

# QUALITY DECLARATION

## Consumer Price Index

**Subject area**

Prices and consumption

**Statistical area**

Consumer Price Index

**Product code**

PR0101

**Reference time**

2024

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## The quality of the statistics

### 1 Relevance

The Consumer Price Index (CPI) is partly used for the indexation of various agreements and in part for economic analyses. Many agreements, taxes and public expenditures are directly linked to the CPI or indirectly via the price base amount, which is projected forward with the CPI inflation in June on an annual basis. Other measures of inflation, such as with fixed interest (CPIF), constant tax (CPI-CT) and CPIF excluding energy products (CPIF-XE), are also calculated. CPIF is the Riksbank's target variable for the inflation target in Sweden in parallel with the CPI, the EU-defined measure HICP (Harmonized Index of Consumer Prices) is calculated to improve comparisons between countries.

In the individual user situation, the CPI's 'basket of goods' (i.e., the composition of goods and services in the CPI) can be more or less relevant. The 'plutocratic' basket of goods with a weighting factor based on the total expenditure per purpose within the total private consumption may be highly relevant for economic analysis. A democratic approach that entails calculating an average of all households' or individuals' price trends may arguably be more relevant for various compensation purposes. This is because different demographic groups spend different amounts of money and use different social transfers. Statistics Sweden does not have sufficiently detailed data on individual households' consumption to be able to base the CPI on a democratic approach.

#### 1.1 Purpose and information needs

##### 1.1.1 Purpose of the statistics

The CPI index is the prevailing measure for calculations of price adjustments and compensations, i.e., revaluations of individual amounts transferred between the public and the private sectors.<sup>1</sup> On a detailed level (for different goods and services), index figures in the CPI are used for volume calculations (deflation) of private consumption in the national accounts and retail trade turnover.

As part of the Official Statistics of Sweden, Statistics Sweden has also been calculating the measure CPI-CT (CPI with constant tax) since 2014. In CPI-CT, the effects of changed indirect taxes and subsidies are excluded from the CPI. As of 2018, CPIF (CPI at fixed interest rates) is also official statistics. The CPIF-CT is calculated on behalf of Sweden's central bank, the Riksbank.

The HICP has been developed to allow comparisons of inflation between countries within the EU. The way national consumer price indices are calculated varies between countries and in HICP, the methods have been

<sup>1</sup> In a study by the Riksbank, it was found that approximately a fourth of the government's total figures have a direct connection to the CPI or the price base amount  
[http://archive.riksbank.se/Documents/Rapporter/Riksbanksstudie/2016/rap\\_riksbanksstudie\\_160914\\_sve.pdf](http://archive.riksbank.se/Documents/Rapporter/Riksbanksstudie/2016/rap_riksbanksstudie_160914_sve.pdf)

coordinated to a certain extent.

In relation to HICP, a constant tax index called HICP-CT is also calculated.

All consumer price indices calculated by Statistics Sweden are based on the same monthly collected price information, even if the coverage and index construction differ to some extent.

### **1.1.2 User information needs**

The main users of the CPI and measures related to the CPI:

- The Ministry of Health and Social Affairs: for establishing the price base amount which is linked to certain pensions, other social benefits and student loans.
- The Riksbank: the CPI as target variable for the monetary policy, and other related measures as supplementary measures of inflation.
- The Ministry of Finance: as a basis for stabilization policy.
- Swedish National Institute of Economic Research: for economic analysis.
- The Swedish Tax Agency: for the calculation of conversion ratios for the taxation of capital gains on property and for calculating break points in income tax rates.
- Statistics Sweden: for deflating in the national accounts as well as the service industry statistics (concerning turnover and inventory).
- Other government administration: including the Swedish Board of Agriculture, which monitors and analyses consumption figures and price trends on the consumer level.
- Organizations, enterprises and individuals: for indexation of agreements and conversions of value amounts to fixed monetary values.
- Asset management enterprises and institutions: as a basis for assessing future interest rates and real returns.

The principal users of HICP are:

- The European Central Bank (ECB): for evaluating the EMU's monetary policy goals.

## **1.2 Content of the statistics**

The CPI shall measure the average price trend for all private consumption in Sweden, expressed as a quota between the current month and the "base month" (December previous year). The price trend is calculated both from the long term and the short-term perspectives. The long-term trend is calculated comparing to year 1980 and the short trend comparing the current period with the previous month and year.

The basis of the CPI has been adopted by the government and the parliament following proposals in government inquiries. The most important calculation rules date from the 1952 Index Committee, the 1955 Housing Index Inquiry and the 1999 Index Inquiry, SOU 1999:124. A special committee is linked to Statistics Sweden, the Consumer Price Index Board. The Board shall assist in matters of principle relating to the application of the index calculation criteria

and promote the development of methods for calculating the CPI. Memoranda and minutes from past meetings in recent years are accessible on Statistics Sweden's website:

<https://www.scb.se/om-scb/scbs-verksamhet/rad-och-namnder/namnden-for-konsumentprisindex/>

### **1.2.1 Units and populations**

The population of interest consists of all transactions in private consumption in Sweden in the period to which the price index refers. It can further be specified in terms of three different dimensions; the target population, a population of sales outlets is defined (objects = stores, service places, websites, etc.), and a population of products (objects = goods and services).

For most of the CPI, it is practically difficult to observe and measure transactions between companies and private consumers. The price for product offers thus constitutes the price that can be observed, for example the shelf price in a store, on a website etc. The combination of place of sale and product leads us to specific product offers whose price we measure.

Around 40% of the CPI is based on transaction data. In these cases, the price is captured for the goods and services that are actually sold. There is thus (for the product dimension) no difference between the interest population and the target population. When other types of data sources are used, however, the target population may also include prices of products that are not sold during the reference period. For the price measurement, however, instructions are given to the price collector to select product offers that are deemed to sell a lot, i.e., can be considered representative.

The target population includes, to some extent, goods that are largely purchased by people residing abroad that are visiting Sweden, such as hotel nights. The consumption of Swedish inhabitants abroad is not included. Package tours that include foreign holidays are included if the whole service is purchased in Sweden. Foreign travel by air, train, bus and boat is included if the trip departs from Sweden and tickets are sold here. Consumption areas not included in the target population are certain other health and social care fees (childcare and elderly care are included, though), certain financial services and various other services (such as company car benefits). Products with high artistic values cannot be measured as it would be impossible to make comparisons over time.

The product unit has different meanings in the surveys. Packaged food consists of products that are fully specified with an article number. For furniture, for example, generic definitions are used that delimit the definition of a chair without an upholstered seat and a chair with an upholstered seat. Products may cease to exist or be added from month to month, in the entire market or in a specific retail outlet. While certain products are considered to be entirely new, others can be regarded as substitutes for others, even though they are not exactly alike.

The price on a product offer can change during a month, which means that the survey must delimit the time for the population of product offers. An entire calendar month should be an ideal population, at least for price adjustments and compensations, but a practical delimitation to the week in the middle of

the month, or the three weeks in the middle of the month, is considered to be a sufficient approximation for most purposes. However, in some register-based sub-surveys (for example, fuel and rail travel), price information for the entire calendar month is included.

### 1.2.2 Variables

The target variable in the survey is the price change, expressed as a quota between prices measured in two different periods.

The primary variable is therefore the price paid by the consumer for the product offer. To enable adjustments of prices to render comparability between product offers that may differ in some ways, packaging sizes and quality characteristics are also collected.

### 1.2.3 Statistical measures

#### CPI

The CPI is calculated as a chain index with annual links and index base year 1980=100. Every annual link measures how much the average price level has changed during the year from the average price level in the previous year. Index numbers are calculated by multiplying together, i.e., chaining together, annual links (via full year) and ends with the link for the current month. For January 2023, for example, the index number with year 1980 = 100 is calculated as follows:

$$CPI_{1980}^{2024,jan} = I_{2022}^{2024,jan} \times I_{2021}^{2022} \times \dots \times I_{1980}^{2005}$$

In the period from 1980–2004, the calculation of the CPI was based on a different index construction, so the chain for those years consists of other links. For more information about index construction in the CPI, see the memorandum *Förbättrad KPI-konstruktion från 2005: Teknisk beskrivning* on Statistics Sweden's website.

When calculating the index on a detailed level, the index is calculated using Jevon's index formula – the geometrical mean value of price ratios. If the information is accessible, the price ratios are weighted with inverted sampling probabilities for products and retail outlets, respectively (when sampling probability is applied) and estimated market shares.

#### CPI with constant tax (CPI-CT)

CPI-CT is an index figure with the base year 1980 = 100. It is a constant tax index where effects from changed taxes and subsidies are deducted from the actual price trend.

#### CPI with fixed interest rate (CPIF)

CPIF is CPI with fixed interest rate shows the same price changes as the CPI, but without the direct effects of monetary policy changes as the Riksbank's monetary policy affects the CPI through interest rate changes to households' housing loans. The CPIF replaces the CPI as a target variable in the Riksbank inflation target from September 2017.

Statistics Sweden also calculates CPIF excluding energy and CPIF-CT. CPIF-CT is calculated on behalf of the Swedish Riksbank. In the CPIF excluding

energy the energy products are excluded. In CPIF-CT taxes and subsidies which are connected to the products in CPIF are held constant.

### **HICP (Harmonised Index of Consumer Prices)**

Index figures (2015 = 100), change in percent since the previous month, change in percent during the most recent 12-month period. Like the CPI, the HICP is a chain index with annual links, but with chaining via December month instead of a full year.

#### **1.2.4 Study domains**

In the regular dissemination of CPI and HICP, there are 12 main categories and some 90 sub-categories of products in private consumption according to Classification of Individual Consumption by Purpose (COICOP 1999) which is an international classification of the private consumption from households. The CPI is also reported by Product Group, which is Statistics Sweden's own nomenclature. No regional dissemination is made, neither by industry nor type of retail outlet.

#### **1.2.5 Reference time**

The dissemination refers to the month and year. Annual averages are formed by unweighted arithmetic averages of monthly figures.

For some products, the CPI's measurement period refers to the 15th of the month or the nearest weekday. In other cases, the entire week of the 15th is included (e.g., tickets to sporting events, theaters and dance halls) or the middle three-week period of the month (e.g., groceries, clothing and furniture). For instance, interest rates and rental apartments prices refers to throughout the month. Fuel and dental care are included for the first 25 days of the month.

## **2 Accuracy**

### **2.1 Overall accuracy**

The CPI is calculated based on aggregation, from price changes of goods and services to indices at various grouping levels over the year. Thereafter, the years are linked together into time series covering several years.

The CPI is comprised of around 60 separate statistical surveys with materially different sampling and measurement methods. The calculations are based on price observations for individual product offers. The price trend is first calculated by comparing the current month's prices with the prices from the base month, which is December in the previous year. When calculating the index on an elementary level, for approximately 354 product groups, the index is calculated using Jevon's index formula (the geometrical mean value of price ratios). The price ratios are weighted with inverted sampling probabilities for products and retail outlets, respectively, when sampling probability is applied and with estimated market shares when available.

At an overall level, accuracy is considered sufficient, but for various reasons, separate surveys are sometimes associated with inaccuracies.

## **2.2 Sources of inaccuracy**

New products on the market are a source of possible systematic under- or overestimation. Valuation of quality differences between goods and services entering and exiting the market also entails potentially systematic uncertainty. According to the principles, the valuation must be based on the consumers' values, which is very difficult in practice. The statistics also contain some model uncertainty, especially to the calculation of costs related to owner-occupied housing and tenant-owned dwellings. Finally, the use of random samples introduces sampling uncertainty. Which calculation method is used for a certain sub-survey is important for the uncertainty in the specific sub-index.

### **2.2.1 Sampling**

#### **Sampling of retail outlets in the CPI's local price collection and web scraping**

Sampling of outlets for certain goods and services is made by a joint procedure. The sampling method used in this case is a stratified, sequential Poisson sample with sampling probabilities proportional to the size of the outlet. The size measure is a combination of the number of employees and turnover and stratification is done by industries relevant to consumer purchases. Outlets can be either physical stores or online stores (or combined online/physical in applicable cases). Changes in the sampling is made annually against the background of changes in the number of stores and sampling rotation is made in accordance with SCB:s standard of 20% annually if necessary. For chain stores, no sampling rotation is applied.

Allocation of the sample across industries is based on estimates of the variation in the price index based on a distribution-free method (so-called Jackknife) in the store dimension and consists of approx. 500 sample locations including chains that are surveyed online.

Information from stores and chains that apply central pricing, i.e., identical prices between stores and websites within the same chain, is scraped from the web as far as possible.

#### **Sampling of products in the CPI's collection of prices on everyday items**

Prices for food, laundry detergent and other everyday items are collected from about 100 shops in five major retail chains. In each retail chain, Statistics Sweden annually selects a statistical sample of approximately 1200 carefully specified representative products in some 90 product groups. The sample is based on statistics collected from the data systems of the shops, i.e., transactions register data. The samples are drawn with probability in proportion to sales. Samples for price measurement at tobacco shops and health food stores are also selected using the same method. The sample of representative products is updated annually.

#### **Sampling of representative products in the CPI's other local price collection**

General specifications of representative products (generic definitions) are determined centrally for a large part of the remaining price collection, i.e., a deliberate sample is used here.

#### **Sampling of product offers in the local price collection**



For each product, the price collectors are instructed to choose the most popular product offers, i.e., those that sell the most (in volume) during their first visit to the selected retail outlets. Product offers are substituted in the sample as they disappear from the market. In such a case, the price collector shall choose a product that is both reasonably comparable with the former and representative.

### **Sampling in the CPI's central price measurement**

The sampling of retail outlets and products in the central price collection is drawn using the methods nps sampling, modified ratio sampling and cut-off. In cut-off, the largest units in a population are usually selected. In some sub-surveys, all units are included in the sample. To some extent, the samples are renewed annually.

### **Sampling in the CPI's web scraping**

The sample size of products per website is proportional to the turnover weight by retailer. The distribution of the number of products per product group within a retailer is proportional to the weighting factors per product group in the CPI. The sample of products is partly random and partly based on the popularity rating on the website. Some samples are also made by support of scanner data from the outlets.

### **Weighting factor**

Price trends are calculated for approximately 350 product groups, with weighting factors that are based on preliminary annual calculations in the national accounts concerning households' consumption expenditures, household budget surveys (HUT, HBU, HBS) and retail trade statistics as well as a number of other sources of information about the private consumption of various products. Many of the product groups are weighted totals of groups at an even more detailed level, with available information regarding the weighting factor.

### **Estimating sampling inaccuracy in the CPI**

Since the selection of outlets is made once a year, as well as the weights of product groups is determined for one year at a time, the sample inaccuracy for each month under the calendar year will be correlated. In other words, there is a tendency that every month's inflation figure during a calendar year has an inaccuracy of the same direction and size.

In general, sampling inaccuracy can be reduced by increasing the total size of the sample. Previous studies indicates that more product offers make a greater difference than a greater sample of retail outlets and products<sup>2</sup>. In recent years, Statistics Sweden (SCB) has increased the utilization of transaction data from retail chains. By using this data, the sample size can be expanded at a reduced cost, leading to a reduction in sampling inaccuracy. On the other hand, discounts, promotions, etc. in the price variable creates greater volatility in data.

<sup>2</sup> A. Norberg (2004): *Comparison of Variance Estimators for the Consumer Price Index*. (Ottawa Group 8:th meeting, Helsinki, Finland, August 2004.)

Inaccuracy in weighting factors leads to an inaccuracy in the CPI statistics that has not yet been evaluated.

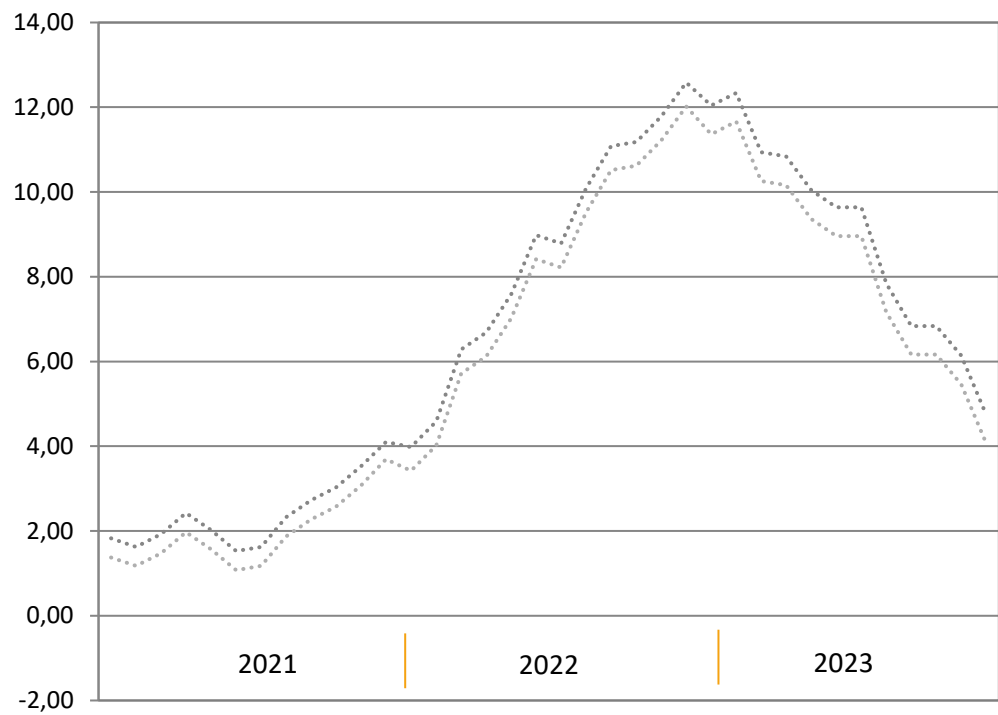
The sampling inaccuracy of the CPI is estimated annually. The results are provided in table 1.

**Table 1 Estimated sampling uncertainty, length of 95% confidence interval 2023**

Statistics	Length of 95% confidence interval	Comments
Monthly change	±0.21	Somewhat shorter for April, May, June and November
Annual change (inflation rate)	±0.30	
Monthly change in inflation rate	±0.29	Somewhat shorter for April, May, June, November and December, somewhat longer for other months

\* The change from December to December is based on one and the same sample.

**Figure 1 Inflation rate 2021–2023, 95% confidence interval**



**2.2.2 Frame coverage**

For practical reasons, the CPI survey use several frames to draw samples. In the case of stores and service points for consumer goods and some services such as car service, hair care or restaurants and hotels, it is possible to draw a sample from a common framework. For many services such as health care,

telecommunication services and insurance, special frameworks can be established to be able to get a functional sample. The quality aspects associated with the framework work are described below.

### **Retail outlets**

New retail outlets opened in the index year cannot be included according to the calculation method, which is based on annual links. According to the latest CPI investigation from 1999, this bias is estimated to overestimate price developments by 0.03–0.05 index points.<sup>3</sup> No adjustment of this bias is made at present.

### **Products**

A current or complete sampling frame is often lacking for the product sample within each product category. For example, there is no list for dining tables that describes quantities/values concerning size, form, material, surface treatment, extra leaves, etc. For these kinds of product groups, one or several representative products is intentionally created with size intervals, form, materials, etc.

## **2.2.3 Measurement**

### **Local price collection**

The price collection is carried out by Statistics Sweden's interviewers through visits to shops, telephone interviews and web sites. Price collection at the local level is done using tablets. The period for local price collection is three weeks: the week that includes the 15th of the month, as well as the weeks before and after this week. The month of December is an exception, since the measurement weeks are extended and brought forward.

Some minor studies have shown that interviewers sometimes note prices incorrectly. Evidently this is caused both by the interviewers' collection and by shops marking products with the wrong price. How much these errors affect the total uncertainty in the CPI is not known, but it is likely that the vast majority of errors will be identified in the subsequent review.

Tablets have made it possible with different logical controls as well as automatic controls where the registered prices are related to historical values directly during the data collection, which is reasonably likely to have reduced the number of registration errors.

### **Central price collection**

Central price collection is carried out during the week that contains the 15<sup>th</sup> of the month. Price collection is carried out centrally in cases where a product can be assumed to have uniform prices across the country, or where special methods must be used. Collection is made via the Internet and an e-mail questionnaire. Central price collection is carried out in two steps by two employees, a price measurement and a control.

### **Transaction data**

<sup>3</sup> Page 124. SOU. 1999. Betänkande från Utredningen om konsumentprisindex. Statens offentliga utredningar 1999:124

As of 2019, the use of scanner data will be expanded to include all of COICOP 01 (Food and non-alcoholic beverages). This means that during 2019, no price collection via visits to stores will be done concerning food and non-alcoholic beverages. Studies of the quality of scanner data from retail sales of everyday items were provided in connection with the implementation and showed that the data are of good quality.

As of 2019, the calculation of the price index on package holidays will be based on transaction data. The new data source enables a larger sample and a more detailed basis for weighting.

Systembolaget (Swedish state retail monopoly for alcoholic beverages) provides Statistics Sweden with weekly sales data on item level. The annual product sample is drawn from these data which covers total annual turnover per article. If the articles are discontinued during the year, exchanges are made.

For prescription drugs from all existing and new pharmacies, daily transaction data are obtained.

As of 2019, data collection in the survey on railway transport changes partly, as transaction data will replace some manual online price collection. The new data includes all sold travel, from the first to the last booking prior to departures.

As of 2020, fuels (Gasoline 95, Gasoline 98/99, Diesel and E85) belong to the group of products whose index is calculated based on transaction data.

From 2021, transaction data will be included in subsets of samples in home electronics and household equipment.

### **Webb scraped data and data from API:s**

From 2019, prices of domestic and international flights will be collected with the help of Application Programming Interface (API) from an internet service that lists prices for most of the airlines and travel agencies that are part of the international booking systems. As of 2021, prices from parts of the home electronic market will be collected using API:s as well.

From 2021, Statistics Sweden will introduce web scraped price data. In particular, web scraped price data will be collected on certain furniture and household goods (COICOP groups 4 and 5). The majority of these prices were previously collected manually over the internet. Some price data previously collected in stores will also be replaced by web scraped data. Other than a larger sample size, no methodological changes concerning survey design, collection period, or index construction formula will be introduced for the product groups concerned.

### **Quality assessment when exchanging goods, general**

The Consumer Price Index shall not be affected by price changes caused by changes in the quality of goods and services. When products are altered or must be replaced (substituted), a quality assessment is carried out to remove the difference in observed prices due to different quantities and qualities.

The lack of clarity and inability to define quality and to measure quality differences for products comprise a relatively big problem for the CPI and

HICP. The impact on the overall reliability of the CPI is difficult to estimate. However, we can compare the index with and without quality adjustment, where the Implicit Quality Index (IQI) is calculated to show estimated effects from quality adjustments on the product group index in the CPI.<sup>4</sup>

### **Quality and quantity assessments when replacing everyday items**

Few quality assessments are made for everyday items. The same exactly specified product is measured every month as long as it is marketed (i.e., coffee medium roast for electrical brewing, brand A, package of 500 grams). In some cases, it is possible to find a fully comparable substitute, especially when the manufacturer only has made a minor change. Where applicable, prices are adjusted for changes of quantity, form of packaging, etc. If no sufficiently comparable replacement can be found, the price measurement ceases for the product in question for the rest of the year. Quality and quantity assessments in case of replacements of everyday items are considered to have little impact on the total inaccuracy of the CPI.<sup>5</sup>

### **Quality assessment when replacing clothes and shoes**

In these groups of goods, the lifespan in stores can be very short, and several replacements are often needed during a twelve-month period. Using hedonic regression, considerable amounts of data are used concerning the goods' appearance and content in order to estimate the market value of these characteristics. In addition to prices, the interviewer therefore also collects data on the material, design, brand, etc. of the clothes.

For shoes, a tight product description is used, which means that the product offers that are replaced are usually reasonably similar to the ones they replace. Hedonic regression is used in product exchanges between brand groups to assess the market's valuation of the difference between the brands.

It is difficult to assess the inaccuracies caused by quality assessments of clothes and shoes. Aspects such as durability, warmth and useful life takes into account in the model, while aspects such as the current fashion is not taken into account.

### **Quality assessment when replacing video games, books and other cultural media.**

Price collection for video games and books and other cultural media is done from the respective store's sales top list. This means that titles on the top list are judged to be comparable over time. Any change in quality when changing titles on the top lists is not measured.

<sup>4</sup> The total effect of quality adjustments on the CPI is estimated during 2021-2023 to have reduced the inflation rate by approximately 0.05-0.25 percentage points per year. For more information, see Quality evaluation reports presented at the Consumer Price Index Board, <https://www.scb.se/om-scb/scbs-verksamhet/rad-och-namnder/namnden-for-konsumentprisindex/underlag-namnden-for-konsumentprisindex/>

<sup>5</sup> The effect of "shrinkflation" on food price inflation is estimated at less than 0.05 percentage points in 2020-2022. More information (in Swedish) here: <https://www.scb.se/hitta-statistik/redaktionellt/matpriser-paverkas-mindre-av-krympflation/>

### **Quality assessment when replacing other products in local price measurements**

For other locally collected prices, the interviewer selects a new representative product offer when the previously measured product is no longer sold or no longer sold in any significant amount. The interviewer assesses the value of any quality difference between the new product and the old. For example, if an increase in quality can be considered to correspond to an observed price difference, the price index of the good will remain unchanged. If the quality of the change is considered equivalent to one-half of the price change, then one-half of the price difference may take effect as a price change, etc.

The model assumption is that the price collector is a representative of the average consumer and with corresponding assessment of a product's quality.

### **Quality assessment of home electronics with support of hedonic models.**

Quality differences that arise when new home electronics enters the market are largely estimated with hedonic methods. The models are estimated based on data from a price comparison site, where prices are explained by quality-affecting characteristics such as performance, size and functionality.

### **Central collection of price information**

Prices are collected centrally at Statistics Sweden for products in about 100 product categories, including products that are likely to have uniform prices across the country or for which special collection methods must be used. Changes in quality are assessed in virtually the same way in the central price collection as for "other products in local price measurements" above.

### **Measurement of housing costs**

The price trend in housing costs is measured in part through a rental survey with a probability sample of dwellings and a similar survey regarding fees paid to tenant-owner associations by tenant-owners. In the cost calculations for owner-occupied housing and tenant-owned dwellings, centrally collected interest rates on housing loans and building materials are important items in surveys regarding interest expenses, depreciation and internal repairs. In addition, price data is collected centrally for heating and electricity.

#### **2.2.4 Non-response**

In visits to shops, telephone interviews, online data collection and direct collection from enterprises, non-response is nearly non-existent; for the rental survey as well for the survey on fees to tenant-owner associations, non-response is approximately one percent. Unweighted and weighted non-response in price measurements is a minor problem in comparison with other sources of inaccuracy.

Household budget surveys form a basis for the weighting factors and have very high non-response, which in many cases renders the weighting factors uncertain at a detailed level. This inaccuracy has not been quantified.

#### **2.2.5 Data processing**

A production system, Pi09, has been developed to perform most of the CPI calculations. Quality assurance of computer programs and IT systems are now

in place and the risk for data processing errors is therefore minor. It is not possible to assess the impact of various types of data processing.

The observations collected are reviewed based on suspected errors and their suspected potential effect on the results. Contact is often made with the retail outlet where the observations were collected, or with the person collecting the data (the interviewer) in cases where price observations are collected locally.

#### **2.2.6 Model assumptions**

##### **Deliberate under coverage**

Many individual small product groups are not measured but instead represented at an aggregated level by a selection of other product groups. One such example is takeaway food that is often sold at a manned counter in many supermarkets these days. This consumption is represented by food in total, or by meat, fish or other sub-categories whenever possible.

Most representative products have been selected with a deliberate delimitation, which excludes many variations with small sales values; for example, wedding dresses are not included in dresses and fur is not included in leather clothes.

By purpose, only some combinations of product groups and industries are measured. For example, sales of tobacco and magazines at petrol stations are therefore excluded. These are measured in other industries instead. These examples are considered to generate only minor inaccuracies in the statistics, however, as the price trend is generally determined through central decisions. The sale of food at petrol stations is not negligible, at least not for certain products, but it is still not measured; instead, it is represented by grocery stores and hypermarkets.

Sales at market stalls are not measured at all. The price trend for goods sold at market stalls is assumed to follow the same price trend as corresponding goods sold in shops.

In the selection of retail outlets for local price measurement, trade that takes place far away from the price collector is excluded. The value excluded must not amount to more than 10 percent of the total trade. Excluded geographic areas are compensated for by region.

Consumption related to housing (homes) can be divided in four separate groups: rental dwellings, tenant-owner dwellings, owner-occupier housing and holiday homes. It is really only for the consumption value of rental dwellings that the measurements in the CPI and the national accounts have the same purpose. For the other areas, a cost approach is used in the CPI and a rental equivalence approach is used in the national accounts to measure these consumption values.

##### **Measuring price**

The price trend for the cost of living in owner-occupied homes or tenant-owned dwellings in the CPI is measured by the price development of the owners' expenditure items. In addition to housing, price indices for all durable goods in the CPI are calculated using an acquisition approach. That means that the whole cost is recognized at the time of purchase. The good is

consumed immediately, so to say, even if it remains in use for an extended period of time. Many examples of durable goods are treated this way in the CPI, such as washing machines and new cars. In the housing calculations, the cost is allocated to a period instead, so that the household's cost of the housing service in principle is regarded an annual rent.

For electricity consumption and telecommunications services and similar, consumption profiles are used for which price trends are surveyed.

### **Measuring quality**

A hedonic method for quality adjustment is used in the measurement of price trends for clothing, shoes, home electronics and household appliances.

"Consumer evaluations" of various characteristics are estimated using a statistical model applied to CPI data for previous years. When products are discontinued in a store's range, these estimated evaluations are used to recalculate the prices of replacements so that their price level is comparable with the previous product in terms of quality.

In general, the quality assessments described in 2.2.3 Measurement can be considered to constitute a relatively major source of inaccuracy of the model assumption type.

## **2.3 Preliminary statistics compared with final statistics**

After the official release of the CPI for a specific month, it cannot be revised; it will therefore apply in all contexts where references are made to the consumer price index, such as laws, ordinances or agreements.

Published inflation figures can be revised, but it is rare<sup>6</sup>. CPI inflation is not calculated based on the adopted series but based on the shadow index numbers (also published). According to the EU regulations, all HICP numbers can both be revised and disseminated in preliminarily form under certain circumstances. However, Eurostat and Statistics Sweden have different policies regarding when inflation figures should be revised. This means that Eurostat may revise Swedish HICP numbers while Statistics Sweden does not revise them. When such situations have occurred, however, Statistics Sweden have for practical reasons also chosen to revise HICP, to ensure that the statistics are consistent<sup>7</sup>.

## **3 Timeliness and punctuality**

### **3.1 Production time**

Publication is usually 10–14 days into the month following reference month. However, the index figures for January are usually published a few days later than for other months due to basket and weight updates.

<sup>6</sup> The inflation rate for April–June was revised due to the so-called "shoe error". In May 2009–April 2010, revisions were made due to new statistical materials on the tax deduction for building repairs and extensions. This tax deduction (involving renovation, conversion and extensions) is a tax subsidy granted to private individuals for certain types of work carried out in their homes).

<sup>7</sup> On two occasions, in December 2012–January 2013 and in July 2013, the revision's contribution to the inflation rate was less than 0.1 percentage points.



### **3.2 Frequency**

CPI, CPI-CT, HICP, HICP-CT, CPIF and CPIF excluding energy and CPIF-CT are calculated and published monthly. All the statistical measures mentioned above are derived from the same dataset.

### **3.3 Punctuality**

The publishing follows the original publishing plan for the Official Statistics of Sweden. Publishing delays have occurred due to the website. Those delays have never been longer than a few minutes.

## **4 Accessibility and clarity**

### **4.1 Access to the statistics**

The channel used to disseminate the statistics is chiefly Statistics Sweden's website (scb.se) (in the form of statistical news, reports and in the Statistical Database). In the Statistical Database on scb.se, the users can produce their own tables and charts. This is where the CPI, CPI-CT, HICP, HICP-CT, CPIF, CPIF-XE and CPIF-CT can be found.

### **4.2 Possibility of obtaining additional statistics**

Materials regarding interview surveys and retail outlet samples are stored in the SQL database. In the case of centrally collected prices, material is partly stored in the SQL database and partly stored in Excel files. Statistics Sweden conducts special processing of the material on a commission basis.

### **4.3 Presentation**

CPI's change figure and the contribution to monthly and inflation figures are also described in more detail in a statistical unit. Pursuant to COICOP, the change figure and contribution to/from all main groups are disseminated in a separate table. The inflation according to the CPI and some measures of inflation related to the CPI are also disseminated in a diagram in the statistical news.

### **4.4 Documentation**

The production of the statistical register and the statistics are described in Description of the statistics (StaF). The quality of the statistics is described in the present document. Detailed information about microdata is described in Documentation of microdata (MetaPlus). All documentation is accessible on Statistics Sweden's website, [http: https://www.scb.se/PR0101](https://www.scb.se/PR0101)

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<http://www.scb.se/contentassets/a937c5a16b79458891bca7f273693dec/kpi-ks-och-kpif-ks-pm-2014-02-17.pdf>

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- SM PR 15: Konsumentprisindex 1914–2005.
- Memoranda and minutes from the Consumer Price Index Board.
- Proposal to the Riksdag: Riksdagens revisorers förslag angående konsumentprisindex (Förs. 1991/92:16).
- Commissioning of Statistics Sweden to calculate the Consumer Price Index etc., His Majesty's (Ministry of Finance) decision of 28 June 1962.
- 1955 års bostadsindexutrednings betänkande Bostadsposten i konsumentprisindex.
- The basis of the CPI, etc.: 1952 års indexkommittés betänkande (SOU 1953:23) Konsumentprisindex; Prop. 1954:1, bilaga 2; Statsutskottets utlåtande 1954:13; Riksdagens skr 1954:92.
- For more information about the COICOP division, see <https://unstats.un.org/unsd/classifications/>

## 5 Comparability and coherence

### 5.1 Comparability over time

The CPI is a chain index with annual links. Methodology changes usually take place at the end of the year, that is, before a new monthly link in January CPI index. Times series breaks in the form of new seasonal patterns may occur.

Major changes over time are described below.

- For everyday items (non-perishable goods), price lists instead of measurements in retail outlets were used from 1983 through 1992.
- As of 1984, calculations for owner-occupied housing costs were modified regarding interest and depreciation.
- For clothing, a new measurement method was introduced as of 1991 and a new method for valuation of quality differences was introduced as of 1994.
- Seasonal adjustments for fresh vegetables and fresh fruit ceased as of 1992.
- As of April 1997, a new method is used for calculating costs for owner-occupied housing with regards to interest rates. The change in method means that shifts in weighting during the year between loans with different fixed rate periods do not affect the index. The change also means that the cost for early redemption fees payable on early repayment of housing loans are taken into account.
- In 2005, the CPI index construction changed. For more information on the changes to the index construction and how the calculations were made before

the change, see "Förbättrad KPI-konstruktion från januari 2005 " (only in Swedish) on [www.scb.se/pr0101](http://www.scb.se/pr0101)

- As of 2013, the majority of the prices on daily necessities is collected thorough scanner data.
- In 2020, the corona pandemic has affected the calculation of CPI and HICP. For more information, see "[Measurement issues related to the coronavirus pandemic](#)".
- In 2021 and 2022, the weighting factors have been adjusted due to the corona pandemic. For more information, see "[Adjusted compilation method for CPI, CPIX and HICP weights in 2021](#)"

## **5.2 Comparability among groups**

The CPI calculates the average price trend using the same index formula for all sub-categories included in the CPI. There is full comparability of price trends among the product groups.

## **5.3 Other coherence**

The CPI can be used in several contexts for deflating (calculating constant prices), such as in the national accounts and the service industry statistics. Comparisons of price trends for producer and import prices are difficult for several reasons. For example, taxes are handled differently, and weighting factors differ. There are also methodological differences between the two statistical products; quality evaluations, for example, are made according to different principles.

## **5.4 Numerical consistency**

As far as we know, there are no problems related to the numerical consistency between different statistical values.

# **General information**

## **A The classification Official Statistics of Sweden**

The CPI is included in the Official Statistics of Sweden.

Special rules apply for surveys that are included in the Official Statistics of Sweden concerning quality and accessibility. See the Official Statistics Ordinance (2001:100).

The Consumer Price Index (CPI) also forms the basis for the calculation of CPI with constant tax (CPI-CT) and CPI with fixed interest (CPIX), which is also included in the Official Statistics of Sweden. For more information about CPI-CT, see the memorandum on Statistics Sweden's website under Consumer Price Index.

## **B Confidentiality and the handling of personal data**

Agencies' specific task of producing new statistics is subject to confidentiality according to Chapter 24, Section 8, of the Public Access to Information and Secrecy Act (2009:400). In cases where processing of personal data occurs, the EU Data Protection Regulation (2016/679) applies.

## **C Storage and elimination**

On 24 October 2014, the National Archives decided to repeal the National Archives' culling decision no. 391 of 4 September 1973 for Statistics Sweden (regarding the Consumer Price Index). Accordingly, RA-MS 1998:7 and RA-MS 2006:57 are applied to the Consumer Price Index.

## **D Obligation to provide information**

There is an obligation to provide information according to the Official Statistics Act (SFS 2001:99) and SCB's ordinance regulations (SCB-FS 2016: 25) on data to Consumer Price Index.

## **E EU regulation and international reporting**

The CPI is the starting point for the calculation of the EU measure Harmonised Index of Consumer Prices (HICP). It is regulated in accordance with Regulation (EU) 2016/792 of the European Parliament and of the Council. The different countries shall use a common methodology in certain important respects of the HICP, such as in the selection of index formula and aggregation principles. Compared to the CPI, the HICP does not include the majority of the housing costs of owner-occupied homes, tenant-owned dwellings or state gambling proceeds. Unlike the CPI, the HICP includes costs for hospital services as well as certain financial services (where the fees are proportional to the size of the transaction).

## **F History**

As of July 1954, the CPI is calculated on a monthly basis. Quarterly data is accessible calculated from 1949 through June 1954. Historical series with yearly index figures (based on cost of living index and Myrdal-Bouvin's consumer price index) are accessible as of 1830.

The HICP has been calculated monthly since January 1995.

## **G Contact details**

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