

EXPLANATIONS ON 2021 CONSUMER PRICE INDEX CALCULATIONS

Consumer Price Index (CPI) measures the change over time in the overall level of prices for goods and services subject to consumption expenditures. 2003=100 base year CPI is calculated as chained index. Therefore, the locations and the outlets, the items in the index basket and their weights, and the definitions of the items are updated every year. The outlets to be followed throughout the year are determined in December and these outlets are monitored in the following year. These updates are being announced every year in December and used through the whole year.

The basket and the weights of CPI and the rates of changes do not belong to any single individual or a specific income group, but represent the average for the whole country.

As of 2019, outlet sampling has been used for the markets and clothing stores that in retail sector with use of turnover data obtaining from the Revenue Administration. Every year in December, the most up-to-date turnover data are examined and the markets and clothing stores for which prices are compiled on a provincial basis are reviewed. Based on the turnover shares, the aim is to compile prices from the most preferred chain and local companies in the markets and clothing stores in the retail sector.

CPI gives estimate for 26 region according to Statistical Classification of Regional Units Level 2 (NUTS2) and Turkey. Separate item baskets are constituted for 26 region and Turkey.

In 2021 CPI, 415 items and 901 varieties will be covered and 550 632 prices will be derived from 27 980 outlets and 4274 households (for rents) within the scope of all 81 provinces and 225 districts.

Numerical information about the prices, outlets and index basket is given below.

Table 1. Numerical information related with the CPI coverage

| CPI | 2017 | 2018 | 2019 | 2020 | 2021 |
|----------------------------|---------|---------|---------|---------|---------|
| Number of items | 414 | 407 | 418 | 418 | 415 |
| Number of varieties | 910 | 895 | 895 | 897 | 901 |
| Number of outlets | 27 386 | 28 015 | 28 711 | 28 019 | 27 980 |
| Number of prices | 400 772 | 415 000 | 544 256 | 553 064 | 550 632 |
| Number of rents | 4 275 | 4 274 | 4 274 | 4 274 | 4 274 |

1. Updating the CPI basket and the weights

2003=100 CPI is calculated as chained index, in this context the basket and weights to be used in CPI calculations are updated every year to reflect the current consumption structure.

Within the scope of chained index, a new index based on previous December is established every year and this structure is preserved throughout current year index calculations.

The COVID-19 pandemic has caused changes in the households consumption expenditure behaviors significantly in 2020. Some of the changes in consumption because of the pandemic is temporary, however some of them will remain through several years. In December 2020, EuroStat published a methodological guidance¹ in the topic of reflecting COVID-19 effects in CPI item weights. In the guidance, it is stated that “t-1” (2020 for this year) household consumption expenditures shall be used instead of “t-2” (t=current year) when compiling CPI weights. Household Budget Survey (HBS) “t-2 (2 years before)” expenditure data had been used in line with the methodology in previous years.

For protecting public health, face to face surveying method was stopped for all household surveys of TURKSTAT, temporarily. Hence, HBS which is not possible to collect data any alternative data compiling method, the main data sources of CPI, could not be completed for the year 2020.

Regarding the methods given in the guidance of EuroStat, CPI weights of 2021 calculated as; the expenditure shares for years 2017-2018-2019 (HBS data) updated by using National Accounts Household Final Consumption Expenditure growth rates of 2020. National Accounts are currently used in most of European Union Countries for compiling CPI weights. Consumption from own production, in-transfers in kind, imputed rent and second hand car sales from household to household are excluded during the weight construction in National Accounts data such as in HBS. When the weights for the varieties cannot be supplied from data, the administrative data is used for the weights.

Given methods are being also used for Harmonized Indices of Consumer Prices (HICP) requested from European Union.

¹<https://ec.europa.eu/EuroStat/documents/10186/10693286/Guidance-on-the-compilation-of-HICP-weights-in-case-of-large-changes-in-consumer-expenditures.pdf>

The items which are not significant anymore are excluded from the basket and the items which gain importance are included in the basket update in every December. For this reason, the number of items in CPI basket may change every year. Also, the definition of the items are reviewed every year, the prices are compiled with the tablets according to the current definitions in the market. The CPI consumption basket and weights remain constant throughout the year.

The item varieties are included in 2021 CPI item basket that are started to involve in household expenditures due to COVID-19 pandemic (Surgical mask is added as a variety covered in the item "Other health supplies").

In 2021 CPI item basket, the definition of item variety "Dry Yeast" under item "Baking Powder" was changed. Previously, the price of a package of dry yeast in a certain weight was compiled, however due to the differentiation in weight of packaging detected in the field the unit of measurement was changed, the product price will be followed in kilograms. Also, the number of varieties changed and the weights are updated in; "White Cheese", "Cigarettes", "Other Health Supplies", "Automobile (Diesel)", "Automobile (Gasoline)" and "Fees for Legal Service" items. The reason for this change is that the current consumption preferences of households, which get changed at the level of item variety, can be reflected in item detail. To illustrate; for "cigarettes (item)", if a new product (item variety) launched to the market or if consumed widely, it should be added to the item basket as a variety. The same situation also is valid for the cars. Brands and models (item type) for which prices are compiled for "Automobile (Diesel)" and "Automobile (Gasoline)" items are updated every year due to the introduction of new models in market and the discontinuation of some models, as well as change in preferences of consumers over time (for example, gear type) is reflected in item variety and the weights. It is also within this scope that the definition of "White Cheese (item)" has been expanded to include cheese varieties that are widely consumed by households.

In January 2021 published average item prices, price changes for these items should be evaluated within this scope. Because of the chain index, the updates will reflect to the index as a pure price change.

The list of new items included in the CPI basket in 2021 is shown in Table 2.1 and items excluded from the basket are shown in Table 2.2.

Table 2.1 New items covered in 2021 consumer price index

| No | Items |
|----|--------------------|
| 1 | Pickle |
| 2 | Women's sweatshirt |

Table 2.2 Items excluded from 2021 consumer price index

| No | Items |
|----|-----------------------------|
| 1 | Cress |
| 2 | Plum |
| 3 | Refrigerator (with freezer) |
| 4 | Mixture fabrics |
| 5 | Flash heaters |

Weight structure of 2021 for CPI main groups is shown in Table 2.3.

Table 2.3 Weight structure of 2021 for CPI main groups

| | Main expenditure groups | Weights for 2021 |
|----|----------------------------------|------------------|
| 1 | Food and non-alcoholic beverages | 25.94 |
| 2 | Alcoholic beverages and tobacco | 4.88 |
| 3 | Clothing and footwear | 5.87 |
| 4 | Housing | 15.36 |
| 5 | Furnishings, household equipment | 8.64 |
| 6 | Health | 3.25 |
| 7 | Transportation | 15.49 |
| 8 | Communication | 4.64 |
| 9 | Recreation and culture | 3.01 |
| 10 | Education | 2.28 |
| 11 | Hotels, cafes and restaurants | 5.91 |
| 12 | Miscellaneous goods and services | 4.73 |

2. Price compilation periods for items in CPI

In the scope of CPI, final consumer prices that include all taxes are compiled. Reference year prices are the prices coming from the previous December as a necessity of chained index calculation method; meanwhile current prices are the prices of the month where the calculations are done for the 26 regions and Turkey.

The most important factor in following the prices of the items covered in the CPI is the compilation of goods and services with the same definition and quality. For this reason, the items in the CPI basket are described in as much detail as possible.

Within the scope of CPI, the price compilation frequency is defined to reflect the price development in the market. For the items with high price mobility, the price is compiled more frequently.

The frequency of compilation of prices in CPI varies as twice in a month, 4 times in a month and daily. In order to catch the price movement that may occur during the month, the prices of fresh vegetables and fruits, tube gas, LPG, fee paid for watching sport games (football) and selected foods are derived 4 times a month. Cigarette, gold, diesel and petrol prices are collected daily and all other item's prices are compiled twice in a month. Items which are collected four times in a month are listed in Table 3.

Table 3. Items in food collected four times in a month

| No | Item name |
|----|------------------|
| 1 | Veal |
| 2 | Lamb |
| 3 | Poultry |
| 4 | Milk |
| 5 | Yoghurt |
| 6 | White cheese |
| 7 | Egg |
| 8 | Margarine |
| 9 | Sun-flower oil |
| 10 | Olive |
| 11 | Granulated sugar |
| 12 | Tea |
| 13 | Fresh fruits |
| 14 | Fresh vegetables |

3. Compilation of prices during COVID-19 pandemic

As a result of the restrictions during the COVID-19 pandemic, some outlets were closed or working hours were changed and some services cannot be provided. In this period, for producing the CPI at the best, fieldwork continued as much as possible. Due to restrictions,

in cases where the prices were not available the alternative data sources are used which is recommended in guidance of EuroStat² published in April 2020. In this context:

- Compiling prices via telephone,
- Using outlets websites,
- Using scanner data prices
- E-mail enquiries

alternative data sources are used.

4. New data sources regarding CPI price compilation

Data on products purchased by consumers are recorded by companies operating in the trade industry in order to perform various financial transactions. In recent years, many National Statistical Offices have been working on the use of the sales data which held by retail industry as a data source in the Consumer Price Index. Besides, EuroStat has published a guide on the subject and the International Monetary Fund (IMF) has included the topic in its new CPI Manual. TurkStat's studies to integrate barcode (sales) data into CPI data compilation processes have been ongoing since 2018. In 2020, the analysis processes of the data obtained from chain stores (markets) that have an important share in the retail trade industry were completed. Several studies (classification, code matching, etc.) carried out to make the data ready for use for CPI calculations. Scanner (sales) data obtained from chain markets started to be used in the CPI calculations for 2021. By this way, instead of prices compiled from the field on certain days of the month, prices and quantities covering the whole month were included in the index by using daily sales data on the basis of branch stores provided from the companies. By integrate the scanner data into CPI, approximately 21% of the total number of prices will be obtained directly from chain markets.

5. Weights of items and main expenditure groups and item prices are available on internet

Index basket, index weights and prices for the item level is published by Turkstat. The prices on the TURKSTAT website are given as average prices for 415 aggregated items. The item prices are calculated by taking geometric mean of varieties under the item and multiplying them with the weight of varieties. In CPI calculation, indices are calculated for 901 varieties using their December prices, current prices and weights.

²https://ec.europa.eu/EuroStat/documents/10186/10693286/HICP_guidance.pdf

Some types of items can differ due to reasons such as definition and quality change. These changes are not reflected in the prices published on the internet and these prices do not include the quality change. CPI detects pure price changes, free from quality effects. For example, if the description or type of motor cars change, price as one of the covered prices is required to be collected with a new type of motor cars differing from old type of motor cars, new item is included to the basket for index construction along with eliminating the quality difference between two motor cars. The quality adjustment methods, which are used, prepared by the International Labor Organization (ILO), the International Monetary Fund (IMF), and the European Statistical Office (EuroStat), are internationally accepted methods, used by all countries of the world which can be easily accessed from the websites. These methods have been used in calculations since the establishment of the CPI index with 2003 = 100 base years.

Index calculation procedure starts from variety level and then index for item level is calculated by using obtained weights and indices of varieties. For example automobile is one item in the basket; however it consists of many different automobile types. Index is calculated for each automobile type and aggregated with the weights of each type and then the item level indices are constituted. Index figures which are directly calculated by using item level prices and weights can be different from the index figures calculated by variety prices and weights.

For these reasons, index calculated by users by using weights and average prices of items can be different from the published national CPI.

6. The scope of CPIs having specified coverages

CPIs having specified coverage which are prepared in accordance with the demands and requirements of the Central Bank of the Republic of Turkey will continue to be published.