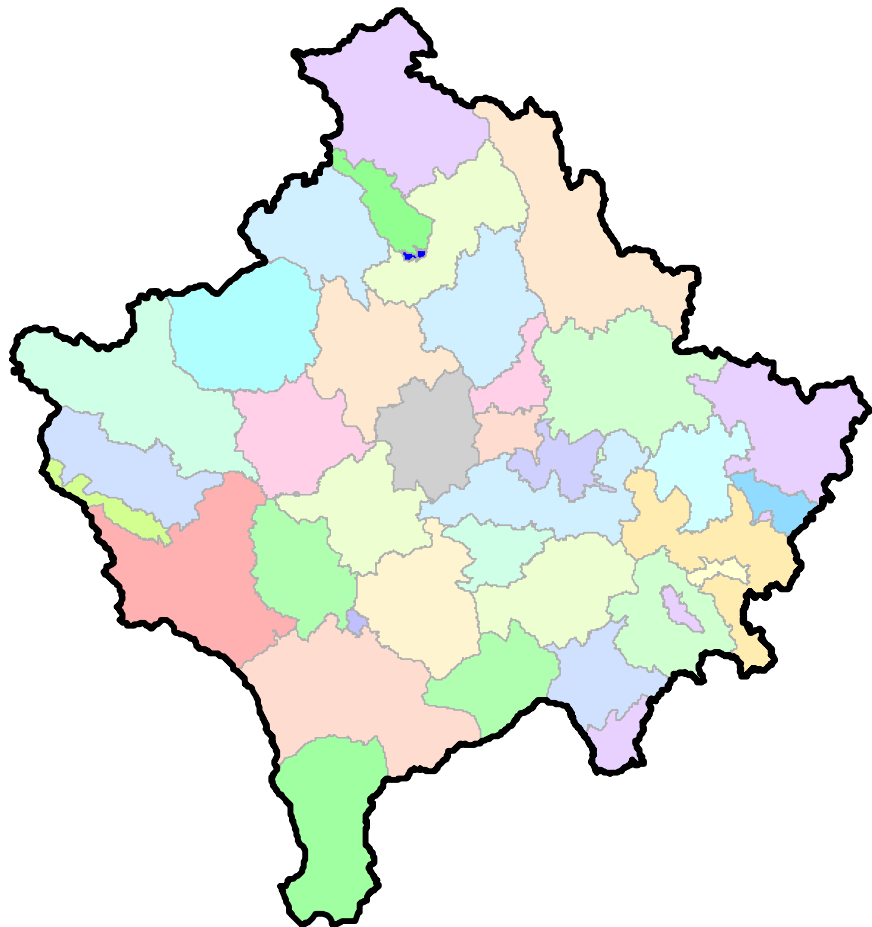




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*Agjencia e Statistikave të Kosovës - Agencija za Statistike Kosova - Kosovo Agency of Statistics*

## Series 3: Economic Statistics

### Harmonised Indices of Consumer Prices October 2018



## Foreword

Kosovo Agency of Statistics (KAS) started to publish Consumer Price Index (CPI) in September 2002 until December 2014, and since January 2015 the CPI has been harmonized by the international concept and is published as Harmonized Index of Consumer Prices (HICP). Consumer prices have started to be collected in May 2002 which is considered as a base month.

Since January 2016 the Harmonized Index of Consumer Prices (HICP), based on the Eurostat recommendations, is published with base year **2015=100**. Prices are collected from date 10 to 20 each month in 14 municipalities of Kosovo.

Since September 2002, KAS has continuously published CPI-HICP on a monthly basis including fourteen publications annually (2004 - 2017).

This publication contains the table with Harmonized Index of Consumer Prices in Kosovo on a monthly basis January 2010 – October 2018, annual average 2010-2017 (2015=100), with monthly and annual changes in percentage, graph, table for specific weights, index for October 2018, monthly changes of the harmonized index of consumer prices in percentage (October 2018 / September 2018) and annual changes in the harmonized index of consumer prices in percentage (October 2018 / October 2017) for groups and subgroups according to COICOP, table with average prices for some more representative items and the calculation methodology of the harmonized indices of consumer prices.

### Explanation for data users

The time series of Consumer Price Index (CPI) in the country have been published with the base month May 2002 = 100 for the period May 2002 - December 2015. Whereas, as of January 2016 with the Eurostat recommendations, the Consumer Price Index (CPI), respectively the Harmonized Index of Consumer Prices (HICP) is calculated with the base year 2015 = 100, and are recalculated on this basis of all time series of the Consumer Price Index (CPI) in the country and are published with 01.06.2018 on the KAS website (in the annual publication of the Harmonized Consumer Price Index 2002-2017). From January 2016, the time series have been published continuously from the month of January 2010.

Proposals, suggestions and feedback can be send via e-mail: [economic@rks-gov.net](mailto:economic@rks-gov.net)

Consumer Price Index (CPI), namely the Harmonised Index of Consumer Prices (HICP), is a regular monthly publication.

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## Symbols and abbreviations

CPI	Consumer Price Index
COICOP	Classification of Individual Consumption by Purpose
HBS	Household Budget Survey
HICP	Harmonized Index of Consumer Prices
KAS	Kosovo Agency of Statistics
:	Figure not available
0	Less than half of the unit used
-	Not applicable
%	Percentage
W	Statistical weights (specific weight - CPI/HICP)
∅	Average

## Content

	Page
Harmonized Index of Consumer Prices in October 2018.....	5
Table 1: Harmonised indices of consumer prices (HICP) January 2010 – October 2018 (2015=100), monthly and annual changes of prices in percentage.....	6
Graph 1: Yearly harmonized index of consumer prices, 2010 - 2017 (2015 = 100) .....	8
Graph 2: Annual and monthly changes in percentages of the HICP.....	8
Table 2: Weight, HICP October 2018 (2015=100), monthly and annual price change in percentage for groups and sub-groups according to COICOP .....	9
Table 3: Average prices in Euros for some selected goods and services .....	11
HICP Methodology.....	12

## **Harmonized Index of Consumer Prices in October 2018**

Monthly inflation measured by the harmonized index of consumer prices was 0.2% in October 2018, while annual inflation was 1.5%.

### **October 2018 / September 2018 0,2%**

The total harmonized index of consumer prices is higher by 0.2% in October 2018 compared to September 2018. This is mainly explained by the increase of the consumer prices in COICOP subgroups: bread and cereals (0.7%), meat (1.3%), vegetables (2,0%), use of personal transport means (1.1%) - (increase of price of oil and gasoline) with a common impact of these subgroups by 0,4 percent in the HICP.

The increase was largely neutralized by the decrease of the consumer prices in COICOP subgroups: milk, cheese and eggs (-1.3%), fruits (-9.0%) with a common impact of these subgroups by -0.2 percent in the HICP.

### **October 2018 / October 2017 1.5%**

The total harmonized index of consumer prices is higher by 1.5% in October 2018 compared to October 2017. This is mainly explained by the increase in consumer prices in this period to COICOP subgroups: bread and cereals (1.2%), meat (4.6%), vegetables (10.7%), alcoholic beverages (3.6%), tobacco (2.8%), use of personal transport means (11.4%) - (increase of price of oil and gasoline), transport services (5.8%) - (increase of airline ticket prices), hotel services (2.6%) with a common impact of these subgroups by 2.2 percent in the HICP.

The increase was neutralized mainly by the decrease in consumer prices in COICOP subgroups: fruits (-11.7%), sugar and sweets (-7.0%), mineral waters, soft drinks, fruit and vegetable juices (-1.1%), electricity, gas and other fuels (-6.3%) with a common impact of these subgroups by -0.7 percent in the HICP.

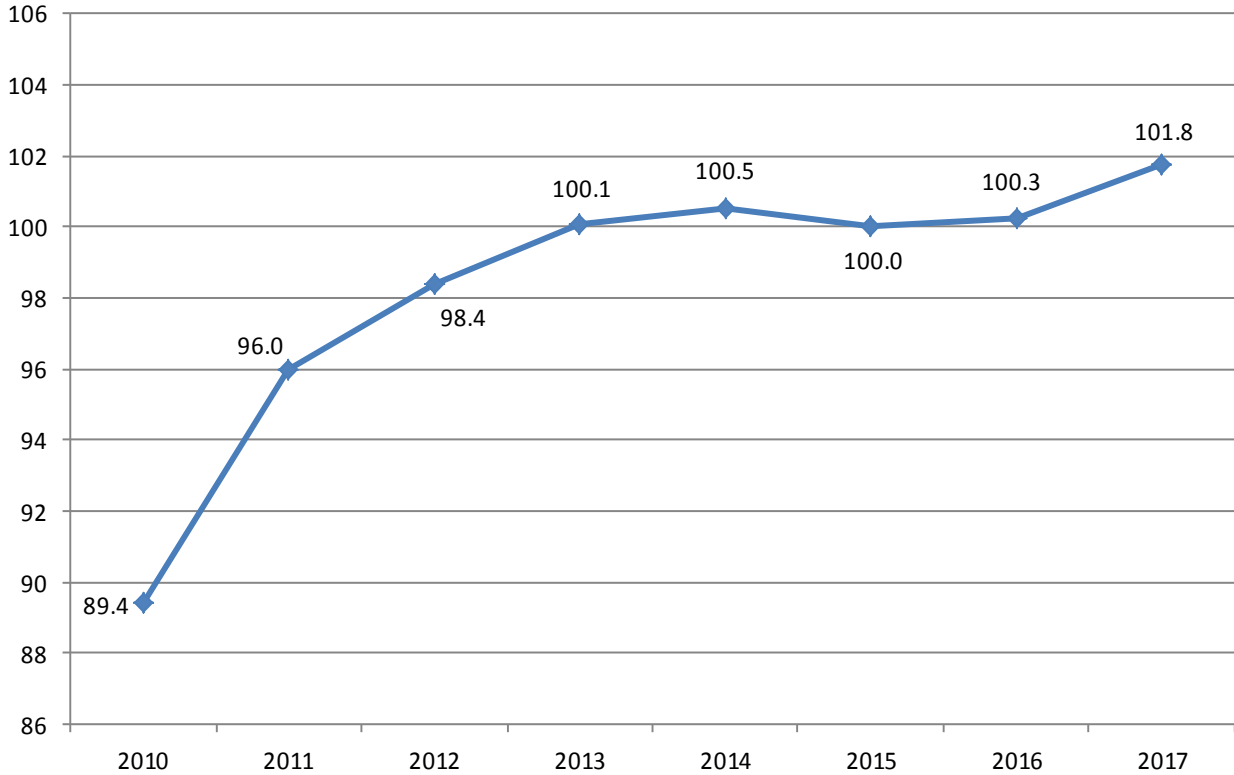
**Table 1: Harmonised indices of consumer prices (HICP) January 2010 – October 2018 (2015=100), monthly and annual changes of prices in percentage**

Year	Month	Index (2015 = 100)	Monthly change in percentage	Annual change in percentage
2010	January	88.0	0.6	0.7
	February	88.2	0.2	1.1
	March	88.1	-0.1	0.8
	April	87.2	-1.0	1.6
	May	87.5	0.3	2.2
	June	87.6	0.1	2.2
	July	87.9	0.3	2.7
	August	90.5	3.0	6.0
	September	90.8	0.3	6.0
	October	91.9	1.2	6.0
	November	92.3	0.4	6.2
	December	93.2	1.0	6.5
		<b>Annual average 2010</b>	<b>89.4</b>	<b>:</b>
2011	January	94.5	1.4	7.4
	February	96.5	2.1	9.4
	March	97.6	1.1	10.8
	April	96.5	-1.1	10.7
	May	96.5	0.0	10.3
	June	95.7	-0.8	9.2
	July	95.2	-0.5	8.3
	August	95.3	0.1	5.3
	September	95.1	-0.2	4.7
	October	96.2	1.2	4.7
	November	96.2	0.0	4.2
	December	96.5	0.3	3.5
		<b>Annual average 2011</b>	<b>96.0</b>	<b>:</b>
2012	January	97.3	0.8	3.0
	February	98.2	0.9	1.8
	March	98.3	0.1	0.7
	April	97.6	-0.7	1.1
	May	97.6	0.0	1.1
	June	97.3	-0.3	1.7
	July	97.3	0.0	2.2
	August	98.3	1.0	3.1
	September	99.1	0.8	4.2
	October	99.9	0.8	3.8
	November	99.5	-0.4	3.4
	December	100.1	0.6	3.7
		<b>Annual average 2012</b>	<b>98.4</b>	<b>:</b>
2013	January	100.7	0.6	3.5
	February	100.8	0.1	2.6
	March	100.8	0.0	2.5
	April	100.0	-0.8	2.5
	May	99.7	-0.3	2.2
	June	99.9	0.2	2.7
	July	99.6	-0.3	2.4
	August	99.5	-0.1	1.2
	September	99.3	-0.2	0.2
	October	100.1	0.8	0.2
	November	100.3	0.2	0.8
	December	100.6	0.3	0.5
		<b>Annual average 2013</b>	<b>100.1</b>	<b>:</b>

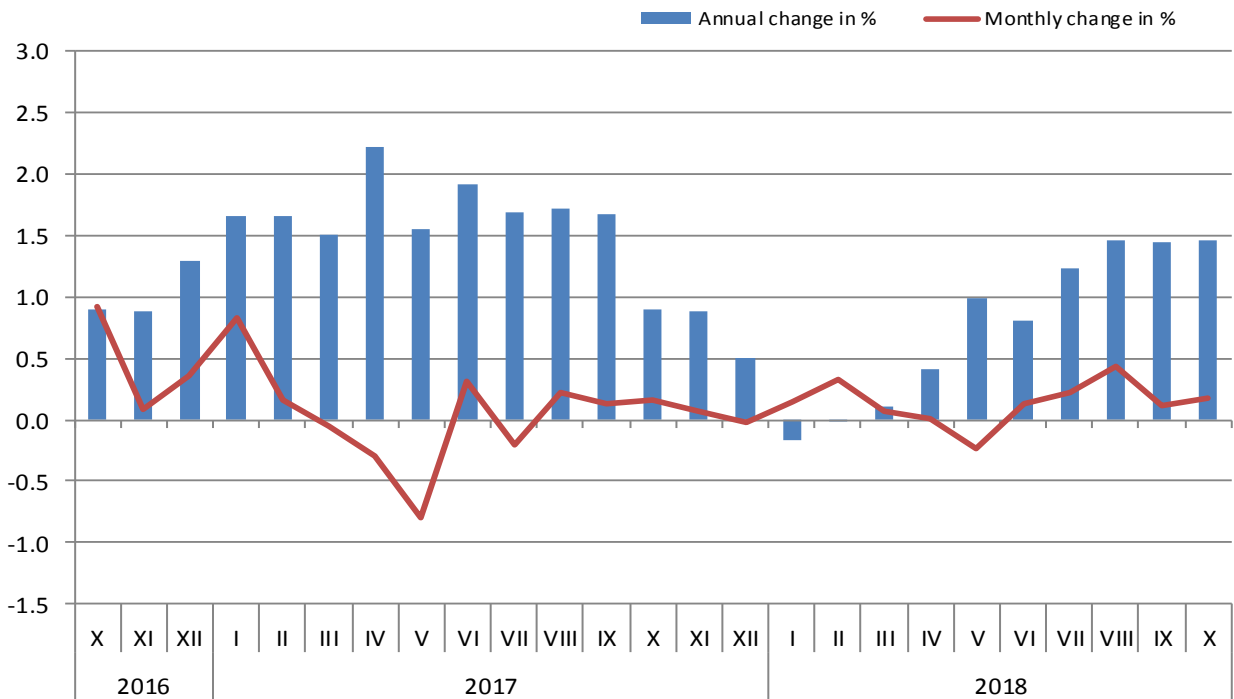
**Table 1: Harmonised indices of consumer prices (HICP) January 2010 – October 2018 (2015=100), monthly and annual changes of prices in percentage (continued)**

Year	Month	Index (2015 = 100)	Monthly change in percentage	Annual change in percentage
2014	January	100.9	0.3	0.2
	February	100.9	0.0	0.1
	March	101.1	0.2	0.3
	April	100.3	-0.8	0.3
	May	100.2	-0.1	0.5
	June	100.3	0.1	0.4
	July	100.4	0.1	0.8
	August	100.4	0.0	0.9
	September	100.6	0.2	1.3
	October	100.7	0.1	0.6
	November	100.4	-0.3	0.1
	December	100.2	-0.2	-0.4
		<b>Annual average 2014</b>	<b>100.5</b>	:
2015	January	100.3	0.1	-0.6
	February	100.6	0.3	-0.3
	March	100.7	0.1	-0.4
	April	99.9	-0.8	-0.4
	May	99.7	-0.1	-0.5
	June	99.9	0.1	-0.4
	July	99.6	-0.2	-0.8
	August	99.7	0.1	-0.7
	September	99.4	-0.3	-1.2
	October	100.0	0.6	-0.7
	November	100.1	0.1	-0.3
	December	100.0	0.0	-0.2
		<b>Annual average 2015</b>	<b>100.0</b>	:
2016	January	100.5	0.4	0.1
	February	100.7	0.2	0.0
	March	100.8	0.1	0.1
	April	99.8	-1.0	-0.1
	May	99.6	-0.2	-0.1
	June	99.6	-0.1	-0.3
	July	99.6	0.0	0.0
	August	99.8	0.2	0.0
	September	99.9	0.2	0.6
	October	100.9	0.9	0.9
	November	101.0	0.1	0.9
	December	101.3	0.4	1.3
		<b>Annual average 2016</b>	<b>100.3</b>	:
2017	January	102.2	0.8	1.7
	February	102.3	0.2	1.7
	March	102.3	-0.1	1.5
	April	102.0	-0.3	2.2
	May	101.2	-0.8	1.5
	June	101.5	0.3	1.9
	July	101.3	-0.2	1.7
	August	101.5	0.2	1.7
	September	101.6	0.1	1.7
	October	101.8	0.2	0.9
	November	101.8	0.1	0.9
	December	101.8	0.0	0.5
		<b>Annual average 2017</b>	<b>101.8</b>	:
2018	January	102.0	0.2	-0.2
	February	102.3	0.3	0.0
	March	102.4	0.1	0.1
	April	102.4	0.0	0.4
	May	102.2	-0.2	1.0
	June	102.3	0.1	0.8
	July	102.5	0.2	1.2
	August	103.0	0.4	1.5
	September	103.1	0.1	1.4
	October	103.3	0.2	1.5

**Graph 1: Yearly harmonized index of consumer prices, 2010 - 2017 (2015 = 100)**



**Graph 2: Annual and monthly changes in percentages of the HICP**





**Table 2: Weight, HICP October 2018 (2015=100), monthly and annual price change in percentage for groups and sub-groups according to COICOP**

COICOP	Groups and subgroups	Weight 2018 in ‰	X - 2018 2015=100	<u>X - 2018</u> IX- 2018	<u>X - 2018</u> X - 2017
<b>00</b>	<b>Total HICP</b>	<b>1000.0</b>	<b>103.3</b>	<b>0.2</b>	<b>1.5</b>
<b>01</b>	<b>Food and non-alcoholic beverages</b>	<b>397.9</b>	<b>102.7</b>	<b>0.1</b>	<b>1.4</b>
<b>01.1</b>	<b>Food</b>	<b>339.4</b>	<b>102.5</b>	<b>0.1</b>	<b>1.8</b>
01.1.1	Bread and cereals	101.1	100.8	0.7	1.2
01.1.2	Meat	105.8	107.2	1.3	4.6
01.1.3	Fish	2.6	103.9	-0.6	0.7
01.1.4	Milk, cheese and eggs	51.5	104.4	-1.3	0.2
01.1.5	Oils and fats	7.0	102.7	-0.1	-2.0
01.1.6	Fruits	18.3	90.7	-9.0	-11.7
01.1.7	Vegetables	31.4	95.0	2.0	10.7
01.1.8	Sugar, jam, honey, chocolate and confectionery	13.8	104.9	-0.1	-7.0
01.1.9	Food products n.e.c.	7.9	102.0	-0.5	-0.1
<b>01.2</b>	<b>Non-alcoholic beverages</b>	<b>58.5</b>	<b>104.5</b>	<b>-0.1</b>	<b>-0.5</b>
01.2.1	Coffee, tea and cocoa	11.3	114.4	0.8	1.8
01.2.2	Mineral waters, soft drinks, fruit and vegetable juices	47.2	101.8	-0.3	-1.1
<b>02</b>	<b>Alcoholic beverages, tobacco</b>	<b>57.3</b>	<b>115.8</b>	<b>0.7</b>	<b>3.2</b>
02.1	Alcoholic beverages	25.8	111.2	1.7	3.6
02.2	Tobacco	31.5	119.5	0.0	2.8
<b>03</b>	<b>Clothing and footwear</b>	<b>38.7</b>	<b>103.3</b>	<b>0.1</b>	<b>-0.1</b>
03.1	Clothing	30.2	103.0	0.0	0.6
03.2	Footwear	8.5	103.7	0.1	-2.5
<b>04</b>	<b>Housing, water, electricity, gas and other fuels</b>	<b>72.9</b>	<b>99.4</b>	<b>0.4</b>	<b>-3.2</b>
04.1	Actual rentals for housing	5.5	97.5	0.0	-0.3
04.3	Maintenance and repair of the dwelling	8.8	102.1	0.1	1.5
04.4	Water supply and miscellaneous services relating to the dwelling	13.3	98.0	0.0	2.6
04.5	Electricity, gas and other fuels	45.3	97.6	0.6	-6.3
<b>05</b>	<b>Furnishing, household equipment and routine maintenance of the house</b>	<b>83.3</b>	<b>101.1</b>	<b>0.0</b>	<b>-0.2</b>
05.1	Furniture and furnishing, carpets and other floor coverings	19.4	99.6	0.2	-2.1
05.2	Household textiles	2.9	100.8	-0.4	-1.7
05.3	Household appliances	15.2	97.8	0.7	-2.6
05.4	Glassware, tableware and household utensils	12.5	104.2	-0.9	1.0
05.5	Tools and equipment for house and garden	14.6	103.1	0.0	1.7
05.6	Goods and services for routine household maintenance	18.7	101.9	-0.2	1.6

**Table 2: Weight, HICP October 2018 (2015=100), monthly and annual price change in percentage for groups and sub-groups according to COICOP (continued)**

COICOP	Groups and subgroups	Weight 2018 in ‰	X - 2018 2015=100	X - 2018 IX- 2018	X - 2018 X - 2017
<b>06</b>	<b>Health</b>	<b>27.1</b>	<b>102.8</b>	<b>0.0</b>	<b>-0.3</b>
06.1	Medical products, appliances and equipment	16.4	102.8	0.0	-0.4
06.2	Out-patient services	9.7	103.1	0.0	-0.2
06.3	Hospital services	1.0	100.0	0.0	0.0
<b>07</b>	<b>Transport</b>	<b>151.1</b>	<b>107.0</b>	<b>0.3</b>	<b>6.5</b>
07.1	Purchase of vehicles	52.3	98.6	0.1	-0.6
07.2	Equipment operations of personal transportation	76.3	112.2	1.1	11.4
07.3	Transport services	22.5	110.4	-2.0	5.8
<b>08</b>	<b>Communication</b>	<b>36.9</b>	<b>97.8</b>	<b>0.2</b>	<b>-0.8</b>
08.1	Postal services	2.6	104.6	0.0	0.0
08.2	Telephone and telefax equipment	4.5	84.9	1.7	-6.6
08.3	Telephone and telefax services	29.8	99.8	0.0	0.1
<b>09</b>	<b>Recreation and culture</b>	<b>47.2</b>	<b>97.0</b>	<b>0.2</b>	<b>-1.4</b>
09.1	Audio-visual, photographic and information processing equipment	12.3	87.7	-0.1	-3.5
09.2	Other major durables for recreation and culture	2.5	102.1	0.3	-0.1
09.3	Other recreational items and equipment, gardens and pets	9.7	101.9	0.0	0.1
09.4	Recreational and cultural services	6.3	100.5	0.0	-0.2
09.5	Newspapers, books and stationery	11.9	98.5	0.3	-0.9
09.6	Package Holidays	4.5	100.0	1.7	-2.8
<b>10</b>	<b>Education</b>	<b>10.1</b>	<b>99.7</b>	<b>0.0</b>	<b>-1.0</b>
<b>11</b>	<b>Restaurants and hotels</b>	<b>27.9</b>	<b>104.6</b>	<b>-0.3</b>	<b>2.6</b>
11.1	Catering services	24.1	105.2	-0.4	2.6
11.2	Accommodation services	3.8	102.7	0.0	3.0
<b>12</b>	<b>Miscellaneous goods and services</b>	<b>49.6</b>	<b>102.3</b>	<b>0.3</b>	<b>0.8</b>
12.1	Personal care	14.9	102.2	0.5	0.8
12.3	Personal effects n.e.c.	12.9	102.7	0.5	2.3
12.4	Social protection	1.0	107.7	0.0	1.5
12.5	Insurance	8.2	102.3	0.0	-0.3
12.6	Financial services n.e.c.	9.2	101.0	0.0	0.0
12.7	Other services n.e.c.	3.4	99.9	0.0	-0.7

**Table 3: Average prices in Euros for some selected goods and services**

<b>Code</b>	<b>Item</b>	<b>Unit Mesaure</b>	<b>X 2017</b>	<b>IX 2018</b>	<b>X 2018</b>
101	Rice	1 kg	1.34	1.31	1.33
102	Wheat flour	1 kg	0.40	0.40	0.41
103	White bread	500g	0.29	0.29	0.29
111	Beef meat	1 kg	6.36	6.89	7.03
112	Veal meat	1 kg	7.22	7.44	7.76
114	Chicken	1 kg	2.65	2.65	2.67
131	Milk (tetrapak)	1 lit	0.88	0.89	0.89
133	Yoghurt	1 lit	0.90	0.88	0.87
137	Eggs	30 pcs	2.58	2.57	2.42
141	Edible oils	1 lit	1.09	1.02	1.01
153	Bananas	1 kg	0.94	0.98	0.98
161	Potatoes	1 kg	0.35	0.50	0.49
162	Tomatoes	1 kg	0.83	0.95	1.01
163	Beans	1 kg	2.45	2.36	2.35
167	Pepper	1 kg	0.87	1.06	1.21
175	Sugar	1 kg	0.84	0.64	0.65
192	Ground coffee	1 kg	7.89	8.02	8.06
193	Tea	1 kg	7.69	8.00	8.10
195/1	Natural water	1.5 lit	0.31	0.30	0.30
204	Beer	0.5 l	0.64	0.65	0.65
215	Cigarettes - Ronhill	1 pack	1.61	1.63	1.63
217	Cigarettes - Marlboro	1 pack	2.51	2.59	2.59
416	Electricity (no fixed cost)	1 kwh	0.06	0.06	0.06
418	Firewood	1 m <sup>3</sup>	40.34	36.79	37.37
701	Petrol	1 lit	1.05	1.19	1.21
702	Diesel	1 lit	1.02	1.18	1.20

## HICP Methodology

HICP Kosovo, produced by Kosovo Agency of Statistics (KAS), is produced by methods of the Harmonized Index of Consumer Prices (HICP). Eurostat has defined the HICP as the European standard of consumer price indices. Index calculated and their results are presented by Classification of Individual Consumption by Purpose (COICOP), the international classification which classifies consumption in divisions, groups and classes of items. By COICOP, KAS has allocated 91 classes of defined consumption (at 4-digit level) further to 410 products (elementary aggregate). KAS has defined aggregation weight for each element and each month collects prices for each elementary aggregate.

Each month the HICP is calculated in two steps:

1. Elementary indices (elementary aggregate indicator) calculated from the collected prices by using the formula of unweighted geometric average (Jevon).
2. The indices of the highest level, including the HICP itself, are calculated by averaging the elementary indices by formula of weighted arithmetic average (Laspeyres).

Aggregate elementary weights are based on estimates of annual consumption expenditures. KAS, for 91 classes of consumption, estimates annual consumption expenditures from the Household Budget Survey (HBS) and National Accounts (NA); the weights within consumer classes come from KAS's internal resources. The specific weights, as of January 2013, were based on estimates of Household Budget Surveys (LFS) and National Accounts (NA) data referring to 2012, and since January 2015 specific refreshed weights are based on data from National Accounts (NA) and the Household Budget Survey (ABF) of 2013. From January 2016 the specific weights for items and services harmonized according to E-coicop (recommendations from Eurostat) are based on National Accounts data (NA) and the 2014 Household Budget Survey (HBS). As of January 2017, specific items and services weights are based on the National Accounts (NA) data for 2015. As of January 2018, specific items and services weights are based on the National Accounts (NA) data of 2016. Annually updated weighing ensures that the HICP reflects current consumer trends.

Total annual consumption expenditure is defined as all domestic (within-country) monetary purchases of the household sector. This matches the NA category called *Household Final Monetary Consumption (HFMC)* and means the weights must exclude the value of consumption of own production and costs for owner-occupied housing. Until December 2014 the weights included expenditure of only domestic consumers, while from January 2015 are also include expenditure of non resident consumers.

To estimate monthly price change, KAS staff collect prices for a set of specific items (often called a *market basket*) chosen to represent the elementary aggregates. The goal is to collect all prices of exactly the same items every month; whenever a price cannot be collected, carefully developed procedures must be applied to avoid a biased result.

KAS data collectors, who are based in seven regional centers, collect approximately 6800 prices during the period of 10<sup>th</sup> - 20<sup>th</sup> of each month. They obtain prices in stores, markets, service enterprises and other retail outlets in fourteen municipalities of Kosovo:

- Gjakovë
- Gjilan
- Istog
- Mitrovicë
- Pejë
- Kamenicë
- Rahovec
- Podujevë
- Prishtinë
- Prizren
- Suharekë
- Ferizaj
- Vushtrri
- Kaçanik

The KAS central office staff in Prishtina collects prices for items such as electricity, water, postal and telecom services, and rail transport.

### ***Elementary Indexes***

Elementary index for a month is equal to its index in the previous month multiplied by the price change measured on a monthly basis, calculated from collected prices. KAS uses the geometric mean formula (Jevon) to calculate monthly changes: geometric average rate of the current month in geometric average price collected for the previous month.

Index for elementary aggregate  $e$  for month  $m$

$$I_e^m = I_e^{m-1} \times \left[ \frac{\left( \prod_{i=1}^{n_e} p_i^m \right)^{1/n_e}}{\left( \prod_{i=1}^{n_e} p_i^{m-1} \right)^{1/n_e}} \right] \quad I_e^0 \equiv 100$$

$I_e^m$  = Price index for elementary aggregate  $e$  for month  $m$

$I_e^{m-1}$  = Price index for elementary aggregate  $e$  in month  $m-1$

$p_i^m$  = Price for item  $i$  in month  $m$

$p_i^{m-1}$  = Price for item  $i$  in month  $m-1$

$n_e$  = Number of collected prices for elementary aggregate  $e$

### ***Higher-level indexes***

In Kosovo's HICP indexes are calculated first for groups (of elementary aggregates) and these are combined to obtain the total HICP.

Higher-level indexes are weighted by arithmetic averages of elementary indexes. In the current CPI, which uses the *Young* formula until December 2013, the weights are shares of the unadjusted weight-period expenditures. Since January 2014 the index will use the *Lowe* formula, with weights that are shares of weight-period expenditures that have been updated for price change. (The *Lowe* formula is closer to the actual *Laspeyres* formula).

Both the *Young* and *Lowe* formulas are weighted by arithmetic averages with weights that are shares of consumption expenditure and so both are *Laspeyres-type* index formulas. Currently HICP uses the *Young* index formula whose weights are shares of expenditures during the weight period (year 2010). New weights from NA data and from the 2012 HBS and are applied since January 2014. CPI has passed in calculating indexes by *Lowe's* formula; (the weights were part of the 2012 expenditures calculated with the price changes of December of 2013. From January 2015, are applied specific weights from NA and HBS data for 2013 calculated with the price changes of December 2014. From January 2016, the specific weights are based on National Accounts data (NA) and the 2014 Household Budget Survey (HBS) calculated with the price changes of December 2015. From January 2017, specific items and services weights are based on the National Accounts (NA) data for 2015 calculated with the price changes of December 2016. From January 2018, the specific items and services weights are based on the National Accounts (NA) data of 2016 calculated with the price changes of December 2017.

## Index weights

### Young Formula Weights for Elementary Aggregates within Groups

$$w_{e,g}^b = \frac{x_e^b}{\sum_{e=1}^{k_g} x_e^b} \quad \sum_{e=1}^{k_g} w_{e,g}^b = 1$$

$w_{e,g}^b$  = Weight for elementary aggregate  $e$  within group  $g$  in weight-period  $b$

$x_e^b$  = expenditure for elementary aggregate  $e$  in weight-period  $b$  (Currently  $b = 2012$ )

$k_g$  = Number of elementary aggregates in group  $g$

### Young Formula Weights for Groups within the Overall CPI

$$w_g^b = \frac{\sum_{e=1}^{k_g} x_e^b}{\sum_{g=1}^h \sum_{e=1}^{k_g} x_e^b} \quad \sum_{g=1}^h w_{e,g}^b = 1$$

$w_g^b$  = Weight for group  $g$  in weight period  $b$

$h$  = Number of groups in CPI

### Lowe Formula Weights for Elementary Aggregates within Groups

$$w_{e,g}^b = \frac{x_e^b \times a_e^{b \rightarrow v}}{\sum_{e=1}^{k_g} (x_e^b \times a_e^{b \rightarrow v})} \quad \sum_{e=1}^{k_g} w_{e,g}^b = 1$$

$w_{e,g}^b$  = Weight for elementary aggregate  $e$  within group  $g$  in weight-period  $b$   
(Effective January 2014,  $b = 2012$ )

$a_e^{b \rightarrow v}$  = weight adjustment factor for elementary aggregate  $e$

$$a_e^{b \rightarrow v} = I_e^v / \frac{1}{12} \left( \sum_{m=Jan}^{Dec} I_e^{m/b} \right)$$

$I_e^v$  = Price index for elementary aggregate  $e$  for month  $v$

(Effective January 2014,  $v =$  December 2013)

$I_e^{m/b}$  = Price index for elementary aggregate  $e$  in month  $m$  in year  $b$

### Lowe Formula Weights for Group within Overall-CPI

$$w_g^b = \frac{\sum_{e=1}^{k_g} (x_e^b \times a_e^{b \rightarrow v})}{\sum_{g=1}^h \sum_{e=1}^{k_g} (x_e^b \times a_e^{b \rightarrow v})} \quad \sum_{g=1}^h w_{e,g}^b = 1$$

### ***Indexes for higher-level groups***

$$I_g^m = \sum_{e=1}^{k_g} w_{e,g}^b * I_e^m \quad I_e^0 = 100$$

period **0** is May 2002 for most items,  
but later for items that entered at a later date

### ***Total HICP***

Total HICP is a weighted arithmetic average of the indexes of groups. CPI used in the formula of Young, but since January 2014 has passed in using Lowe formula.

Because the groups have different bases indexed (most have a base May 2002 = 100, but the groups added later have otherwise, since January 2016 the indices are calculated with base year 2015 = 100), indices of groups should be re-based on a common period, which is the month  $\nu$  (previous month before new weights being put into use).

$$HICP^m = HICP^\nu \times \sum_{\varepsilon=1}^h w_{\varepsilon}^b \times \frac{I_{\varepsilon}^m}{I_{\varepsilon}^{\nu}} \quad HICP^0 = 100$$

$HICP^m$  = Harmonized index of consumer prices for the month  $m$

$\nu$  = previous month before new weights being put into use. (Currently  $\nu$  = December 2017)

