

# Harmonized Index of Consumer Prices (HICP)

## Methodology

(Updated February 2019)

## 1. Purpose, nature and use

### 1.1. Nature of the HICP

The HICP (Harmonized Index of Consumer Prices) measures the general relative change in level of prices of goods and services used by households for final consumption in the territory of Bulgaria.

The HICP is calculated on the base of harmonized methodology, elaborated by Eurostat<sup>1</sup>. The HICP is the main measure of price stability in the euro-zone. Its purpose is to measure inflation by means of the consumer price index on comparable basis, taking into account differences in national definitions.

The HICP is the chained Laspeyres-type index which reflects the 'pure price change' i.e. the index reflects only the change in prices between the current and the base period. The HICP does not measure the cost of living and it is not a cost of living index.

HICP calculation is based on the ECOICOP classification – European Classification of Individual Consumption According to Purpose, adapted to the needs of the HICP, according **Regulation (EU) 2016/792** of 11 May 2016<sup>2</sup> of the European Parliament and of the Council. It is hierarchical and is built on five levels: division, group, class, subclasses. The HICP covers all subclasses which have a weight accounting for more than 1/1000 of total weight (i.e. 12 divisions, 42 groups, 97 classes and 208 subclasses). For calculation of the HICP in 2019, national accounts (NA) data for households' final monetary consumption expenditures (HFMCE) - domestic concept in 2017 is used.

### 1.2. Differences between the HICP and national consumer price index (CPI)

Calculated HICP differs from national CPI. The main reasons for the difference between the two indices are:

- The different structure of weights due to the different coverage of the HICP and of the national CPI in respect of the treatment of the consumption of the non-residents on the territory of the country. This consumption is covered by HICP, while in the CPI it is out of the index coverage.
- The different sources of data for weights construction, and therefore the different time period of the HICP weights and of the CPI weights. The main source for HICP weights is the NA data (HICP in year  $t$  is calculated with weights for year  $t-2$ ), while the main data source for CPI weights is the household budget survey (CPI in year  $t$  is calculated with weights for year  $t-1$ ).

## 2. Coverage

### 2.1 Population coverage

HICP covers consumer expenditures of the following categories households on the economic territory of the country in accordance with the domestic concept of consumption:

- expenditures of resident (Bulgarian) households, including institutional households;
- expenditures of non-residents (foreign citizens).

HICP excludes:

- expenditures of the resident (Bulgarian) households abroad;
- expenditures for consumer goods for business purposes.

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<sup>1</sup> Eurostat (2001), 'Compendium of HICP Reference Document (2/2001/B5)', *Office for Official Publications of the European Communities*

<sup>2</sup> **Regulation (EU) 2016/792** of the European Parliament and of the Council of 11 May 2016 on harmonised indices of consumer prices and the house price index, and repealing Council Regulation (EC) No 2494/95 (OJ L 135, 24.05.2016 ,p.11)

## 2.2 Geographic coverage

The HICP covers the entire area of the country.

All regions of Bulgaria are covered in the sample of localities where the prices for HICP are collected. At this stage, non-probability sampling techniques (cut-off) are applied. The localities are sampled according to the number of population and according to the volume of retail sales of each locality.

HICP includes 27 district centres (NUTS III) in its sampling framework. Over 50% from population of the country live there and over 65% from sales are realized.

Furthermore, the sample is stratified between the district centres. The main principle is to have different numbers of price observations in each district centre according to the population in it. The district centres are stratified in three groups: (1) capital, (2) 'big' and (3) 'small' centres.

## 3. Price collection, weights and sampling

### 3.1. Price collection period and frequency of price collection

Prices of the most of goods and services are collected each month and the price collection period is between 1<sup>st</sup> and 28<sup>th</sup> calendar day of the month (prices are not collected during the weekends and public holidays). Most of the prices are observed regionally by price collectors – qualified specialists, employed in the regional statistical offices (RSOs): the weight of locally collected prices is 77% in total HICP weight. The prices of electricity, mobile phones, personal computers, books, newspapers, pre-recorded recording media, electronic games, insurance, packaged holidays, hotels in holiday centres, camping sites, youth hostels and similar accommodation services, banking services, administrative fees, legal services and accountancy and some of the health, transport and telecommunication services are collected centrally.

### 3.2. Weights

HICP weights are constructed according to the requirements of the Commission Regulation (EC) № 1114/2010<sup>3</sup> and of the Council Regulation (EC) № 1688/98<sup>4</sup>. The weights for HICP reflect the structure of the HFMCE – domestic concept.

National accounts are the main source of data for construction of the HICP weights at the highest levels of aggregation. In constructing of the weights for HICP, data from NA are adapted as follows:

- = Household final consumption expenditures, **HFCE – domestic concept**, as resulting from NA,
- Own final consumption (to the extent that it forms part of HFCE and does not involve monetary transactions) – mainly imputed rentals COICOP 04.2.0
- Expenditure on the following COICOP classes:
  - a) Narcotics (COICOP 02.3.0)
  - b) Games of chance (COICOP 09.4.3)
  - c) Prostitution (COICOP 12.2.0)
  - d) Service charge for life insurance (12.5.1)
  - e) Administrative charges of private pension funds and the like (COICOP 12.6.2)
- = Household final monetary consumption expenditures, **HFMCE – domestic concept**.

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<sup>3</sup> **Commission Regulation (EU) No 1114/2010 of 1 December 2010** laying down detailed rules for the implementation of Council Regulation (EC) No 2494/95 as regards minimum standards for the quality of HICP weightings and repealing Commission Regulation (EC) No 2454/97 (Official Journal of the European Union on 2 December 2010, p. 4).

<sup>4</sup> **Commission Regulation (EC) N 1688/98 of 20 July 1998** amending Commission Regulation (EC) N 1749/96 concerning geographic and population coverage of harmonized index of consumer prices (*OJ L 214, 31.07.1998*, p.23)

Data from household budget survey (HBS) is used for construction of the weights at the lower levels of aggregation, where the information from NA is not available.

The additional data sources are used for construction of detailed weights for electricity, heat energy, telecommunication services, tobacco, medicines, fuels, new cars, insurance, hotels, books and newspapers. 374 elementary aggregates (EAs) are available at the lowest level of aggregation.

The item weights are expressed as a part of total expenditure of all goods and services fell into index scope.

Preliminary NA data for 2017 in combination with HBS data for 2018 are used as weights for calculation of the HICP in 2019. Weights are price-updated to December 2018 for ensuring of the common base period of the index.

Weights are reviewed and updated annually based on NA and HBS results and on other data sources.

### **3.3. Selection of the observation points (outlets)**

The prices are collected in the selected observation points (outlets) – sample of stores, shops, restaurants, cafes, etc. in the sample of localities. The sampled outlets are drawn using non-probability sampling techniques: so called ‘purposive’ or ‘judgmental’ sampling. The selection is made at regional level by price collectors in regional statistical offices.

The number and the structure of the observation points are done in a way that can assure the optimum number of prices collected, which are sufficient to represent national prices for any of observed group of goods and services. The number of observation points is determined proportionally to the population in the selected district centres and to the volume of retail sales in the relevant outlets. The sample includes outlets, which:

- have a large volume of retail sales;
- supply a variety of goods, representative of the relevant elementary aggregates groups.

The main types of trade are covered, including supermarkets, hypermarkets, general and specialised stores and market stalls. Mail order and Internet shopping are not included in the index (till now they are not relevant). Prices for electricity, cars, mobile phones, PCs, pre-recorded recording media, electronic games, books, packaged holidays, banking services, hotels in resorts and some transport and telecommunication services, are collected from Internet sites of the respective supplies.

### **3.4. Techniques for selection and specification of the representative goods and services**

The prices of specially selected representative products (sample of goods and services representatives, so called ‘consumer basket’) are collected. Selection and specification of the products is done jointly by staff in central office and by price collectors in regional statistical offices.

Procedures for specifying the goods and services representatives can be described as follows:

- definition of an initial product sampling framework using HBS results;
- use of alternative data sources for the definition of the exact characteristics of the sampled products (administrative data, privately-owned data bases, etc.) , in addition to HBS data, where possible;
- use of price collectors’ field experience when information from the HBS and other data sources is not enough for the definition and specification of the sampled products;
- extraction of the sample using purposive sampling techniques.

The specifications for individual goods/services are more or less detailed; indicating size, unit, materials, model, brand characteristics, etc. How tight or loose the specifications will be depends on the nature of the product. If a product has many characteristics could affect its price, the specification is more exact. There are detailed specification in case of cars, medicines, fuels and some foods and services. For the most of the products looser specifications are used.

The specific variety of the good/service (reference product-offer), whose price will be collected in the sampled outlet, is selected by price collectors. They are instructed to pick the ‘typical’ product variety:

- which is the most sold in the sampled outlet; and;

- which meets as close as possible the specification of the product.

At the end of each year during the annual CPI/HICP revision several letters with instructions for the price collectors are sent to RSOs. The procedures for selecting the particular product in outlets are covered in them. The issue is also discussed on the seminars/workshops with price collectors, which take place regularly.

### **3.5. Sample size** (reference year 2019)

#### **Number of price observations per month: 39 021**

- 01** Food and non-alcoholic beverages **13 829**
- 02** Alcoholic beverages, tobacco **1 512**
- 03** Clothing and footwear **6 524**
- 04** Housing, water, electricity, gas and other fuels **1 253**
- 05** Furnishings, household equipment and routine household maintenance **3 954**
- 06** Health **2 860**
- 07** Transport **1 583**
- 08** Communication **141**
- 09** Recreation and culture **1 729**
- 10** Education **94**
- 11** Restaurants and hotels **2 935**
- 12** Miscellaneous goods and services **2 607**

#### **Number of representative products (goods and services): 741**

- 01** Food and non-alcoholic beverages **161**
- 02** Alcoholic beverages, tobacco **25**
- 03** Clothing and footwear **120**
- 04** Housing, water, electricity, gas and other fuels **31**
- 05** Furnishings, household equipment and routine household maintenance **70**
- 06** Health **55**
- 07** Transport **52**
- 08** Communication **50**
- 09** Recreation and culture **61**
- 10** Education **6**
- 11** Restaurants and hotels **56**
- 12** Miscellaneous goods and services **54**

**Number of observation points:** above **6 500**.

## **4. Compilation practices**

### **4.1. Computation of the lowest-level indices**

For compilation of price indices for elementary aggregates the ratio of geometric mean prices is used.<sup>5</sup>

### **4.2. Computation of the high hierarchical level indices and of the total index**

The Laspeyres formula is used in the compilation of the high-level indices and of the total index<sup>6</sup>.

### **4.3. Index reference period**

The index reference period is 2015=100<sup>7</sup>.

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<sup>5</sup> **Commission Regulation (EC) N 1749/96 of 9 September 1996** on initial implementing measures for Council Regulation (EC) N 2494/95 concerning harmonized indices of consumer prices (*OJ L 229, 10.09.1996 ,p.3*)

<sup>6</sup> **Regulation (EU) 2016/792** of the European Parliament and of the Council of 11 May 2016 on harmonised indices of consumer prices and the house price index, and repealing Council Regulation (EC) No 2494/95 (*OJ L 135, 24.05.2016 ,p.11*)

## **5. Data preparation methods and procedures**

### **5.1. Controls on the quality of the data**

Data quality checks and validation work is distributed between central office and regional statistical offices, but most of the data editing work is carried out at the national level by Statistics of Consumer prices and PPP Division in NSI.

The data validation process at regional offices can be divided into two stages. The first one takes place during the entering of the collected prices into the computer system and the second stage – after the data has been typed and processed into the system, when information is checked and validated by specialists in regional statistical offices and if necessary, prices are cross-checked in outlets.

The validation of the data in the central office is done after the first index calculation. The prices are checked and validated by the experts at the CPI division. Data quality checks fall into the following types of validation: 'relevant' index change validation (extreme and unusual price levels/changes); missing prices validation; outlets replacement validation; product specification change validation; fresh products price change validation; etc.

There is no automatic rejection of observed prices in our validation process. Each case (problematic price) is considered individually and all necessary modifications are done only on the basis of relevant information.

### **5.2. Treatment of the missing observations and replacements**

In case of temporally missing price the imputation is done in the 1<sup>st</sup> and in the 2<sup>nd</sup> month. For estimation of the missing price the method of matching samples is used and the short-term approach is applied – the imputation is done using the short-term price relative. If the price is still missing in the 3<sup>rd</sup> month, the price collector is obliged to select a replacement.

When replacing an old product by a new replacement product, price collectors are instructed to:

- Choose another product with the most similar quality and the one that accounts for the substantial amount of sales value in the outlet; and,
- Ask for the price of the new replacement product in the previous month.

When replacing an outlet, price collectors are told to choose a new one, which has to be:

- as close as possible to the old outlet;
- of the same type;
- as similar as possible to the old outlet in term of their sales values.

### **5.3. Treatment of the quality changes of the observed products**

When the HICP is calculated, it is important to be priced the products with unchangeable quality, because the change in prices should reflect only 'pure' price changes not changes due to change in the quality of the observed products.

The most influential methods with dealing with quality change of products are:

- Annual overlap. For many of the products new samples are drawn each year during the annual revision of consumer basket. December is used as linking month and then the dual price collection is done – the prices are collected both for the old and for the new sample. Quality differences between these two samples are then eliminated by overlap method called 'annual overlap'.
- Direct comparison. Price collectors are instructed to measure the price for the same variety throughout the year and if the variety disappears permanently from the market, they should choose another one with the most similar quality. In these cases, direct comparison method is applied, because of the minor difference in quality between the old and the new variety.

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<sup>7</sup> **Commission Regulation (EU) 2015/2010 of 11 November 2015** amending Regulation (EC) No 1708/2005 laying down detailed rules for the implementation of Council Regulation (EC) No 2494/95 as regards the common index reference period for the harmonised index of consumer prices (*OJ L 295, 12.11.2015, p.1*)

- Implicit quality adjustment methods. In some particular cases, the second approach is not applicable, due to the fact that quality difference between old and new product is ‘significant’, and implicit quality adjustment methods are applied: (a) overlap is used when the prices of both products are available in the same time period; (b) bridged overlap is used when they are not available; and (c) option cost.

Quality adjustment procedures are done centrally by the staff in central office. At regional level, price collectors do not make any quality adjustments; they are only instructed to report to central office for the all cases of considerable quality changes of the replacement products.

#### **5.4. Introduction of newly significant goods and services**

The procedures for identification of newly significant goods and services is based on:

- Analyses of HBS data on the structure of household expenditures;
- Price collectors information;
- Research and consultations with suppliers;
- PPP survey;
- Eurostat list.

Newly significant good and services are introduced at the end of each year (in December) during the annual revisions of consumer basket.

#### **5.5. Treatment of price reductions**

Seasonal sales, other sales prices and reduced prices (e.g. special offers, discounts, etc.) are included in the index when they are available to all potential consumers with no special conditions attached.

#### **5.6. Treatment of seasonal products**

The seasonal products are treated according to the requirements of the Commission Regulation (EC) N 330/2009<sup>8</sup>.

The fixed-weight approach is used for determining of the weights for seasonal items i.e. during the whole year indices of seasonal products are calculated with fixed weights.

The prices of the missing fruits and vegetables during the out-of-season are estimated using the method of ‘all-seasonal estimation’:

- in the first month of out-of season period, the estimated price is equal to the average price of the previous in-season period;
- from the second month of out-season period, the estimated price is equal to the price of the previous month, adjusted by the price change of all available products.

The prices of the missing clothing and footwear during the out-of-season are estimated using the method of ‘counter-seasonal estimation’:

- in the first month of out-of season period, the estimated price is equal to the average price of the previous in-season period;
- from the second month of out-season period, the estimated price is equal to the price of the previous month, adjusted by the price change of all seasonal products that are in-season.

#### **5.7. Index revisions**

In general, monthly indices are not subject to revisions – index numbers are final when first released.

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<sup>8</sup> **Commission Regulation (EC) N 330/2009 of 22 April 2009** laying down detailed rules for the implementation of Council Regulation (EC) N 2494/95 as regards minimum standards for treatment of seasonal products in the Harmonised Indices of Consumer Prices (HICP) (*OJ L 103, 23.4.2009 ,p.6*)

## **6. Dissemination of the information**

### **6.1 Publication of the HICP**

The HICP data is published together with CPI data to a strict, pre-announced timetable – in general 13 and 16 days after the month in a question.

The HICP data which is released each month covers the price indices (2015=100), monthly indices and rates of change, annual indices, annual average indices and indices for the current month compared to December of the previous year.

The HICP methodology, HICP data and press release are available on the NSI's website. The HICP data is also published in the following NSI publications:

- 'Statistical Yearbook of the Republic of Bulgaria', Chapter 'Consumer price indices';
- 'Statistical Reference Book', Chapter 'Prices' - annual publication of NSI;
- 'Bulgaria' - annual brochure of NSI;
- '129 years Bulgarian Statistical Institution';
- 'Consumer Price Indices and Inflation - Answers to the Most Frequently Asked Questions' - brochure.