS). The HBS is calculated annually based on a combination of interviews, accounting and administrative data from the sampled households (around 2 200 households out of Denmark's total of 2.6 million households). The concrete product to be followed throughout time is chosen by shopkeepers of sampled outlets whenever prices are collected through digital questionnaires and by price collectors for traditional field price collection activities. Products are replaced based on similarity and most-sold criteria.

Annual resampling is conducted for products included in scanner data. At the beginning of each year, Global Trade Item Numbers (GTINs) are selected based on their turnover in the previous year. Cut-off sampling is applied to include the most sold GTINs for a pre-defined sample size.

The HICP sample of outlets and products is reviewed monthly in quality meetings that have the participation of the staff in charge of the compilation of the CPI and HICP. These monthly meetings are used to identify outdated products and newly significant products. Hybrid and electric cars, which were added to the HICP basket in January 2021, and e-book subscription services, which were included in 2019, constitute two examples of newly significant products that were introduced in the last years in the index.

Compliance

The sampling and representativity in the Danish HICP are in line with the legal requirements.

4. Weights

The compilation of weights is based on 74 household final consumption expenditure (HFCE) groups that are provided by the national accounts unit annually. These consumption groups are calculated using a 13-step approach, which combines balancing procedures and different type of sources, such as the retail turnover index and the household budget survey (HBS) ⁽⁵⁾. These aggregates, which are the most detailed level of disaggregation provided by national accounts, are the source for the derivation of the four-digit ECOICOP HICP weights for Denmark.

Four-digit ECOICOP weights are further divided into the five-digit ECOICOP level and a six-digit national version of this nomenclature, which corresponds to the index's elementary aggregate level, through the use of the relative consumption pattern given by the most recent HBS (i.e. preliminary figures, which are provided 20 months after the end of the reference year of the survey). The weighting system below the elementary level is applied at the product (i.e. eight digits) and store level. While for the former weights are largely based on the HBS, the latter are derived using information taken from the DBR.

Following Article 3(1) of the implementing regulation, national accounts consumption groups (and HBS information on relative consumption patterns) applied in the compilation of subclass expenditure shares refer to year $t-2$.

In line with Eurostat's guidance on the compilation of weights in case of large changes in consumption expenditures ⁽⁶⁾, the expenditure groups used in the HICP for 2021 were updated from 2019 to 2020 using the development provided by quarterly national accounts at the four-

⁽⁵⁾ See pages 155 to 159 of the Danish national accounts' description of [methods and sources](#) on GDP and GNI.

⁽⁶⁾ Available in the [HICP dedicated section](#) on Eurostat's website.

digit ECOICOP level. The fourth quarter of year 2020, which was not available when HICP weights were compiled, was estimated applying the change in consumption between the first three quarters of 2019 and of 2020 and multiplying this estimate with the value of the fourth quarter of 2019. The final weighting structure was price-updated from 2020 to December of 2020 and normalised to 1 000 using the development in elementary aggregates (i.e. six-digit level).

All ECOICOP subclasses, as defined by the weight derivation process mentioned above, and with a share of more than one part per thousand are covered in the Danish HICP. However, the zero weight attached to retirement homes for elderly persons and residences for disabled persons (ECOICOP 12.4.0.2), may be caused by HBS difficulties in capturing and separating these expenditures from other services (e.g. provision of meals, rents). This particular HICP component relates to national accounts consumption group retirement homes, day-care centres (12.4.0.1), which presents expenditure estimates that seem to be significant and different from zero (⁷).

The weight for insurance is derived as a 3-year moving average of household expenditure of the service charge in line with the now repealed Regulation (EC) No 1617/1999. The current implementing regulation specifies that weights for insurance should be based on the service charge as estimated by the national accounts for a single year. According to an assessment made by Statistics Denmark, the impact of using a 3-year moving average compared to a single year is very small.

Recommendations

- Statistics Denmark should investigate whether the expenditure share for ECOICOP 12.4.0.2 is less than one part for thousand and include this subclass index in the HICP in case its relevance proves to exceed this threshold.
- Statistics Denmark should derive weights for insurance services based on the household expenditure of the service charge estimated by the national accounts for a single year.

5. Price collection

The prices survey of the Danish HICP is based on five different data sources. Each month, approximately 7 000 prices of prices are taken from scanner data, which is used for products sold in supermarkets. In addition, around 6 600 prices per month are collected on the internet from web shops for a wide variety of products and services by the central staff.

Moreover, around 4 500 prices per month are obtained through traditional price collection activities. These prices are essentially obtained for fresh food products from butchers, bakeries and other similar small shops), and clothing and shoes. Digital questionnaires are sent to shops and cover all ECOICOP divisions (around 4 200 price quotes per month). Finally, the price indices for rents, electricity and pharmaceuticals are calculated from administrative data sources.

Statistics Denmark plans to investigate the use of bulk web scraping as another source for the compilation of the HICP in the near future.

(⁷) See table 5.4 on page 160 of the Danish national accounts' description of [methods and sources](#) on GDP and GNI for an example from 2012.

Prices are collected in the period between the 7th and the 15th of the month. Prices for energy are collected three times per month. For scanner data, an average price for the two middle weeks is calculated. Prices for flights and package holidays are usually collected in advance, unless an average price can be directly obtained from the travel company. For these services, the prices enter the HICP in the month during which the travel takes place.

The price index for rents, the HICP component with the highest HICP weight (around 9% of the total), is based on a survey comprising of approximately 1 700 dwellings covering the privately owned market and on the use of administrative data containing all rents for the social housing (the private and social sectors each account for half of the rental market in Denmark). The survey is carried out annually, with rents collected in January of each year. The administrative data covering social rents is also provided yearly. With this process, all price developments that may appear in between the month of January of two consecutive years (e.g. those caused by a change in tenancy) will only be captured with the index for January of the next year and not when the actual consumption of the service started, something that is not in line with the HICP regulatory framework. Statistics Denmark is working to obtain data from an association that covers part of the private market and increase, using this new data source, the frequency of the rents index from yearly to quarterly in 2022.

The prices used in health services correspond to the prices actually paid by the households. They do not include the subsidies that may be paid to the service providers. For pharmaceuticals, an average price is used that includes any reimbursements made to households. The index for this category is compiled on a comprehensive data set provided by the Danish health authority on a monthly basis, which has information on the prices, discounts and quantities applied on all products sold in supermarkets and pharmacies in Denmark. However, this data source is integrated into the HICP with a time lag of one month. In practice, this means that the index for the group covering pharmaceutical products (ECOICOP 06.1.1) refers to price developments of one month before. However, based on calculations provided by Statistics Denmark for the period starting in December 2018 and ending in December 2020, it is possible to see that the one month lag, when retrospectively corrected, produces no different results in the overall year on year rates of change. A number of other price indices are based on less than monthly price collection. While some are expected to remain fairly stable throughout time (e.g. passport fee), other may suffer from more frequent month to month changes (e.g. caravans, motor bikes).

Statistics Denmark only follows the full rate for child care services (ECOICOP 12.4.0.1), although prices eventually charged can be lower depending on the socio-economic characteristics of the household, including its income. According to Article 5 of the implementing regulation, the prices for social protection products should be net of reimbursements. Moreover, if income is a condition determining the price, changes in prices resulting from changes in the household income should be shown as price changes.

Compliance

The price collection is not fully in line with the legal requirements. For actual rentals, as prices are collected only in January of each year, any price change happening within the year is only acknowledged in January of the next year and not in the HICP in the month in which the change took place, as required by Article 8(2) of the implementing regulation.

Requirement

Statistics Denmark should ensure that observed prices for services shall be included in the HICP for the month in which consumption of the service can commence.

Recommendations

- Statistics Denmark should revise the frequency of products with less than monthly price collection and, where monthly price changes are expected to occur (e.g. motor cycles), prices could be collected using information taken from the internet.
- Statistics Denmark should investigate ways of reducing the time lag associated with the compilation of the price index for pharmaceutical products.
- Statistics Denmark should ensure that the index for child care services correctly takes into account changes in the reduced rates and also shows changes in income as price changes.

6. Replacement and quality adjustment

Statistics Denmark uses similarity as the main criterion for selecting a replacement and, in case the most similar product is unrepresentative, selects replacements on a most-sold/largest turnover approach. However, for products collected through digital questionnaires the shopkeeper or the staff in charge of answering the questionnaire selects a replacement product.

When a product is not observed, prices are imputed using an estimated price change based on changes in the prices of available products of the same elementary aggregate (i.e. six-digit ECOICOP level). Prices are imputed for a maximum of two months in a row.

Statistics Denmark essentially applies implicit quality adjustment method to control for quality change of the HICP. As a rule, when prices are not deemed to be directly comparable, the bridged overlap method is used. For technologically-driven products, such as personal computers (ECOICOP 09.1.3.1), the monthly chaining and replenishment method (MCR) is applied. For products with a high rate of replacements and that experience continuous quality and technological improvements, the application of the bridged overlap and of the MCR mechanism may lead to a downward drift in the sub-indices.

Explicit quality adjustments are done for rents, for which respondents are asked for stating the impact of any eventual renovations on charged rent value, internet access provision services (when, for instance, the speed of the connection on offer changes) and for the adjustments done when the quantities associated with the products on sale change (e.g. pack adjustments of food products). For second-hand motor cars, Statistics Denmark takes prices adjusted for age, mileage other variables from a website that is used as a reference by car dealers, leasing companies and other market players.

The price index for pharmaceutical products is calculated using defined daily doses (DDD) groups as homogenous products. This method allows to take into account any substitution between generic and non-generic drugs as they are combined in the same DDD-groups. New DDD-groups are chained into the index as they come into the market.

For airfares, average prices are obtained by broad destination categories. The homogeneous product used in the HICP should be composed of transactions (flights) amongst which there are no significant quality differences.

The production system does not provide statistics on certain aspects revolving around the compilation of the HICP such as the number of missing prices and number and type of imputations and quality adjustments. Statistics Denmark is developing a new IT compilation tool for the CPI and HICP that will be able to accommodate the calculation of these statistics.

Compliance

The application of quality adjustment methods in the Danish HICP is in line with the legal requirements.

Recommendations

- Statistics Denmark should investigate whether the use of the bridged overlap method in the compilation of price indices of technological products with high replacement rates (e.g. personal computers) has a downward impact on results when compared with the application of other alternative quality adjustment methods.
- Statistics Denmark should develop, within its production environment, metrics on the type and frequency of imputations and quality adjustments.
- Statistics Denmark should assess the impact of unit value bias in the average prices used for airfares.

7. Treatment of seasonal products

For clothing and footwear, Statistics Denmark applies the counter-seasonal estimation method. Clothing and footwear products are available either in the summer or in the winter season. In the out-of-season period, the prices are estimated using the price changes of the in-season products. The first-out of season price is set to be equal to the first price observed in the previous season. The same procedure is applied to package holidays which are sub-divided into summer and winter package holidays. For amusement parks, all-season estimation is applied, with prices of closed parks in the winter being estimated using the price change of parks that are open all-year round.

Statistics Denmark does not include any seasonal products in food. The sampling procedure applied to scanner data only selects products that are available all year round.

Compliance

The treatment of seasonal products is in line with legal requirements.

Recommendations

- Statistics Denmark should investigate the importance of seasonal products in scanner data for food and include them in the HICP if significant.

8. Index calculation

Statistics Denmark uses a Jevons index to compile an elementary price index. A geometric average price is calculated by outlet or retail chain and by most detailed product category (eight-digit COICOP). A weighted geometric average price is calculated for the six-digit COICOP

level (the elementary aggregate level) using product and outlet weights where available. An elementary index is obtained by comparing the average price of the current month to the average price of the previous month. These month-on-month elementary indices are chained, starting with the price reference period (December month of the previous year). This procedure applies to both scanner data and prices collected through other means.

From the elementary aggregate level upwards, a Laspeyres-type index is applied. The obtained indices are chain-linked via December and are expressed in the index reference period 100=2015. Sub-indices that were only introduced with the implementation of ECOICOP in January 2016 are expressed in the index reference period 100=December 2015.

Compliance

The index calculations of HICP for Denmark is in line with legal requirements.

9. HICP at constant tax rates and administered prices

Statistics Denmark reviews and updates annually the list of ECOICOP subclasses that are considered to be mainly or partly administered.

Statistics Denmark calculates an HICP at constant tax rates by first calculating a price for each individual product using the tax rates of the previous December. Starting from these adjusted prices data, the HICP-CT is then obtained in the same way than the HICP. The HICP-CT takes into account excise duties, consumption taxes, car registration taxes and taxes on insurance premiums. The tax rate changes are taken into account in the month in which they enter into force.

Compliance

The calculation of the HICP-CT for Denmark is in line with legal requirements.

10. Follow-up from the previous compliance report

The main findings from the previous compliance monitoring report were published in [August 2010](#). Part of the recommendations made in this report were implemented by Statistics Denmark, which changed the way prices are collected for footwear products, included a new price index for second-hand motor cars, and increased the frequency of the collection of energy product prices. However, the recommendation to increase the frequency of the collection of rents and of other products that were collected less frequently than monthly has not been implemented.

11. Overall assessment

On the basis of the information listed in section 1, Eurostat assesses that the HICP for Denmark is in line with most legal requirements. Statistics Denmark should improve the compliance by implementing the requirement formulated in section 5.

Notwithstanding this issue, Eurostat assesses the HICP for Denmark to be comparable to that of the other EU Member States. Furthermore, if Statistics Denmark follows up on the recommendations given in sections 2, 4, 5, 6 and 7 the comparability of the Danish HICP will improve further.