

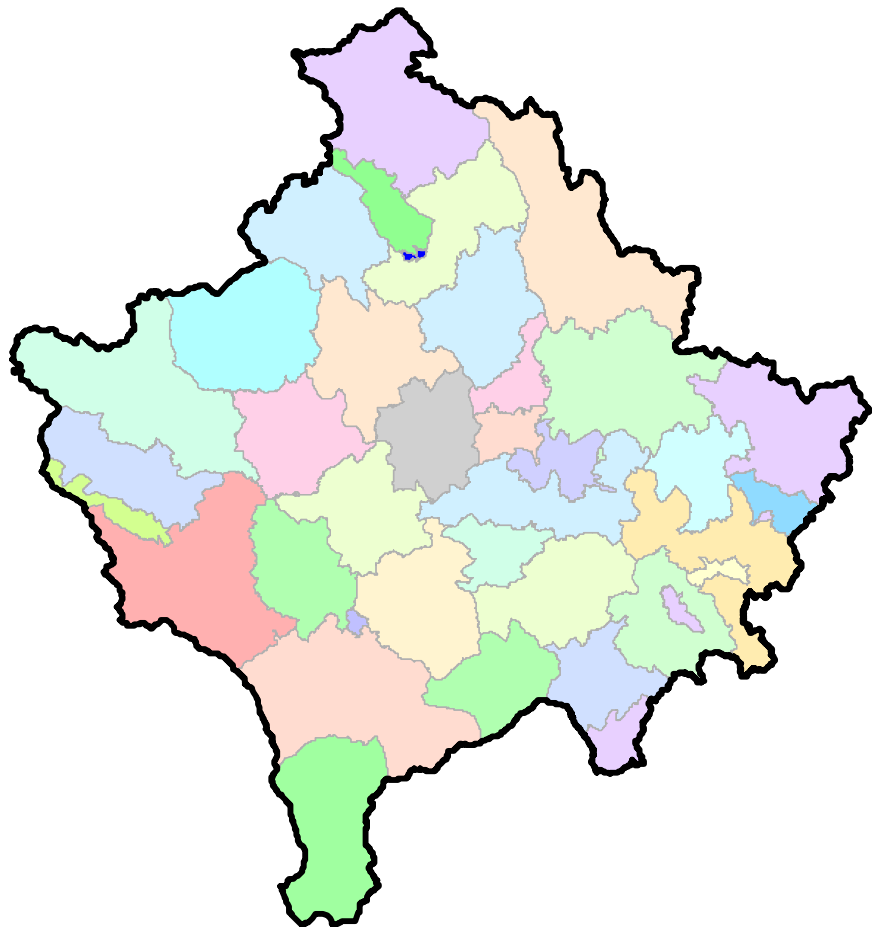


Republika e Kosovës
Republika Kosova-Republic of Kosovo
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Ministria e Financave - Ministarstvo za Financije - Ministry of Finance
Agjencia e Statistikave të Kosovës - Agencija za Statistike Kosova - Kosovo Agency of Statistics

Series 3: Economic Statistics

Harmonised Indices of Consumer Prices October 2020



AGJENCIA E STATISTIKAVE TË KOSOVËS
AGENCIJA ZA STATISTIKE KOSOVA
KOSOVO AGENCY OF STATISTICS

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, as well and sixteen publications on an annual basis (2004 - 2019).

This publication contains the table with Harmonized Index of Consumer Prices in Kosovo on a monthly basis January 2010 - October 2020, annual average 2010 - 2019 (2015=100), with monthly and annual changes in percentage, graph, table for specific weights, index for October 2020, monthly changes of the harmonized index of consumer prices in percentage (October 2020 / September 2020) and annual changes in the harmonized index of consumer prices in percentage (October 2020 / October 2019) 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), respectively the Harmonized Index of Consumer Prices (HICP) in the country and are published with 29.05.2020 on the KAS website (in the annual publication of the Harmonized Consumer Price Index 2002-2019).

Proposals, suggestions and feedback can be send via e-mail: 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
NA	National Accounts
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
‰	Promil
W	Statistical weights (specific weight - CPI/HICP)
∅	Average

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Harmonized Index of Consumer Prices, October 2020

Monthly inflation measured by the harmonized index of consumer prices in October 2020 was 0.2%. The annual inflation rate measured in October 2020 with October 2019 was -0.2%.

October 2020 / September 2020 0,2%

The total harmonized index of consumer prices in October 2020 is higher by 0.2% compared to September 2020. This is mainly explained by the increase in consumer prices in the COICOP subgroups: milk, cheese and eggs (3.2%), oils and fats (3.2%), vegetables (7.6%), solid fuels, firewood, pellets, etc. (2.5%), with a combined impact of these subgroups of 0.4 percent on the HICP

While a decrease in prices is observed in the COICOP subgroups: bread and cereals (-0.3%), fruit (-7.5%), use of personal transport means (-0.5%) "slight decrease of oil and gasoline prices", with a common impact of these subgroups of -0.2 percent on the HICP.

October 2020 / October 2019 -0,2%

The total harmonized index of consumer prices decreased by an average of -0.2 percent in October 2020 compared to October 2019. This is mainly explained by the decline in consumer prices in this period in the COICOP subgroups: fruits (-3.6%), glassware, cutlery and kitchen utensils (-4.3%), purchase of vehicles (-1.8%), use of personal transport means (-15.0%) "decrease in oil and gasoline prices", with a common impact of these subgroups of -1.4 percent on the HICP.

While price increases are observed in the COICOP subgroups: bread and cereals (2.3%), meat (1.3%), milk, cheese and eggs (2.2%), oils and fats (3.4%), vegetables (6.7%), sugar, honey, chocolate and sweets (3.0%), water, soft drinks, fruit and vegetable juices (2.0%), tobacco (2.0%), medical products, apparatus and equipment (4.3%), outpatient services (5.5%), hotel services (1.8%), insurance (19.7%) "increase in vehicle insurance prices last year", with a common impact of these subgroups of 1.2 percent on the HICP.

Table 1: Harmonised indices of consumer prices (HICP) January 2010 – October 2020 (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
		Annual average 2010	89.4	:
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
		Annual average 2011	96.0	:
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
		Annual average 2012	98.4	:
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
		Annual average 2013	100.1	:

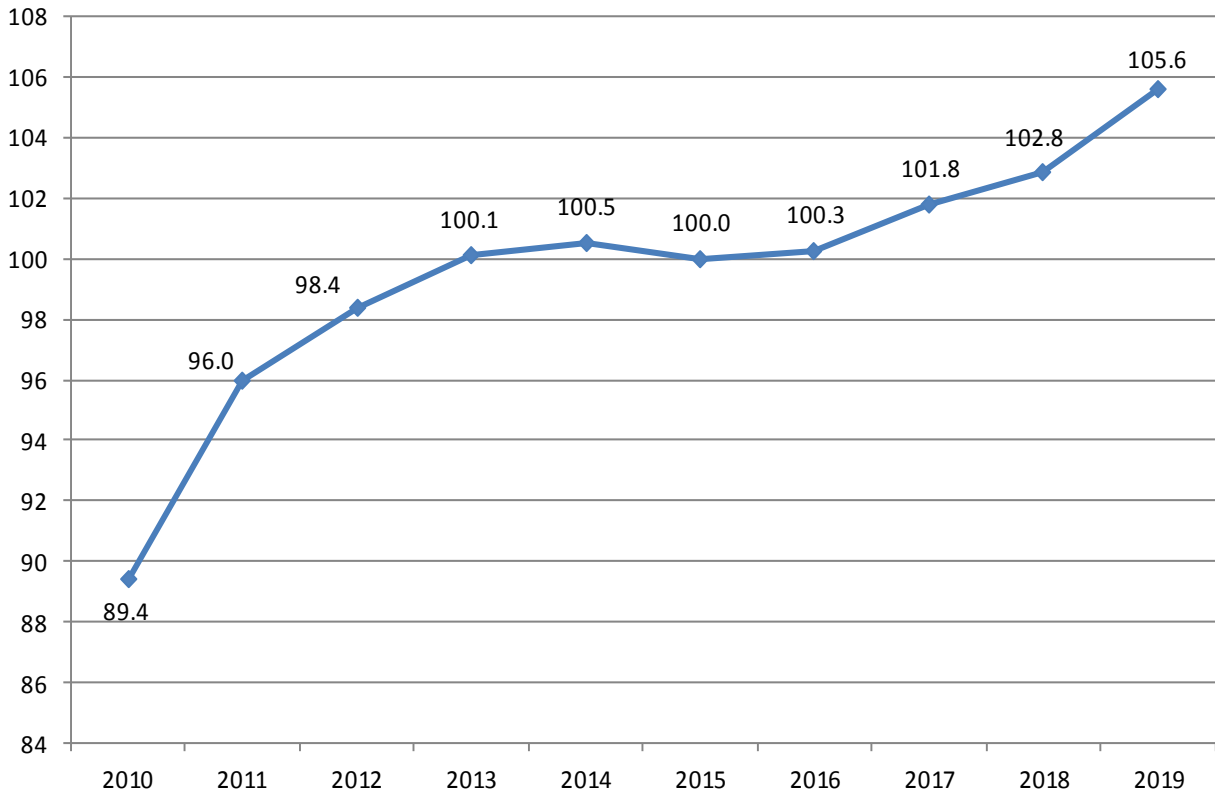
Table 1: Harmonised indices of consumer prices (HICP) January 2010 – October 2020 (2015=100), monthly and annual changes of prices in percentage (continued)

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
		Annual average 2014	100.5	:
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
		Annual average 2015	100.0	:
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
		Annual average 2016	100.3	:
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
		Annual average 2017	101.8	:

Table 1: Harmonised indices of consumer prices (HICP) January 2010 – October 2020 (2015=100), monthly and annual changes of prices in percentage (continued)

Year	Month	Index (2015 = 100)	Monthly change in percentage	Annual change in percentage
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
	November	103.9	0.7	2.1
	December	104.8	0.8	2.9
		Annual average 2018	102.8	:
2019	January	105.2	0.4	3.1
	February	105.6	0.4	3.2
	March	105.7	0.1	3.3
	April	105.9	0.1	3.4
	May	105.7	-0.2	3.4
	June	105.3	-0.3	3.0
	July	105.2	-0.1	2.6
	August	105.7	0.5	2.7
	September	105.6	-0.1	2.4
	October	105.5	0.0	2.2
	November	105.7	0.2	1.7
	December	106.0	0.2	1.2
		Annual average 2019	105.6	:
2020	January	106.8	0.8	1.5
	February	106.6	-0.2	1.0
	March	106.5	-0.1	0.7
	April	106.2	-0.3	0.3
	May	105.9	-0.3	0.2
	June	105.4	-0.4	0.1
	July	105.1	-0.3	-0.1
	August	105.2	0.1	-0.5
	September	105.1	-0.1	-0.4
	October	105.3	0.2	-0.2

Graph 1: Yearly harmonized index of consumer prices, 2010 - 2019 (2015 = 100)



Graph 2: Annual and monthly inflation rates in percentages measured by the HICP

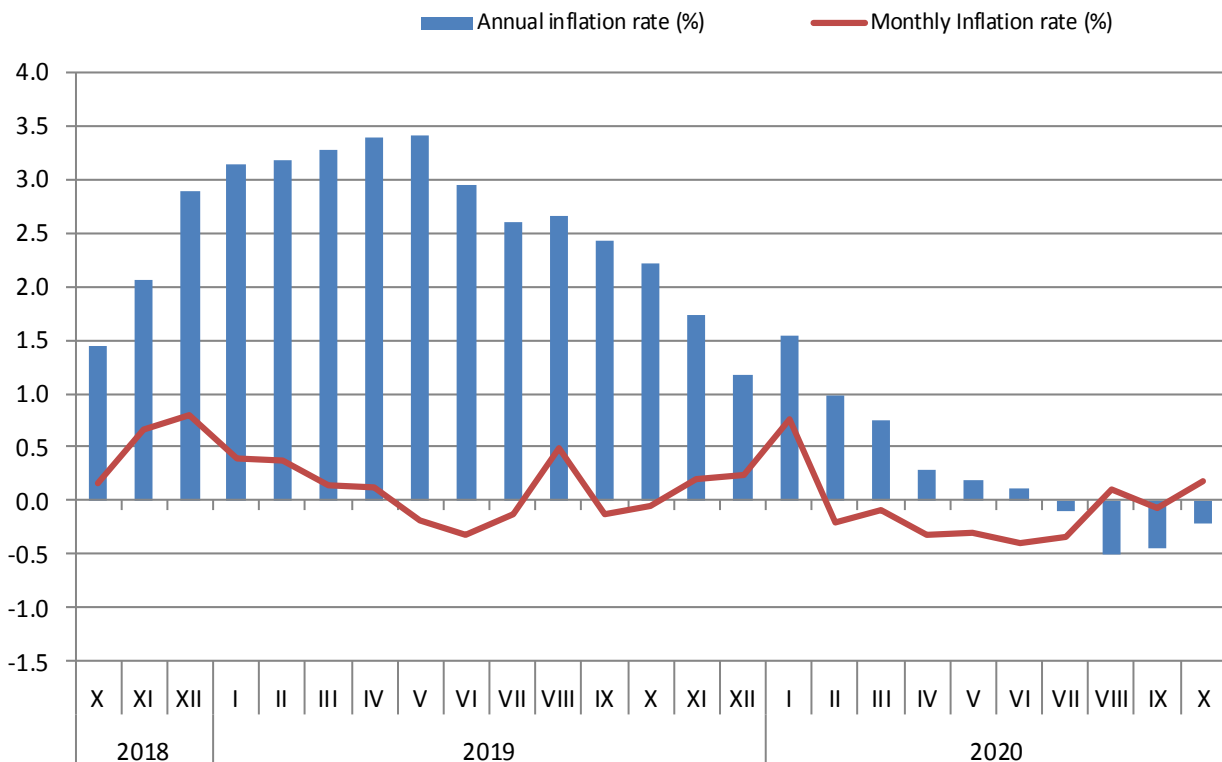


Table 2: Weights, HICP for October 2020 (2015=100), monthly and annual price change in percentage for groups and sub-groups according to COICOP

COICOP	Groups and subgroups	Weight 2020 in ‰	X - 2020 2015=100	X - 2020 IX- 2020	X - 2020 X - 2019
00	Total HICP	1000.0	105.3	0.2	-0.2
01	Food and non-alcoholic beverages	401.2	109.2	0.5	1.9
01.1	Food	347.4	109.3	0.6	1.9
01.1.1	Bread and cereals	102.1	115.3	-0.3	2.3
01.1.2	Meat	103.7	110.8	0.0	1.3
01.1.3	Fish	3.1	109.9	-0.1	2.4
01.1.4	Milk, cheese and eggs	54.2	108.4	3.2	2.2
01.1.5	Oils and fats	6.2	109.4	3.2	3.4
01.1.6	Fruits	21.7	90.7	-7.5	-3.6
01.1.7	Vegetables	33.1	96.7	7.6	6.7
01.1.8	Sugar, jam, honey, chocolate and confectionery	14.4	110.9	0.1	3.0
01.1.9	Food products n.e.c.	8.9	106.4	-0.5	1.2
01.2	Non-alcoholic beverages	53.8	109.5	-0.1	1.7
01.2.1	Coffee, tea and cocoa	11.4	127.0	0.1	0.7
01.2.2	Mineral waters, soft drinks, fruit and vegetable juices	42.4	104.9	-0.1	2.0
02	Alcoholic beverages, tobacco	57.3	118.4	-0.2	0.3
02.1	Alcoholic beverages	25.4	110.3	-0.4	-1.7
02.2	Tobacco	31.9	125.2	-0.1	2.0
03	Clothing and footwear	40.7	102.8	0.3	-0.5
03.1	Clothing	30.6	102.3	0.6	-0.7
03.2	Footwear	10.1	104.0	-0.6	0.2
04	Housing, water, electricity, gas and other fuels	77.2	100.2	0.6	0.2
04.1	Actual rentals for housing	5.8	97.5	0.0	0.0
04.3	Maintenance and repair of the dwelling	9.4	105.2	-0.2	1.3
04.4	Water supply and miscellaneous services relating to the dwelling	10.7	99.4	0.3	1.4
04.5	Electricity, gas and other fuels	51.3	98.2	0.9	-0.2
04.5.1	Electricity	26.5	89.6	0.0	0.0
04.5.2	Gas	3.1	102.8	0.0	-2.5
04.5.4	Solid fuels	19.3	117.0	2.5	-0.2
04.5.5	Heat energy	2.4	91.8	0.0	0.0
05	Furnishing, household equipment and routine maintenance of the house	75.9	102.6	0.1	-0.5
05.1	Furniture and furnishings, carpets and other floor coverings	17.9	100.5	-0.1	-0.3
05.2	Household textiles	3.5	94.4	-1.2	-6.3
05.3	Household appliances	15.4	101.0	0.5	1.6
05.4	Glassware, tableware and household utensils	12.1	104.1	0.9	-4.3
05.5	Tools and equipment for house and garden	9.9	104.7	0.0	1.0
05.6	Goods and services for routine household maintenance	17.1	105.3	-0.1	0.5

Table 2: Weights, HICP for October 2020 (2015=100), monthly and annual price change in percentage for groups and sub-groups according to COICOP (continued)

COICOP	Groups and subgroups	Weight 2020 in %	X - 2020 2015=100	<u>X - 2020</u> IX- 2020	<u>X - 2020</u> X - 2019
06	Health	21.4	108.8	0.0	4.6
06.1	Medical products, appliances and equipment	12.0	108.3	0.0	4.3
06.2	Out-patient services	8.4	110.7	0.0	5.5
06.3	Hospital services	1.0	100.0	0.0	0.0
07	Transport	156.9	98.6	-0.4	-8.0
07.1	Purchase of vehicles	57.3	100.4	-0.1	-1.8
07.2	Operation of personal transport equipment	77.9	94.0	-0.5	-15.0
07.3	Transport services	21.7	108.1	-1.2	1.2
08	Communication	37.6	98.5	0.0	-0.3
08.1	Postal services	2.5	104.6	0.0	0.0
08.2	Telephone and telefax equipment	4.1	84.7	-0.4	-3.0
08.3	Telephone and telefax services	31.0	100.6	0.0	0.0
09	Recreation and culture	44.0	96.8	-0.1	-0.5
09.1	Audio-visual, photographic and information processing equipment	11.1	84.1	-0.3	-1.0
09.2	Other major durables for recreation and culture	2.1	101.2	0.0	0.0
09.3	Other recreational items and equipment, gardens and pets	7.5	102.1	0.0	-0.7
09.4	Recreational and cultural services	6.4	101.5	0.0	-1.0
09.5	Newspapers, books and stationery	11.1	99.4	0.0	-0.9
09.6	Package Holidays	5.8	103.0	0.0	1.6
10	Education	10.4	100.1	0.0	0.5
11	Restaurants and hotels	32.1	107.3	0.0	1.8
11.1	Catering services	28.5	107.3	0.0	1.8
11.2	Accommodation services	3.6	109.4	0.0	1.8
12	Miscellaneous goods and services	45.3	107.3	-0.1	4.0
12.1	Personal care	16.1	104.4	-0.1	2.2
12.3	Personal effects n.e.c.	9.5	108.8	-0.1	2.2
12.4	Social protection	1.0	109.7	0.0	1.1
12.5	Insurance	7.8	122.5	0.0	19.7
12.6	Financial services n.e.c.	7.7	101.0	0.0	0.0
12.7	Other services n.e.c.	3.2	99.4	0.0	0.2

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

Code	Item	Unit Mesaure	X 2019	IX 2020	X 2020
101	Rice	1 kg	1.34	1.38	1.38
102	Wheat flour	1 kg	0.48	0.50	0.50
103	White bread	500g	0.35	0.36	0.35
111	Beef meat	1 kg	7.18	6.74	6.74
112	Veal meat	1 kg	7.98	7.62	7.62
114	Chicken	1 kg	2.73	2.64	2.63
131	Milk (tetrapak)	1 lit	0.93	0.92	0.91
133	Yoghurt	1 lit	0.87	0.87	0.85
137	Eggs	30 pcs	2.24	1.95	2.39
141	Edible oils	1 lit	1.03	1.06	1.11
151	Apple	1 kg	0.74	1.03	0.73
152	Pears	1 kg	1.57	1.55	1.49
153	Bananas	1 kg	1.18	0.96	0.98
155	Limon	1 kg	1.48	1.64	1.24
161	Potatoes	1 kg	0.38	0.35	0.38
162	Tomatoes	1 kg	0.66	0.58	0.86
163	Beans	1 kg	2.42	2.56	2.55
167	Pepper	1 kg	0.82	1.01	1.23
175	Sugar	1 kg	0.68	0.71	0.70
192	Ground coffee	1 kg	9.56	9.44	9.33
193	Tea	1 kg	7.83	7.90	7.93
195/1	Natural water	1.5 lit	0.31	0.31	0.31
196	Coca cola	2 lit	1.26	1.29	1.29
197	Fruit juice	1 lit	0.91	0.92	0.91
204	Beer	0.5 l	0.66	0.66	0.66
216	Cigarettes - Ronson	1 pack	1.68	1.77	1.75
217	Cigarettes - Marlboro	1 pack	2.70	2.70	2.70
416	Electricity (without fixed cost)	1 kwh	0.06	0.06	0.06
418	Firewood	1 m ³	38.73	37.78	38.99
701	Petrol	1 lit	1.16	0.92	0.92
702	Diesel	1 lit	1.15	0.91	0.90

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 415 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 (HBS) 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 (HBS) 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. As of January 2019, specific items and services weights are based on the National Accounts (NA) data of 2017. As of January 2020, specific items and services weights are based on the National Accounts (NA) data of 2018. Annually updated weighing ensures that the HICP reflects current consumer trends. 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 10th - 20th of each month. They obtain prices in stores, markets, service enterprises and other retail outlets in fourteen municipalities of Kosovo:

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

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. From January 2019, the specific items and services weights are based on the National Accounts (NA) data of 2017 calculated with the price changes of December 2018. From January 2020, the specific items and services weights are based on the National Accounts (NA) data of 2018 calculated with the price changes of December 2019.

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 ν (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

ν = previous month before new weights being put into use. (Currently ν = December 2019)

