

**AGENCY FOR STATISTICS OF BOSNIA AND HERZEGOVINA**

**QUARTERLY NATIONAL  
ACCOUNTS INVENTORY**  
BOSNIA AND HERZEGOVINA

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## **Chapter 1**

### **Organization and institutional arrangements**

In Bosnia and Herzegovina (BiH), quarterly national accounts (QNA) are compiled by the Agency for Statistics of Bosnia and Herzegovina (BHAS). The implementation of this project has been facilitated through a close cooperation with the Federal office of Statistics and the Republica Srpska Institute of Statistics, which have provided BHAS with an important part of required source data.

The Agency for Statistics of Bosnia and Herzegovina, according to the Law on Statistics of Bosnia and Herzegovina, is a state institution competent to process, disseminate and endorse statistics of Bosnia and Herzegovina, perform international representation and co-operation with organizations and other bodies and fulfill the international obligations of Bosnia and Herzegovina in the field of statistics.

The statistical system of Bosnia and Herzegovina encompasses the Agency for Statistics of Bosnia and Herzegovina (BHAS), the Central Bank of Bosnia and Herzegovina (CBBH) and other official producers of statistics at the level of Bosnia and Herzegovina; the Federal Office of Statistics of Federation of Bosnia and Herzegovina (FOS) and the Institute for Statistics of Republika Srpska (RZS) at the entity level, and other official producers of statistics in the Federation of Bosnia and Herzegovina and Republika Srpska. At the level of Brcko District, Brcko Branch is organised as a part of the Agency for Statistics of Bosnia and Herzegovina, and together with other producers of statistics in Brcko District, it is a part of the statistical system of BiH.

According to the provisions of the Law on Statistics of BiH, statistical institutions which directly participate in the production of statistics of Bosnia and Herzegovina are: the Agency for Statistics of Bosnia and Herzegovina, the Federal Office of Statistics of Federation of Bosnia and Herzegovina, the Institute for Statistics of Republika Srpska and the Agency for Statistics of Bosnia and Herzegovina – Brcko Branch (organisational unit of the Agency for Statistics of Bosnia and Herzegovina since 2005).

The internal organization of BHAS consist of seven sectors: Sector for Statistical Methodologies, Standards, Planning, Quality and Coordination; Sector for Demography and Social Statistics; Sector for Economic Statistics; Sector for Business Statistics; Sector for Agriculture, Environment and Regional Statistics; Sector for Informational – Communicational technologies; Sector for Dissemination. Quarterly national accounts are compiled in the Department for National Accounts, which is part of the Sector of Economics Statistics.

## **Chapter 2**

### **Publication timetable, revisions policy and dissemination of QNA**

#### **2.1 Release policy**

The Agency for Statistics for Bosnia and Herzegovina (BHAS) presented for the first time compiled quarterly estimates of gross domestic product (GDP) by production approach for BiH on June 2013. Estimates are available for the period 2006 -2012 with a breakdown by economic activity at the section level of the Statistical Classification of Economic Activities in the European Community (NACE Rev 1.1). In the future, it is planned to publish quarterly data 90 days after the end of reference period, by new classification (NACE Rev. 2). New series 2008 – 2012 by new classification (NACE Rev. 2) were published in early 2014.

#### **2.2 Contents published**

Historical time series, compiled according to the uniform methodology of the production approach, are available from first quarter 2006 – last quarter 2012 (NACE Rev 1.1) and first quarter 2008 – third quarter 2013 (NACE Rev. 2)

The following tables are published:

- *Quarterly gross domestic product, current price*
- *Quarterly gross domestic product, previous year price*
- *Quarterly gross domestic product, chain linked values with a fixed reference period*
- *Quarterly gross domestic product, chain linked with a fixed reference period (real growth rate Q/Q-1)*
- *Quarterly gross domestic product, chain linked with a fixed reference period (real growth rate Q/Q-4)*
- *Quarterly gross domestic product, seasonally adjusted data, chain linked with a fixed reference period*
- *Quarterly gross domestic product, seasonally adjusted data, chain linked with a fixed reference period (real growth rate Q/Q-1)*

#### **2.3 Additional information**

QNA data are available at  
<http://www.bhas.ba>

## Chapter 3

### Overall QNA compilation approach

#### 3.1 Overall compilation approach

BHAS compiles national accounts, including QNA according to the concepts, definitions, classification and accounting rules of European system of account (ESA95). Quarterly GDP is compiled only by production approach. Unlike the annual accounts for which direct measures of the variables are available, limited direct information is available on a quarterly basis and the estimates rely mostly on indicators. Indicators at detailed level of economic activities (2 or 3 digits of the NACE Rev 1.1 and NACE Rev. 2) have been used to quarterly allocate the annual estimates for years for which the corresponding annual estimates are available and to produce estimates for the most recent year for which no annual data are available.

The recent establishment of the system of QNA estimation for BiH can be briefly described as having consisted of the following steps:

- *Identification of available indicators*
- *Collection of information on indicators from internal and external sources*
- *Processing the information (indicators and benchmarks) for conversion into required format for compilation of QNA*
- *Preliminary assessment of indicators*
- *Compilation of preliminary historical series at current prices, at prices of previous year, and chain-linked volume measures with a fixed reference period for the series 1st quarter of 2006 – 4<sup>th</sup> quarter of 2011.*
- *Assessing the extrapolation capability of the compilation system and estimates for the year 2012, which is considered as a forecast based on the available indicators.*
- *Assess the temporal and logical consistency of the results*
- *Refining the estimates by using alternative indicators and methods*
- *Assessment of results*
- *Seasonality analysis of the quarterly series*
- *Preparation of publication: tables, graphs and metadata*
- *Presentation of the estimates to main users*
- *Official release of the estimates*

From the technical point of view, all the tables have been prepared on Microsoft Excel. For carrying out seasonal adjustment Demetra+ has been used.

In general: one can distinguish between two approaches for compiling QNA estimates:

- *Direct approach and*
- *Indirect approach.*

The direct approach means that the quarterly values of the required variables are obtained directly from the source data (for example: output of a given activity provided by a representative quarterly establishment survey or household consumption on a specific item obtained directly from a household income and expenditure survey, the value of output, intermediate consumption and value added of utility companies from their quarterly financial statements, possibly government quarterly accounts, etc.).

The indirect approach is in fact more widely used, as there will be usually a lack of sufficient direct observation available on a quarterly basis. The indirect method means that an indicator related to the target variable is chosen to reflect its quarterly movement. The indicator can be an index, number or a value. Examples of indicators are the monthly industrial production indices, revenue from sales, output of a subset of the universe of enterprises, etc. One of the main features required for an indicator is that its annual growths will be highly correlated with the annual growth of the target variable.

### **3.2 Balancing, benchmarking and other reconciliation procedures**

An important property of the quarterly national accounts is their consistency with the annual accounts, that is, the sum of the four quarters for any given year should be equal to the corresponding annual estimate. This identity is obtained by means of a statistical procedure called „benchmarking“. The Proportional Denton benchmarking method has been used in the compilation of the quarterly GDP of the BiH, thus preserving as much as possible the intra-annual movement of the indicators but subject to the restriction that the sum of the resulting quarterly estimates should be identical to the annual data (the benchmark).

The Denton method that has been used is an Excel function for benchmarking quarterly series to annual series, which was developed by the IMF's Statistics Department with the objective to help compilers of quarterly national accounts (QNA) in benchmarking annual national accounts (ANA) series with related quarterly indicator series. The benchmarking problem arises when time series data for the same target variable are measured at different frequencies with different level of accuracy and there is the need to remove discrepancies between annual benchmarks and corresponding sums of the sub-annual values. The optimal combination of annual levels and quarterly movements requires an adjustment, which preserves as much as possible the short-term movements in the preliminary infra-annual sources subject to the restrictions provided by the annual constraints.

The IMF manual on QNA (IMF, 2001) recommends using the Denton's proportional first differences (PFD) benchmarking method with enhancements for extrapolation. This method is optimal because it preserves as much as possible the short-term movements in the quarterly source data under the restrictions provided by the annual data and, at the same time ensures for the extrapolated quarters that the final estimate of the year is as close as possible to the unknown annual data.

### **3.3 Volume estimates**

Quarterly GDP data series are presented at current prices and as volume measures at prices of the previous year and as chain-linked values with a fixed reference period. As requested by EU regulations and also being the most common practice among countries, quarterly volume measures of GDP, like in the annual accounts, are estimated at prices of the previous year, that is, the prices used for the derivation of the volume measures change every year to better reflect the most current structure of price relatives.

However, volume values at prices of a previous year allow for 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 (annual overlap) to produce series at a fixed reference period, thus allowing the comparison between any chosen different periods. The selected fixed reference period in BiH was 2005 and now it is 2010.

### **3.4 Seasonal adjustment**

Seasonal adjustment is a process of time series decomposition, which removes seasonal effects on time series behavior. The seasonally adjusted series remove from the original data the quarterly seasonal fluctuations and the calendar effects. The series have been seasonally adjusted by means of the Demetra + software using the TRAMO-SEATS method. The direct method was used (each series was seasonally adjusted, directly). Sum of quarterly seasonally adjusted data in a year is not equal to the sum of non-seasonally adjusted data.

## Chapter 4

### Gross domestic product - production approach

#### 4.1 GDP – production approach

Gross domestic product by the production equals value added at basic prices by activities, increased by taxes on products, and reduced by subsidies on products. Gross domestic product thus equals the sum of value added at basic prices of all domestic (resident) production units and net taxes on products (taxes less subsidies on products).

Value added at basic prices equals output at basic prices, reduced by intermediate consumption at purchaser's prices. Value added at basic prices also equals the sum of compensation of employees, other taxes on production, less other subsidies on production, and the sum of gross operating surplus and gross mixed income.

Taxes on products are all taxes that are payable per unit of some good or services produced or transacted. The tax may be a specific amount of money per unit of quantity of a good or service, or it may be calculated ad valorem as a specified percentage of the price per unit or value of the goods and services produced or transacted.

Subsidies on products are subsidies payable per unit of a good or services produced or imported. The subsidy may be a specific amount of money per unit of quantity of a good or services, or it may be calculated ad valorem as a specified percentage of the price per unit. A subsidy may also be calculated as the difference between a specified target price and the market price actually paid by a buyer

#### 4.2 Data sources for QNA

The main data sources used for the calculations are:

Statistical surveys:

- *monthly data on industrial production;*
- *monthly data on physical volume of forest exploitation;*
- *monthly data on sales and purchase value of agricultural products;*
- *monthly data on tourists;*
- *monthly data on transport and telecommunications;*
- *monthly data on employees;*
- *monthly data on prices;*
- *monthly data on catering turnover value;*
- *monthly and quarterly data on trade turnover value;*
- *monthly data on value of construction works done and hours worked;*
- *annual data on agricultural production.*

Administrative and other sources:

- *indirect taxation authority (taxes on products and services, customs duties);*
- *monthly data on deposits and credits at commercial banks;*
- *quarterly data on insurance premiums.*

### **4.3 The calculation method for QNA**

GDP calculation is performed in two stages: calculations at previous year prices and current prices , and chain-linking results with prices of the fixed reference period.

In the first stage calculations are carried out at current prices and at prices of previous year. Estimation procedures use the Denton method for benchmarking the quarterly estimates of output and intermediate consumption to the annual benchmarks. Since benchmarking requires data on a series format, the volume indicators and benchmark estimates are rebased to the reference year (selected by convenience). The benchmarked estimates at prices of the reference period are then rebased to prices of previous year by up-scaling the data using the chain-linked annual implicit deflators. Value added at prices of previous year is obtained as the difference between output and intermediate consumption, both at prices of previous year.

1. *Calculation of GVA for all divisions of the Classification of Activities, FISIM, taxes on products and imports and subsidies on products, using respective indicators and weights;*
2. *Calculation of GVA for all sections, by summing up GVA of divisions classified in respective section; net taxes calculation by summing up taxes on products and imports and subtracting subsidies on products;*
3. *Calculation of GVA of all activities by summing up GVA of all sections;*
4. *Adjustment of GVA by subtracting FISIM from GVA of all activities;*
5. *Calculation of GDP by summing up GVA and net taxes.*

In the second stage, chain-linked volume measures are calculated:

1. *Series of chain-linked indices are independently calculated for sections, FISIM, taxes on products and imports, subsidies on products, net taxes, GVA of all activities, GVA and GDP.*

## 4.4 Indicators and calculation methods, by sections of NACE Rev. 2

The following sections describes sources and methods used to construct the historical time-series (for years with available annual estimates). Extrapolation (forecasts) for more recent years are in general to be based in the same volume indicators but an enhanced DENTON procedure is used after assessing the series and on any additional information on the trend is known. Also during extrapolation, price indicators used in the historical series (PPI and CPI) could be subject to adjustments based on their behaviour in comparison with annual deflators of output and intermediate consumption in order to eliminate any possible systematic bias.

### A – Agriculture, forestry and fishing

#### *Division 01: Crop and animal production, hunting and related service activities*

Fixed quantity allocation of production by product in the year 2005 was used for all years in the series. The weighted average prices of 2005 and 2010 were used to calculate output by product for the quarterly series. From these estimates at 2005 and later 2010 prices, a volume Laspeyres index was derived and used as the volume indicator of output. Processed agriculture products were excluded as they should be in manufacturing. Annual data on production are available 3 months after the end of the year.

An implicit Paasche type deflator was calculated based on a sample covering most of agriculture production. The deflator is obtained by dividing the estimates at current prices by the estimate at prices of previous year over the sample of products for which both quantities and prices are available on a quarterly basis. Since specific farm prices of agriculture products are available only from the first quarter of 2009, backward estimates of prices were based on corresponding changes in the CPI.

For extrapolation and preliminary estimates there are quarterly data on sales (quantities and values) by enterprises and by individual producers (namely, direct sales from enterprises and purchases from individuals) . Data are based on a survey designed for the collection of prices. The details by product are satisfactory but the size of the sample may not be representative of the total population. Nevertheless there is no other source of high frequency data. Annual production forecasts, which are lacking at present, would allow to apply the same procedure as in the historical series.

For preliminary estimates (forecasts), estimates at constant prices are prepared for the quarters of 2012 by multiplying the quantities sold by the average sale price. The preliminary QNA estimates (forecasts) for the first quarter are compiled at 2005 prices by extrapolation of the estimate at 2005 of the first quarter of previous year using the over the year growth rate of the estimates at constant prices.

This procedure implies that the quarterly constant prices estimates provide and annual forecast which will change each time a new quarter is available. It is adopted because we want the annual allocation for the new year to be consistent with the quarterly allocation in the historical serie (linking on the fourth quarter of previous year may change this allocation if the quarterly distribution of the indicator-the quarterly estimates at constant prices based on sales- differs from the fixed factors used in the historical series). Adopting this procedure means that with the estimates of each additional quarter, estimates for previous quarters will be revised.

For preliminary estimates, the price indicator would be derived from the same quarterly survey on sales by dividing the current values by the corresponding values at constant prices. These implicit deflators will be chain-linked with the implicit deflators in the QNA estimates of previous year.

An alternative procedure is using and annual forecast of agriculture growth rate, used for extrapolation of quarterly estimates of previous year (the same growth rate over the same quarter of previous year for each of the four quarters).

#### *Division 02: Forestry and logging*

Although quarterly quantity production is available by type of tree for all years, there are no prices available. The sum of all quantities was used as a volume indicator. The PPI for activity 16 (Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials) was used as price indicator. The same indicator is available for preliminary estimates.

#### *Division 03: Fishing and aquaculture*

For historical series we used quarterisation of annual estimate at current and at constant prices.

### **B – Mining and quarrying**

Volume indicator: The IPI for each 2-digit activity.

Price indicator: The PPI for each 2-digit activity.

The quarterly allocation of output in the historical series and for extrapolation is based on the IPI. The same indicator is used for intermediate consumption, thus assuming the movement of inputs to be proportional to the movements of outputs and allowing the benchmarking procedure to correct in the QNA for the annual changes in the I/O ratios. Similarly, as prices for intermediate consumption are lacking, the same PPI for the activity is used as price indicator for intermediate consumption.

Benchmarking of output at current prices is being applied by using as indicator a preliminary value of output obtained as the product of the benchmarked values at constant prices and the PPI. The same procedure is applied to intermediate consumption.

### **C – Manufacturing**

Volume indicator: The IPI for each 2-digit activity.

Price indicator: The PPI for each 2-digit activity.

The quarterly allocation of output in the historical series and for extrapolation is based on the IPI. The same indicator is used for intermediate consumption, thus assuming the movement of inputs to be proportional to the movements of outputs and allowing the benchmarking procedure to correct in the QNA for the annual changes in the I-O ratios. Similarly, as prices for intermediate consumption are lacking, the same PPI for the activity is used as price indicator for intermediate consumption.

Benchmarking of output at current prices is being applied by using as indicator a preliminary value of output obtained as the product of the benchmarked values at constant prices and the PPI. The same procedure is applied to intermediate consumption.

### **D – Electricity, gas, steam and air conditioning supply**

The volume indicator for both output and intermediate consumption is the IPI for the activity. The price indicator for output and intermediate consumption is the PPI for the activity.

### **E – Water supply; sewerage, waste management and remediation activities**

The volume indicator for both output and intermediate consumption is the number of employees for the activity. The price indicator for output and intermediate consumption is the CPI for the activity.

### **F – Construction**

The volume indicator of output was derived as the deflated value of estimates of work put in place. Data on work put in place is obtained from the construction statistics compiled by the entities. The deflator is a composite index derived as a weighted average of wages and salaries in the construction industry and the PPI for the activity 23 (as indicator of prices of raw materials). Weights are the respective shares of value added and intermediate consumption.

The nominal indicator of output is value of work put in place. The volume indicator of intermediate consumption is the same as for output. The PPI for activity 23 is used as price indicator for intermediate consumption.

## **G – Wholesale and retail trade; repair of motor vehicle and motorcycles**

*Division 45: Wholesale and retail trade and repair of motor vehicle and motorcycles*

Deflated real value of turnover (weighted indices by shares of the entities and Brcko in total turnover) is used as volume indicator. General CPI was used as price indicator.

*Division 46: Wholesale trade, except of motor vehicles and motorcycles:*

Turnover deflated by general CPI was used as volume indicator. General CPI was used as price indicator.

*Division 47: Retail trade, except of motor vehicles and motorcycles*

Turnover deflated by general CPI was used as volume indicator. General CPI was used as price indicator.

## **H – Transport and storage**

*Division 49: Land transport and transport via pipelines and*

*Division 50: Water transport:*

A composite volume index was compiled based on the structure of output, which provided output separately for road transport of goods, road transport of passengers, and railway transport of goods (about 80% of railway revenue). The relative shares in output of these categories were used to calculate an average weighted quarterly index composed by km-passengers by road, ton-km of goods by road, and ton-km goods by railway. The resulting index was used as indicator of both output and intermediate consumption. Price indicator – CPI for transport

*Division 51: Air transport:*

Data of number of passengers was used as volume indicator of output and intermediate consumption. CPI for air tickets was used as price indicator.

*Division 52: Warehousing and support activities for transportation*

Turnover indices of transportation and storage activities was used as volume indicator of output and intermediate consumption. General CPI was used as price indicator.

*Division 53: Postal and courier activities:*

Number of letter was used as volume indicator. The CPI for postal service was used as price indicator.

## **I – Hotels and restaurants**

*Division 55: Accommodation:*

*Division 56: Food and beverage service activities*

The volume indicator was derived from data on turnover of hotels and restaurants obtained from the monthly survey conducted by the entities and Brcko district deflated by the matching category in the CPI. Turnover was used as the nominal indicator. It should be noted that although separate data for hotels and restaurants are available on a quarterly basis, there are no separate annual data (benchmarks) for these activities, thus precluding obtaining separate estimates for the sub-activities.

## **J - Information and communication**

Employment was used as volume indicator for output and intermediate consumption. CPI for specific activity was used as price indicator.

## **K – Financial and insurance activities**

*Division 64: Financial service activities, except insurance and pension funds:*

Separate estimates are made for FISIM and other services of banks. Quarterly output of FISIM at current prices is obtained from the consolidated report of the banking services as the difference between interest received and interest paid by banks (Ir-Ip). Estimates of FISIM at prices of 2005 (later 2010) were obtained as the difference between estimates of interest received and paid at prices of 2005 (later 2010). These estimates were respectively obtained by extrapolation of interest received by a calculated volume index of banks' assets and extrapolation of interest paid by a volume index of banks' liabilities. Quarterly current and constant prices of FISIM were both benchmarked using the Denton method.

Explicit charges (fees): a nominal index of output is derived from actual quarterly data. A volume indicator was derived by deflating the quarterly fees by the general CPI. This indicator was used for obtaining the benchmarked quarterly estimates of output and intermediate consumption.

The nominal indicator for output of explicit services is quarterly actual revenue data. Benchmarking volume estimates of intermediate consumption are multiplied by the general CPI to produce a nominal indicator of intermediate consumption for benchmarking.

The quarterly estimate of total output for the activity at current prices is the sum of the benchmarked values of FISIM and explicit services: Total output activity 65 = FISIM plus Fees

*Division 65: Insurance, reinsurance and pension funding, except compulsory social security:*

The nominal value as difference between premiums and claims has been used as indicator for output and intermediate consumption at current prices. Volume indicator was derived by deflating quarterly premiums by general CPI.

*Division 67: Activities auxiliary to financial services and insurance activities:*

The volume indicator of output and intermediate consumption is based on the sum of output of activities 64 and 65. The price indicator is CPI.

## **L – Real estate activities**

*Division 68: Real estate activities*

For the imputation of owner occupied dwellings we used volume indicator based on the quarterization of the annual volume measures. For intermediate consumption the benchmarked estimates of output were used as indicator.

As price indicator the CPI for rentals was used.

*Activity 70: Real estate activities, except the imputation for owner-occupied dwellings:*

The volume indicator is based on the number of employees. The benchmark is the total output of activity less the imputed rent. CPI for actual rentals was used as price indicator. The same indicators are used for intermediate consumption.

## **M – Professional, scientific and technical activities**

Employment was used as volume indicator for output and intermediate consumption. CPI for specific activity was used as price indicator.

## **N – Administrative and support service activities**

Employment was used as volume indicator for output and intermediate consumption. CPI for specific activity was used as price indicator.

## **O – Public administration and defense; compulsory social security**

*Activity 84: Public administration and defense; compulsory social security:*

Number of employees was used as volume indicator. For current price, composite price index made of total CPI and index of wages and salaries are used. For intermediate consumption, general CPI was used as price indicator.

## **P – Education**

### *Activity 85: Education*

Number of employees was used as volume indicator and composite price index for output (wages and salaries and general CPI) as price indicator. For intermediate consumption, general CPI was used as price indicator.

## **Q – Human health and social work activities**

Number of employees was used as volume indicator and composite price index for output (wages and salaries and general CPI) as price indicator. For intermediate consumption, general CPI was used as price indicator.

## **R – Arts, entertainment and recreation**

Employment was used as volume indicator for output and intermediate consumption. CPI for specific activity was used as price indicator.

## **S – Other service activities**

Employment was used as volume indicator for output and intermediate consumption. CPI for specific activity was used as price indicator.