



National Accounts Methodology

Description of Sources and Methods

Part B, Price and Volume Measures

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A) GDP BY PRODUCTION APPROACH

CHAPTER 10

GENERAL PROCEDURES

The availability of GDP estimates at constant prices is necessary to provide a measure of the volume of economic activity, eliminating from the current price data the changes in prices from period to period, and thus allowing monitoring economic growth.

Agency for statistics of BiH compiles price and volume measures of gross domestic product (GDP) by the production and the expenditure approach, and of other main national accounts aggregates.

The first steps in establishing a calculating GDP at constant prices began in 2006 with technical support and direct involvement of the IMF consultant to the real sector in Bosnia and Herzegovina. The first calculations were published in 2007 and were related to the calculation of GDP at previous year prices. The base year is the previous year, ie, all calculations are performed in the prices of previous year. Data in absolute amount and real indices were published at the section level (A21) of Classification of Activities. The publication practice of national accounts data at constant prices follows the publication practice of current price data. Both data sets are published at the same time.

Originally established methods of calculating at constant prices over time are improved depending on available indicators. Currently available are two sets of data:

- 2001-2005 according to the Classification of Activities, which is harmonized with the European classification NACE Rev. 1.1. and not converted according to NACE Rev 2 and it is in line with ESA 95 and
- 2006-2017 to KD BiH 2010 which is in line with the European classification NACE Rev 2. and ESA 2010

The previous year is taken as base year (previous year is also the reference year) for calculation at constant prices. In this way, considering all the structural changes in relative prices that occurred between two successive years. Accordingly, the base year for the calculation of GDP at constant prices for 2015 is 2014 year.

However, volume values at prices of a previous year allow the comparison of the data only between 2 successive years (data at previous year prices for any given year with the annual current price data of the previous year). In order to obtain long-term series, estimates of volume measures at prices of previous year are chain-linked to produce series at a fixed reference period, thus allowing the comparison between any chosen different periods. The selected fixed reference period in BiH is 2010. Chain-linked volume measures are not additive.

For the calculation of GDP at constant prices the concept of the single indicator is used, due to the lack of adequate deflators of intermediate consumption. Applying a single indicator has implicit the assumption of fixed I/O coefficients base year (previous year). GVA at constant prices is calculated as the difference between output and intermediate consumption at constant prices.

Table 10.1 Gross value added by activities and gross domestic product, at previous year prices, 2015

	Activities	Gross value added 000 KM	Real indices, %
A	Agriculture, forestry and fishing	1 777 719	109.2
B	Mining and quarrying	550 720	100.2
C	Manufacturing	3 184 454	106.4
D	Electricity, gas, steam and air conditioning supply	1 086 748	99.2
E	Water supply; sewerage, waste management and remediation activities	301 117	99.2
F	Construction	1 130 198	103.2
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	3 803 826	103.3
H	Transportation and storage	1 031 804	103.6
I	Accommodation and food service activities	567 041	104.3
J	Information and communication	1 310 759	101.3
K	Financial and insurance activities	1 064 342	103.2
L	Real estate activities	1 427 610	101.2
	Of which: imputed rent	1 220 555	99.8
M	Professional, scientific and technical activities	765 488	108.1
N	Administrative and support service activities	223 594	101.1
O	Public administration and defence; compulsory social security	2 447 495	100.7
P	Education	1 307 465	100.4
Q	Human health and social work activities	1 341 559	101.1
R	Arts, entertainment and recreation	308 734	105.5
S	Other service activities	316 384	98.4
T	Activities of households as employers	-	-
U	Activities of extraterritorial organisations and bodies	-	-
	Total of activities	23 947 057	103.1
	FISIM	-729 493	104.5
	Gross value added (basic prices)	23 217 564	103.1
	Net taxes on product	4 986 045	103.2
	Gross domestic product (GDP) at market prices	28 203 608	103.1

Table 10.2 Gross value added by activities and gross domestic product, chain linked values at prices of 2010

		000 KM			
	Activities	2012	2013	2014	2015
A	Agriculture, forestry and fishing	1 525 716	1 766 097	1 542 546	1 684 269
B	Mining and quarrying	552 679	544 273	525 412	526 293
C	Manufacturing	2 737 647	2 874 780	2 998 254	3 189 942
D	Electricity, gas, steam and air conditioning supply	926 702	1 034 974	945 368	938 166
E	Water supply; sewerage, waste management and remediation activities	276 687	261 772	281 903	279 786
F	Construction	1 030 108	1 015 989	1 093 781	1 128 674
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	3 430 571	3 444 683	3 516 629	3 633 423
H	Transportation and storage	847 763	887 257	964 023	998 936

I	Accommodation and food service activities	540 032	535 141	527 732	550 370
J	Information and communication	1 225 254	1 247 661	1 242 260	1 258 596
K	Financial and insurance activities	986 952	1 008 710	1 040 172	1 073 968
L	Real estate activities	1 323 593	1 316 449	1 329 896	1 345 370
	Of which: imputed rent	1 163 753	1 161 661	1 160 609	1 158 427
M	Professional, scientific and technical activities	729 983	685 042	714 379	772 298
N	Administrative and support service activities	168 403	177 248	206 363	208 638
O	Public administration and defence; compulsory social security	2 318 176	2 319 412	2 352 099	2 367 709
P	Education	1 223 812	1 232 595	1 253 111	1 258 250
Q	Human health and social work activities	1 177 580	1 185 333	1 218 524	1 232 256
R	Arts, entertainment and recreation	223 822	234 689	265 662	280 376
S	Other service activities	304 111	290 929	306 642	301 646
T	Activities of households as employers	-	-	-	-
U	Activities of extraterritorial organisations and bodies	-	-	-	-
	Total of activities	21 550 663	22 069 682	22 325 548	23 019 590
	FISIM	723 589	739 808	756 784	790 943
	Gross value added (basic prices)	20 826 870	21 329 604	21 569 225	22 230 365
	Net taxes on product	4 570 819	4 665 329	4 724 380	4 875 352
	Gross domestic product (GDP) at market prices	25 397 761	25 994 871	26 293 302	27 105 298

Table 10.3 Gross value added by activities and gross domestic product, Deflators

	Activities	2012	2013	2014	2015
A	Agriculture, forestry and fishing	102.4	98.3	101.7	100.3
B	Mining and quarrying	104.5	99.9	98.0	102.7
C	Manufacturing	97.4	100.9	98.0	104.8
D	Electricity, gas, steam and air conditioning supply	103.8	104.2	106.1	102.1
E	Water supply; sewerage, waste management and remediation activities	105.6	103.2	96.5	102.0
F	Construction	98.5	101.3	99.6	99.5
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	101.3	101.0	101.3	100.6
H	Transportation and storage	104.6	99.7	99.0	100.3
I	Accommodation and food service activities	101.9	100.6	99.9	100.2
J	Information and communication	99.4	100.5	102.1	100.2
K	Financial and insurance activities	96.9	98.5	100.4	100.8
L	Real estate activities	101.6	103.8	100.0	100.6
	Of which: imputed rent	101.3	104.0	100.0	100.0
M	Professional, scientific and technical activities	103.2	98.9	97.3	103.9
N	Administrative and support service activities	103.3	101.0	99.3	106.1
O	Public administration and defence; compulsory social security	97.9	99.8	101.2	100.8
P	Education	99.9	98.3	101.6	100.7
Q	Human health and social work activities	101.5	101.6	100.9	101.3
R	Arts, entertainment and recreation	104.3	103.6	101.6	105.6
S	Other service activities	101.6	102.8	98.9	104.9
T	Activities of households as employers				
U	Activities of extraterritorial organisations and bodies				

Total of activities	100.5	100.6	100.5	101.5
FISIM	94.5	96.9	97.3	100.1
Gross value added (basic prices)	100.7	100.8	100.6	101.6
Net taxes on product	101.2	95.3	103.0	100.4
Gross domestic product (GDP) at market prices	100.8	99.8	101.0	101.4

CHAPTER 11

GENERAL INFORMATION ON MAIN SOURCES USED

The main data sources used for the calculation of annual GDP by production approach at constant prices are: Producer price indices (PPI); Consumer price indices (CPI); Volume indices of industrial production (IPI), Indices of number of employed persons.

11.1 The producer price index (PPI)

Producer price index is a short-term statistical indicator that represents the measurement of change of prices of industrial products produced and sold by enterprises on domestic and non-domestic market.

PPI in Bosnia and Herzegovina is calculated based on the representative list of products and its producers making a sample of cca. 570 producers. Each month 4255 prices are collected directly from producers through the unique questionnaire created in cooperation with Italian experts.

The main criterion for selecting the sample of enterprises, products and services that are surveyed was the volume of production and selling on the domestic market got from the Annual survey on Industrial production (IND-21). Entities institutes of statistics have created the sample of enterprises and products and the enterprises itself have chosen the items to be priced.

The price that is to be collected each month on the domestic market represents a price for which producer sells his products to the regular costumers on the domestic market at maximum volume, franco loaded into a wagon (truck) at the producers location. It includes reimbursements if applicable, and it excludes commercial rabbates, disscounts, VAT and excises. The producer price for non-domestic market is a price on a national border - FOB (free on board), which means that a seller pays the transport to the port , deliverance, loading costs and a buyer pays costs of transport, assurance, unloading and trasport to it's final destination. This price exclude VAT and similar taxes directly affecting turnover and all taxes and fees on products and services that enterprises pay. The subventions received are added. All the data should be submitted to the Entities institutes each month for the period from 21th of the previous to the 20th of current month. The Entities Institutes completes the data entry process and calculates the PPI for the level of Entity and forward the indices to the Agency for statistics of BiH that calculates the index for the state level.

Weights applayed for the calculation of producer price index represent the relative share of selected products in the total value of sales of industrial products on the market. Weights are based on the results of the Annual Survey on Industrial production (IND-21) for the year 2015, but for the state level the weights are based on the relative share of each Entity in the total production also from the year 2015. Each year the weights are price updated.

Classification of industrial products is based on the Nomenclature of Industrial Products in BiH 2015 based on the PRODCOM List 2015.

The first step in calculation of PPI is the calculation of elementary indices at the level of each products, that is the ratio between the current month price and the base price (from December of the previous year). After that the simple geometric mean is applayed. The second step is the calculation of

the indices of higher aggregates such as classes, divisions, subsections, sections and overall index using the Laspyeres-type formula for the weighted arithmetic mean.

11.2 The consumer price index (CPI)

Consumer Price Index represents a measure of average prices (goods and services) which consumers buy for their personal needs. Consumer Price Index in Bosnia and Herzegovina is calculated on the basis of the representative list of products that in year 2015 consisting of 615 different items. Each month over 21 000 prices are being collected in accordance with defined sample of outlets and 12 geographical locations (cities) chosen by the criterion of their weight in terms of population and their role with respect to the geographical areas belong to. All relevant goods and services bought by the reference population for the purpose of final consumption are included in the index. The coverage of goods and services is reviewed regularly in order to ensure the representative of the basket with respect to the consumer tastes and purchasing.

For the purposes of CPI calculations the price collection is scheduled as follows:

- for agricultural products sold on green markets the prices are being collected twice a month in the first and third week of a month;
- for other items the prices in accordance with European Regulative are being collected once a month (between the 1 and 21 of the month) with the obligation of maintaining the interval of price collection.

Weights used for calculating the CPI reflect relative importance of the sampled goods or services in the total consumption of resident households within the domestic territory. They are used for elementary indices calculations as the weighted averages. They are based on the data linked to the household final consumption and population.

The data source for calculating the weights used in the consumer price indices is the Household Budget Survey. The compilation of the CPI has been based on the weights derived from household expenditures from the Household Budget Survey 2015 updated every year according to changes in prices in a previous year.

The classification of products used in the CPI is based on the Classification of Individual Consumption by Purpose (COICOP). The COICOP divides consumer expenditures into twelve different divisions of consumer goods and services.

Consumer Price Index calculation begins with the computation of elementary indices (items indices) and representative position at the level of towns. Elementary indices are calculated using Laspyeres-type formula for weighted arithmetic mean starting from the level of representative positions indices at the level of entities to the overall index at the level of Bosnia and Herzegovina. Reference base year for index calculation is 2015.

11.3 Volume indices of industrial production

From January 2013, Agency for statistics of BiH, in cooperation with the entity statistical institutions, calculate and disseminate the data on industrial production using new standards (Classification of activities and nomenclature of industrial products), as well as the new base year (2010), that is fully in line current EU standards and regulations in the field of short-term business statistics.

Concepts, definitions and methodologies used to calculate the index of industrial production are harmonized with Eurostat recommendations and regulations in the field of short-term statistics. On the base of historical data BHAS and entity statistical institutes performed recalculation of IPI series for the period 2006-2012. New monthly the time series of IPI are constructed according to new base (2010) year and new classification of activities.

The observation and reporting units in the process of calculating industrial production index are enterprises and their registered local units classified according to their main activity in industry (Section B, C and D of KD BiH 2010), as well as local units performing industrial activities. All enterprises with ten or more persons are covered. Only legal entities (legally registered entities) could be considered reporting units, according to the survey coverage, while entrepreneurs could not be considered as reporting units. The main criteria concerning coverage of statistical units defined by STS Regulations respected (“indices of industrial production at the levels of group (3-digit code) and class (4-digit code) of Section D must represent 90% of the total value added in a given base year”).

The products surveyed should belong to all classes of industrial activities such to provide the best representativeness of class activity in total industry. In the base year, the selected statistical units cover more than 90% of the total value of the industrial production.

Indices of industrial production are calculated by using Laspeyres formula. The base year for the weighting system is 2010. Necessary monthly variable for each product is current volume of production, accompanied by the two constant values: average monthly produced volume of production in the base year and average unit value of the product in the base year.

The index of each upper level of activity classification is calculated as a weighted average of the relevant lower level indices.

Main variable for weighting system calculation is gross value added at factor costs. Gross value added for each class level is compiled by using data from Annual structural business statistics from 2010 and Annual PRODCOM survey for 2010.

11.4 Index of number of employed persons

The number of persons in paid employment in legal entities results from data processing of regular annual and monthly surveys, which comprises 70% of persons in paid employment in each KD division. These surveys cover legal entities of all types of ownership, government bodies, and bodies of local and regional self-government units on the territory of the BiH. Data are collected through the report filled in by legal entities on the basis of the records of persons in employment. Data on persons in employment in crafts and trades and free lances are processed according to the records on pension insurance beneficiaries obtained from the Institute for Pension Insurance.

Annual average of persons in paid employment is calculated on the basis of data by months corrected by the full coverage data with the situation as on 31 March and 30 September.

CHAPTER 12

METHODS USED FOR CALCULATION AT CONSTANT PRICES

The single indicators method was used for the GDP calculation at constant prices. For the GDP calculation at constant prices for 2015, the single deflation method or single extrapolation method for output were used, depending on available indicators. Intermediate consumption at constant prices has been calculated by applying intermediate consumption shares in output for the previous year at current prices to output at constant prices. The reason for the calculation of intermediate consumption at constant prices in this way is the unavailability of data on the structure of intermediate consumption at the relevant level of disaggregation. GVA at constant prices is calculated as the difference between output at constant prices and intermediate consumption at constant prices.

The calculation for enterprises, entrepreneurs, individual agriculture, general government activities and NOE are done separately at the level of 2, 3 or 4-digits of Classification of Activities depending on available indicators used in the calculation. Aggregate countrywide estimates of gross domestic product at constant prices based on the production approach are prepared by the Agency for statistics

of BH based on the data compiled separately for the two Entities, Federation of BH and Republika Srpska, and for Brcko District.

12.1 Agriculture, forestry and fishing (A)

For the calculation of output for individual agriculture, the produced quantities from the current year are used at the level of agriculture products and data on average prices of agriculture products from the previous year. Data on produced quantities of crops and livestock products are obtained through regular surveys in agriculture statistics, as well as data on average prices of agriculture products. Output for agriculture enterprises at current prices is deflated with implicit deflator of output for individual agriculture. Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

For Forestry extrapolation output method with physical volume of forest exploitation volume index of forest assortments is used. Source data is forestry statistics.

For the Fishing deflation output method with Consumer price index (CPI) of fresh fish is used. Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

The real growth rate of GVA for activity A in 2015 is 9.2%.

12.2 Mining and quarrying (B)

Entity statistical institutions have used different approaches for calculating output at constant prices: deflation output method with industrial producer price indices on the domestic and on the nondomestic market (PPI of Mining and quarrying) and extrapolation output method with industrial production indices (IPI of Mining and quarrying).

Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

The real growth rate of GVA for activity B in 2015 is 0.2%.

12.3 Manufacturing industry (C)

Entity statistical institutions have used different approaches for calculating output at constant prices: deflation output method with industrial producer price indices on the domestic and on the nondomestic market (PPI of Manufacturing) and extrapolation output method with industrial production indices (IPI for Manufacturing).

Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

The real growth rate of GVA for activity C in 2015 is 6.4%.

12.4 Electricity, gas, steam and air conditioning supply (D)

Entity statistical institutions have used different approaches for calculating output at constant prices:

- Extrapolation method with volume indices (separately production in hydroelectric power plants and thermal power plants - Electric power generation, transmission and distribution)

- Deflation output method with industrial producer price indices on the domestic and on the nondomestic market (PPI for Manufacture of gas; distribution of gaseous fuels through mains and Steam and air conditioning supply)
- Extrapolation output method with industrial production indices

Output calculation at constant prices is done at division level (2-digit level). Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

The real growth rate of GVA for activity D in 2015 is -0.8%.

12.5 Water supply; sewerage, waste management and remediation activities (E)

Entity statistical institutions have used different approaches for calculating output at constant prices:

- Deflation output method with industrial producer price indices for Waste collection, treatment and disposal activities; materials recovery
- Deflation output method with CPI for other activities: Water collection, treatment and supply, sewerage and remediation activities and other waste management services.

And:

- Extrapolation output method with volume indices of water delivered, waste water, waste disposed. The source of data is environment statistics.
- For non-market producers, within general government sector, extrapolation method with index of number of employed persons.

Output calculation at constant prices is done at division level (2-digit level). Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

The real growth rate of GVA for activity E in 2015 is -0.8 %.

12.6 Construction (F)

This activity is, by nature, very special which is visible in usage of different indicators. Since there are no available adequate indices of prices for construction, construction output is deflated with composite index compiled as weighted average of gross wages and prices for main components of building materials.

Entity statistical institutions have used different approaches for calculating intermediate consumption at constant prices.

- Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices, and
- Deflation of intermediate consumption with PPI of building materials.

The real growth rate of GVA for activity F in 2015 is 3.2%.

12.7 Wholesale and retail trade; motorcycles and personal and household goods (G)

Output at constant prices is calculated in two phases at the division level of Classification of Activities (2-digit level). In the first phase the revenues from sales of goods are deflated with total CPI. In the

next phase, output is extrapolated with real indices of revenues from sales. This approach implies that trade margin rates at constant prices are fixed.

Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

The real growth rate of GVA for activity G in 2015 is 3.3%.

12.8 Transport and storage (H)

Entity statistical institutions have used different approaches for calculating output at constant prices.

For Land transport and transport via pipelines calculation is done at the 3-digit level of Classification of Activities by using extrapolation output method with corresponding indices (tonne/km in railway transport, passenger/km in road transport and tonne/km in road transport). For other activities constant price estimates are done at the 2-digit level using corresponding CPI.

In the second approach, constant price estimates are calculated at 2-digit level using deflation output methods. Output is deflated with corresponding CPI (CPI for passenger transport by railway, CPI for road transport, CPI for transport services and CPI for postal services). For non-market producers, within general government sector, extrapolation method with index of number of employed persons is used.

Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices. For non-market producers, within general government sector, deflation method with total CPI is used.

The real growth rate of GVA for activity H in 2015 is 3.6%.

12.9 Accommodation and food service activities (I)

Calculation output at constant prices is done at the 2-digit level of Classification of Activities, using deflation output method by CPI for restaurants and hotels, CPI for restaurant services, CPI for accommodation services.

Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

For non-market producers, within general government sector, deflation method with total CPI is used.

The real growth rate of GVA for activity I in 2015 is 4.3%.

12.10 Information and communication (J)

Calculation output at constant prices is done at the 2-digit level of Classification of Activities, using deflation output method by corresponding CPI. For non-market producers, within general government sector, extrapolation method with index of number of employed persons is used.

Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

For non-market producers, within general government sector, deflation method with total CPI is used.

The real growth rate of GVA for activity J in 2015 is 1.3%.

12.11 Financial and insurance activities (K)

In calculating data at constant prices for financial intermediation, a difference between two kinds of services is made: financial services that can be directly measured (as fees and commission charges) and financial intermediation services indirectly measured (FISIM). Estimation of financial services that can be directly measured has been made by using deflation by total CPI.

Calculation of FISIM is done in the following way:

- Average value of bank's assets and liabilities (arithmetic mean for opening and closing bank's assets and liabilities) has been deflated by total CPI;
- Interests received from borrowers and interests paid to depositors have been extrapolated by volume index of assets and liabilities;
- Estimation of FISIM at constant prices is obtained as the difference between the interests received from borrowers and the interests paid to depositors at constant prices.

Output for insurance services and secondary financial activities at constant prices has been calculated by deflation with total CPI.

Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

The real growth rate of GVA for activity K in 2013 is 3.2%.

12.12 Real estate activities (L)

Calculation is done at the 2-digit level of Classification of Activities by using the deflation of output method with total CPI.

For calculation output of imputed rent at constant prices extrapolation method with index of number of population is used.

Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

The real growth rate of GVA for activity L in 2015 is 1.2%.

12.13 Professional, scientific and technical activities (M)

Calculation is done at the 2-digit level of Classification of Activities by using the deflation of output method with total CPI. For non-market producers, within general government sector, extrapolation method with index of number of employed persons is used.

Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices. For non-market producers, within general government sector, deflation method with total CPI is used.

The real growth rate of GVA for activity M in 2015 is 8.1%.

12.14 Administrative and support service activities (N)

Calculation is done at the 2-digit level of Classification of Activities by using the deflation of output method with total CPI. For non-market producers, within general government sector, extrapolation method with index of number of employed persons is used.

Intermediate consumption at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices. For non-market producers, within general government sector, deflation method with total CPI is used.

The real growth rate of GVA for activity N in 2015 is 1.1%.

12.15 Public administration and defence; compulsory social security (O)

In this activity, there are institutional units that belong only to the general government sector. Constant prices are calculated by cost components at the 2-digit level of Classification of Activities. Output is estimated by using the cost approach as the sum of compensation of employees, intermediate consumption, consumption of fixed capital and other taxes on production. Compensation of employees and other taxes on production are extrapolated with an index of the number of employed persons. For intermediate consumption deflation with total CPI is done. Consumption of fixed capital is calculated using volume index of intermediate consumption and compensations of employees or by deflation with PPI for capital goods.

The real growth rate of GVA for activity O in 2015 is 0.7%.

12.16 Education (P)

For market enterprises, calculation is done at the 3-digit level of Classification of Activities by using deflation output method with CPI for educational services. Intermediate consumption for market enterprises at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

For institutional units within general government sector, constant prices are calculated by cost components at the 2-digit level of Classification of Activities. Output is estimated by using the cost approach as a sum of compensation of employees, intermediate consumption, consumption of fixed capital and other taxes on production. Compensation of employees and other taxes on production have been extrapolated with an index of the number of employed persons. For intermediate consumption, deflation with total CPI is done, and consumption of fixed capital has been calculated using volume index of intermediate consumption and compensation of employees or by deflation with PPI for capital goods.

The real growth rate of GVA for activity P in 2015 is 0.4%.

12.17 Human health and social work activities (Q)

For market enterprises, calculation is done at the 2-digit level of Classification of Activities by using deflation output method with CPI for health services. Intermediate consumption for private enterprises at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices. For institutional units within general government sector, the estimates at constant prices are calculated in the same way as for institutional units within general government sector in the activity Education.

The real growth rate of GVA for activity Q in 2015 is 1.1%.

12.18 Arts, entertainment and recreation (R)

For market enterprises, calculation is done at the 2-digit level of Classification of Activities by using - extrapolation output method with index of number of employed persons. Intermediate consumption for private enterprises at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices.

For institutional units within general government sector, the estimates at constant prices are calculated in the same way as for institutional units within general government sector in the activities O, P and Q.

The real growth rate of GVA for activity R in 2015 is 5.5%.

12.19 Other service activities (S)

For market enterprises, calculation is done at the 2-digit level of Classification of Activities by using deflation output method with total CPI. Intermediate consumption for private enterprises at constant prices has been calculated by applying intermediate consumption share in output for the previous year at current prices to output at constant prices. For institutional units within general government sector, the estimates at constant prices are calculated in the same way as for institutional units within general government sector in the activities O, P, Q and R.

The real growth rate of GVA for activity S in 2015 is -1.6%.

Table 12.2 Tabular overview of indicators used for calculation of output at constant prices

Activities	Used indicators
A Agriculture, forestry and fishing	Quantities of agricultural products for the current year Prices of agricultural products for the previous year Index of physical volume of forest exploitation CPI of fresh fish
B Mining and quarrying	PPI of Mining and quarrying IPI of Mining and quarrying
C Manufacturing	PPI of Manufacturing IPI of Manufacturing
D Electricity, gas, steam and conditioning supply	PPI of Electricity, gas, steam and conditioning supply; IPI
E Water supply; sewerage, waste management and remediation activities	PPI of Waste collection, treatment and disposal activities; materials recovery Volume index of water delivered, waste water and waste disposed Index of number of employees
F Construction	Composite index (PPI of building material and gross wages) Composite index(CPI of building material and gross wages)
G Wholesale and retail trade; repair of motor vehicles, motorcycles	Real index of revenue from sales of goods, CPI
H Transport and storage	Volume index (tonne/km in railway transport, passenger/km in road transport and tonne/km in road transport) CPI for transport by railway, road, air, transport services and postal services Index of number of employed
I Hotels and restaurants	CPI for restaurants and hotels Index of number of students and pupils
J Information and communication	CPI Index of number of employed
K Financial and insurance activities	CPI Index of number of employed Index of earned premium Volume index of assets and liabilities of banks
L Real estate activities	CPI Volume index of population
M Professional, scientific and technical activities	CPI Index of number of employed
N Administrative and support service activities	CPI Index of number of employed
O Public administration and defence; compulsory social security	CPI Index of number of employed

P Education	CPI Index of number of employed
Q Health and social work	CPI Index of number of employed
R Arts, entertainment and recreation	CPI Index of number of employed
S Other service activities	CPI Index of number of employed

12.20 Classification of methods into A, B and C method

The method used for output calculation at constant prices for all activities could be classified as C method, except for Agriculture for which the method could be classified as B method.

The method used for intermediate consumption calculation at constant prices, due to the lack of data on IC structure at relevant level of disaggregation, could be classified as C method.

12.21 Taxes and subsidies on products at constant prices

Calculation taxes and subsidies on product at constant prices is done in the following way:

Federal Office for statistics - Calculation of subsidies and taxes on products at constant prices has not been done separately. Net taxes on products are extrapolated with real growth index of total gross value added. This method is classified as C method.

Institute for Statistics of republika Srpska - During 2013, with the technical support of the IMF's Advisor in BiH, certain methodological improvements were made in the field of taxes on product at constant prices, in order to obtain the overall growth index of taxes on product.

The calculation of volume indices for each type of tax on product was performed. For the calculation of duties at constant prices, an volume index was calculated using import values, import price indices and average customs duty rate per product group. The duties value from the previous year is extrapolated with the calculated volume index for duties.

For the calculation of the VAT, the volume index was calculated using retail goods data by product groups, consumer price indices and value of services provided to households. VAT from the previous year is extrapolated value with the calculated volume index for VAT.

For the calculation of excises at constant prices the volume index is calculated, for extrapolation of excise value from the previous year. The calculation of volume index is based on the quantities of excise products produced and excise rates. Data on produced quantities of excise products are taken from industry statistics.

The value of the overnight stay tax from the previous year is extrapolated by the index of the number of overnight stays, while for the calculation of the tax on the gambling the index of the volume is calculated using the value of tax on the gambling and deflator of the value of the production of the activity 92 KD BIH 2010.

The real growth rate for net taxes on products in 2015 is 3.2%.

B) GDP BY EXPENDITURE APPROACH

CHAPTER 10

GENERAL PROCEDURES

Agency for statistics B&H compiles GDP by the production and by the expenditure approach at current and constant prices (at previous year prices) as well as the series of chain linked values, with the year 2010 as the reference year and corresponding deflators. GDP by the production approach is the primary approach determining GDP the volume growth of annual GDP.

It should be noted that due to the fact that neither Input/Output framework nor Supply/Use tables has been developed yet, the discrepancy between the two approaches of GDP estimates has not been reconciled. (See Table 1.1)

Although there is a significant discrepancy between two approaches both GDP estimates are published.

GDP by the expenditure approach at constant prices is published on the level of the main expenditure categories. The nominal and real indices for each expenditure categories are published as well.

Household final consumption expenditure data on two digits of COICOP as well as the main categories of Gross fixed capital formation at current and constant prices as well as the series of chain linked values, with 2010 as reference year have been published. The corresponding deflators are available as well.

Table 10.1 GDP by the expenditure approach at constant prices, 2015

Expenditure categories	2015	
	Nominal indices	Real indices
1	2	3
Household final consumption expenditure	101.43	101.81
Final consumption expenditure of NPISH	98.99	99.99
General government final consumption expenditure	100.55	100.06
Individual government consumption	100.59	99.96
Collective government consumption	100.81	100.46
Gross capital formation	101.97	102.93
Gross fixed capital formation	95.63	96.52
Changes in inventories	-232.93	-235.28
Valuables	9.26	102.73
Export of goods and services	106.29	107.39
Goods (fob)	105.26	105.37
Services	111.90	113.03
Import of goods and services (minus)	98.32	100.69
Goods (fob)	97.72	100.18
Service	109.62	110.17
Gross domestic product:	104.80	104.06

Table 10.2 GDP by the expenditure approach at prices of 2010 (chain-linked values), 2015, Mio KM

Expenditure categories				
	2012	2013	2014	2015
1	2	3	4	5
Household final consumption expenditure	21 121	21 125	21 528	21 917
Final consumption expenditure of NPISH	199	206	217	217
General government final consumption expenditure	5 884	5 872	5 959	5 963
Individual government consumption	2 908	2 904	2 956	2 946
Collective government consumption	2 975	2 968	3 003	3 017
Gross capital formation	4 916	4 769	5 158	5 309
Gross fixed capital formation	4 768	4 712	5 255	5 072
Changes in inventories	147	55	-100	236
Valuables	1	1	1	1
Export of goods and services	7 839	8 510	8 863	9 517
Goods (fob)	5 511	6 192	6 466	6 813
Services	2 314	2 292	2 370	2 679
Import of goods and services (minus)	13 466	13 459	14 506	14 606
Goods (fob)	12 719	12 744	13 774	13 799
Service	745	713	729	803
Gross domestic product:	26 489	27 045	27 213	28 317

Table 10.3 GDP by the expenditure approach, Deflators

Expenditure categories				
	2012	2013	2014	2015
1	2	3	4	5
Household final consumption expenditure	102.65	100.81	99.48	99.63
Final consumption expenditure of NPISH	102.05	99.90	99.10	99.00
General government final consumption expenditure	99.95	99.97	100.82	100.49
Individual government consumption	101.07	99.92	100.93	100.63
Collective government consumption	98.84	100.01	100.70	100.35
Gross capital formation	98.58	99.50	99.39	99.07
Gross fixed capital formation	98.62	99.50	99.40	99.08
Changes in inventories	97.20	99.90	99.77	99.00
Valuables	140.03	97.20	83.06	9.01
Export of goods and services	100.84	98.76	98.81	99.52
Goods (fob)	100.37	98.35	98.69	99.72
Services	102.05	99.91	99.10	99.00
Import of goods and services (minus)	99.35	99.24	99.13	97.65
Goods (fob)	99.12	99.08	99.10	97.54
Service	103.42	102.21	99.79	99.50
Gross domestic product:	102.50	100.55	99.72	100.71

CHAPTER 11

GENERAL INFORMATION ON MAIN SOURCES USED

Estimates of GDP by the expenditure for the year 2015 were calculated at prices of 2014, thus allowing the comparison of data of two consecutive years on a quantitative basis (after eliminating the effect of changes in prices). The implicit deflators of the aggregate and its component are of a Paasche type, which implies that they reflect not only changes in prices but also changes in the composition of the expenditures between the years compared.

Table 11.1 GDP by the expenditure approach at constant prices, 2015, Mio KM

Expenditure categories	2015			
	Current prices	Structure	At previous year prices	Structure
1	2	3	4	5
Household final consumption expenditure	23 157	77.98	23 242	78.83
Final consumption expenditure of NPISH	225	0.76	227	0.77
General government final consumption expenditure	6 289	21.18	6 258	21.23
Individual government consumption	3 139	10.57	3 119	10.58
Collective government consumption	3 149	10.61	3 138	10.65
Gross capital formation	5 333	17.96	5 382	18.26
Gross fixed capital formation	5 097	17.17	5 144	17.45
Changes in inventories	236	0.79	238	0,81
Valuables	0	0	0	0
Export of goods and services	9 936	33.46	9 984	33.86
Goods (fob)	7 194	24.23	7 214	24.47
Services	2 742	9.23	2 769	9.39
Import of goods and services (minus)	15 244	51.34	15 611	52.95
Goods (fob)	14 385	48.44	14 747	50.02
Services	858	2.89	863	2.93
Gross domestic product – at market prices	29 695	100.00	29 483	100.00

The most important indicators that have been used for GDP constant price estimates:

- CPI of B&H;
- PPI of B&H
- Export and import unit value indices;
- Construction deflator;
- General government deflator;
- PPI of the most important partner countries.

The detailed description of CPI and PPI is given in Part B 11.2. The description of other indicators is given in the parts that follow.

CHAPTER 12

METHODOLOGY BY PRODUCT

12.1 Estimate of Final consumption expenditure by households at constant prices

Two methods were applied for the calculation of consumption at constant prices:

- Revaluation of quantities;
- Deflation.

Revaluation of quantities consumed in 2015 using the average prices of 2014 was used for the estimates on consumption of agriculture products, for which data on quantities were available. For all other items, where only values were available, the deflation by the most relevant component of the B&H CPI was used.

Except for agriculture products, the estimates at constant prices were made at the four-digit level of COICOP by matching the estimates with the respective items in the CPI.

Estimate of direct purchases abroad by resident households and direct purchases on the domestic market by non-resident households were calculated at prices of 2014, separately for travel and the other services, by using relevant items of Croatian CPI or Bosnian CPI.

Table 12.1 GDP by the expenditure approach at constant prices: Methods and indicators applied, 000 KM

Code	COICOP	2015 current prices	Methods	Indicator	2015 constant prices	Real increase
1	2	3	4	5	6	7
01.00	Food and non-alcoholic beverages	7 446 691	Deflation/ revaluation	CPI	7 509 261	101.23
02.00	Alcoholic beverages, tobacco and narcotics	2 153 874	Deflation	CPI	2 007 254	99.79
03.00	Clothing and footwear	1 097 044	Deflation	CPI	1 183 607	111.91
04.00	Housing, water, electricity, gas and other fuels	3 289 267	Deflation	CPI	3 267 118	101.15
05.00	Furnishing, household equipment and routine household maintenance	1 444 293	Deflation	CPI	1 450 105	102.81
06.00	Health	944 421	Deflation	CPI	934 209	102.38
07.00	Transport	2 105 638	Deflation	CPI	2 211 209	101.76
08.00	Communication	699 563	Deflation	CPI	697 855	97.96
09.00	Recreation and culture	1 141 618	Deflation	CPI	1 148 233	100.64
10.00	Education	331 224	Deflation	CPI	324 595	99.43
11.00	Restaurants and hotels	1 694 203	Deflation	CPI	1 689 778	106.76
12.00	Miscellaneous goods and services	1 774 892	Deflation	CPI	1 784 717	103.08
	Net purchases abroad	966 132	Deflation	CPI	965 818	110.07
Household final consumption expenditure – national concept		23 156 597			23 242 123	101.81

12.2 Estimates of General government consumption expenditure at constant prices

Estimates of general government consumption at constant prices were calculated by applying implicit deflator of general government output taken from the GDP by the production approach at constant prices estimates.

Table 12.2 Estimate of the General government final consumption expenditure at constant prices, 000 KM

General government final expenditure	2015 current prices	Methods	Indicator	2015 constant prices	Real increase
1	2	3	4	5	6
General government final consumption expenditure	6 289 043		Implicit deflator of	6 258 447	100.06
Individual government consumption	3 139 476	Deflation	the	3 119 749	99.66
Collective government consumption	3 149 567	Deflation	government output	3 138 699	100.46

12.3 Estimates of Gross fixed capital formation at constant prices

Estimates of construction assets (buildings and assets) were deflated by the overall implicit deflator of output of the construction industry calculated within the compilation framework of GDP by production.

Estimates of machinery and equipment were calculated at constant prices using the overall weighted producer price index of the main trade partner for capital goods (mostly Germany, Italy and Croatia). The share of machinery and equipment from different countries in total import of machinery and equipment has been used as weight for calculation of composite deflator.

Table 12.3 Estimate of the Gross fixed capital formation at constant prices, 000 KM

Purpose of investment	2015 current prices	Methods	Indicator	2015 constant prices	Real increase
1	2	3	4	5	6
Machinery and equipment	2 248 672	Deflation	Composite PPI	2 283 908	101.15
Construction	2 554 470	Deflation	Implicit deflator of the construction output	2 563 679	93.08
Other investment	294 090	Deflation	Overall CPI	297 061	93.40
Gross fixed capital formation	5 097 232			5 144 648	96.52

12.4 Change in inventories at constant prices

Changes in inventories at constant prices were calculated using a general price index (CPI), as there is no information on the composition of the inventories and no price indices available to deflate the data if it were available.

12.5 Exports and imports of goods at constant prices

Estimates of exports and imports of goods at constant prices were calculated by deflating with unit value indices. Unit value indices are not price indices since their changes may be due to price and (compositional) quantity changes. However, they are used by many countries as surrogates for price indices. They are used as short-term indicators of inflation transmission, to measure changes in a country's terms of trade (effect), and as deflators of export and import values to yield measures of changes in export and import volumes.

A unit value index of imports of a Paasche type was calculated as a weighted average of the indices calculated at the level of each of the 97 chapters of Combined Nomenclature.

12.6 Exports and imports of services at constant prices

Estimates of imports and exports of services were calculated separately for travel and the other services.

For import of travel services items of the Croatian CPI in was used as representative of the changes faced by Bosnian travellers abroad.

For export of travel services, the Bosnian CPI were taken as representative of the price changes in this item. Until more sophisticated methods are established for the calculation at constant prices of other components of exports and imports of services, the deflators used for exports and imports of goods were applied to the corresponding flows of services.