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Estimate of Non-Observed Economy in Bosnia and Herzegovina

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Abbreviations Used in This Report

BiH	Bosnia and Herzegovina
FBiH	Federation of Bosnia and Herzegovina
RS	Republic of Srpska
DB	District of Brcko
CBBH	Central Bank of Bosnia and Herzegovina
NOE	Non-Observed Economy
OECD	Organization for Economic Co-operation and Development
MIMIC	Multiple Indicators Multiple Causes
ISTAT	Italian National Statistical Institute
GDP	Gross Domestic Product
GNI	Gross National Income
VA	Value Added
IMF	International Monetary Fund
SNA	System of National Accounts
ESA	European System of National Accounts
NACE	Classification of Economic Activities in the European Community
LISREL	Linear Interdependent Structural Relationship
LSMS	Living Standards Measurement Survey

Scope of Work

The objectives of this research are:

- (I) To determine the best methodology and areas of particular interest for estimating the size of the Non-Observed Economy (NOE) in Bosnia and Herzegovina (BiH);
- (II) To provide guidelines and recommendations related to the adoption of the OECD methodology and the **Multiple Indicators Multiple Causes** (MIMIC) model to estimate the size of the NOE in the 2003.

At the request of the CBBH, the Authors reviewed the applicability of the current Central Bank of Bosnia and Herzegovina (CBBH) methodology used to estimate the size of the Shadow Economy and made recommendations for improvements (see appendix 2).

Mission Team

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Introduction

Two methods were applied to estimate and project the size of the NOE in Bosnia and Herzegovina:

(I) An (adjusted) OECD approach was used to estimate the NOE in the year 2001.

It allows the identification of the structure of the NOE according to:

- (a) the ISTAT (Italian National Statistical Institute) framework;
- (b) the reasons behind the unrecorded value added (statistical, illegal, economic);
- (c) the sectors of activity;
- (d) the Entities.

(II) An econometric method called “Model or MIMIC approach” was used to estimate the Shadow Economy through 2003. This model allowed us to evaluate the main causes of the Shadow Economy in BiH.

The following factors represented major impediments and challenges to accomplishing this task:

- the low reliability of official data;
- the structural break in data during the war years that significantly reduced the sample size;
- the need to consider heterogeneous sources of data in order to adjust the official statistics, etc.;

Consequently, it is suggested that the figures shown should be interpreted cautiously.

By using the OECD approach and MIMIC model, it was estimated that the proportion of the NOE relative to the official economy (GDP) fluctuated from 57.74% to 52.60% over the 2001-2003 period.

In 2003, the NOE was equal to 52.60% of the official GDP: the share of GDP hidden for economic reasons (Shadow Economy) was equal to 33.15%, illegal activities (corruption and prostitution) accounted for 4.36%, and the statistical part of the NOE (non-response and imputed rentals) was estimated at 15.09% of the official GDP.

The report is organized as follows: The introduction covers the definition of the NOE. It is followed by section 2 that addresses the procedure applied to estimate different components of the NOE and it shows the estimates for 2001. Section 3 introduces the MIMIC model used to estimate the dynamics of the Shadow Economy and the share of the NOE relative to the official GDP. In section 4, empirical outcomes of the estimates are summarized. The paper concludes with recommendations for policymakers about an appropriate economic policy path. In particular, in section 5.1, an econometric exercise to evaluate the effect of select economic policies (decreasing tax burden, unemployment rate, and participation in unemployment insurance system) on the size of the Shadow Economy is carried out. Two statistical appendices accompany the study: The first

shows separately the different structures of non-observed economy in the Federation of BiH (FBiH), on the one hand, and Republic of Srpska (RS) and District of Brcko (DB) on the other. The second appendix presents a review of the Preliminary Estimates of the Non-Observed Economy in 2002 and the statistical recommendations about the reliability of the methodology used in this analysis and the guidelines on how to improve it.

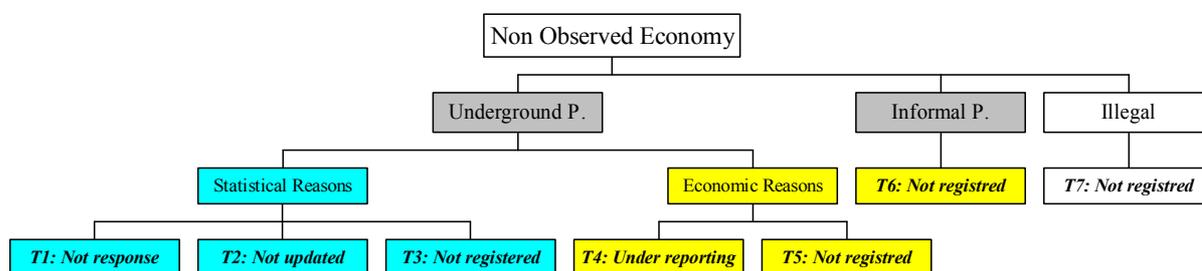
1. General Definition of NOE and Shadow Economy

The most comprehensive definition of the “non-observed economy” (NOE) is possible to be referred from the System of National Accounts (SNA93) and the European System of National Accounts (ESA95). Analytical ISTAT framework described in the OECD handbook “Measuring the Non-Observed Economy” was used to show the different components of the NOE in BiH.

The NOE comprises all production activities that can be classified into the following three areas:

- (1) Underground production (T1, T2, T3, T4, T5);
- (2) Informal production (T6);
- (3) Illegal production (T7).

Figure 1: ISTAT Framework of NOE



Underground production represents production activities that are not directly observed due to:

- (a) *Economic reasons* (T4, T5). Production activities that are carried out with the deliberate intention to avoid payment of taxes and social contributions on behalf of employees or to avoid compliance with legal provisions regarding minimum wages, the number of work hours, job safety, etc.
- (b) *Statistical reasons* (T1, T2, T3). Production activities that are not registered because of:
 - The failure to fill out administrative forms or statistical questionnaires because of the lack of sensitivity to statistics of those surveyed and/or shortcomings in the statistics system;
 - The difficulty to capture statistically the changes within a rapidly evolving system of production characterized by small production activities that are often undetectable by traditional survey techniques.

Informal production (T6) refers to institutional production units characterized by:

- (a) A low level of organization;
- (b) Little or no division between work and capital;
- (c) Labor relations based on temporary jobs, kinship, or personal relations. (This includes production activities of craftsmen, peddlers without licenses, farm workers, home workers, and small merchants).

Illegal production (T7) refers to the production of goods and services whose sale, distribution, or possession is prohibited by law. Included in this area are productive activities carried out by unauthorized operators¹. Illegal activities are often excluded from the system of national accounts because of the difficulty to estimate such activities and because any estimates would have limited international comparability. However, for the purposes of this study, illegal activities, namely corruption and prostitution, are included in the overall estimate of the NOE in Bosnia and Herzegovina.

In accordance with the SNA93 and ESA95 classifications, the use of the terms “non-observed,” “underground,” “informal,” and “illegal” economy is not only a matter of nomenclature. Each of these terms clearly measures different aggregates and therefore requires a different theoretical and empirical methodology of estimation.

Although the proposed structure of the NOE is functional in achieving exhaustiveness of the National Accounts, an aggregate that could be consistent with a broader (economic) notion of the Shadow Economy is not available. For this reason, in this research, the NOE is aggregated into three categories:

- Shadow Economy or Economical part of the NOE is defined as the non-observed economy caused by economic reasons (T4, T5, T6);
- Illegal Activities correspond to T7;
- “Statistical part” includes T1, T2, T3 and imputed rentals.

¹ The 1993 SNA states explicitly that illegal activities should be included in the system of national accounts, noting that “despite the obvious practical difficulties in obtaining data on illegal production, it is included within the production boundary of the System” (1993 SNA: 6.30), and that: “All illegal actions that fit the characteristics of transactions – notably the characteristic that there is mutual agreement between the parties – are treated the same way as legal actions” (1993 SNA: 3.54). The 1993 SNA suggests that illegal actions for which there is no mutual agreement can be construed as an extreme form of externality for which, in general, no values are imputed in the national accounts. So it is the absence of consent rather than illegality that is actually the criterion for exclusion from the production boundary. OECD (2002), pp. 38.

2. The NOE in Bosnia Herzegovina

2.1 General remarks

According to the ISTAT framework, there are seven different types of the NOE. The first three types of the NOE are considered non-observed for statistical reasons and the other four are considered non-observed for economic reasons.

Authors found five types of non-observation in BiH:

- statistical underground because of non-response (T1),
- underreporting of value-added (T4),
- economic underground - not registered units (T5),
- informal sector (T6), and
- illegal activities (T7).

The other two types of the NOE for statistical reasons—the underground production “non-observed” because administrative registers are not updated (T2) and because production units are not registered (T3)—were reviewed and estimated together with (T1) estimates, because there was no information available to estimate these segments of non-observed economy separately.

The year 2001 was chosen as the benchmark year for the NOE estimates. The choice was based on the fact that there are relatively more studies and data available for this year than for other years. The NOE was estimated for each of the entities separately (for Federation BiH as well as for Republic Srpska and District of Brčko). Total estimate at the country level is the sum of the NOE estimates for the entities.

2.2 Description of components of NOE and methodology used

2.2.1 NOE of Statistical Reasons (T1, imputed rentals T6')

T1 Non-observation for statistical reasons – (non-response):

Description

The BiH national accounts statistics use administrative data to estimate GDP. As far as administrative data are concerned, it is quite usual that some production units do not submit their reports to administrative bodies, at all or in due time. Omission of reported data for these specific production units leads to situations in which the collected administrative data are not comprehensive. When the collected data are used to estimate the output, intermediate consumption, and value added, the resulting national accounts estimates are not comprehensive as well.

There are two ways to resolve the non-response problem by replacing the missing data

- with information submitted by the same production unit in earlier periods, or

- with the average values of data reported for the current period by production units that are of the same type as the “non-responsive” units.

Methodology

It was assumed that the level of “non-coverage” in statistics in the Republic of Srpska and District of Brcko is the same as in FBiH. “Non-response” was estimated as 10% of the official value added by production activities (exp. public administration, defense, education, health and social work activities) in both entities.

Data sources

Data	Value	Source
<i>Statisticians’ assumption regarding the number of production units not covered in statistics</i>	10% of value added by covered units	Federation of BiH Bureau for Statistics

T6’ Imputed rentals

Description

ESA 1995 stipulates in the paragraph 3.08 c) that “Production includes the own-account production of housing services by owner-occupiers” and SNA 1993 adds that “The production of housing services for their own final consumption by owner-occupiers has always been included within the production boundary in national accounts, although it constitutes an exception to the general exclusion of own-account service production” (SNA 1993 6.29). Because of that, GDP estimates should include the production of housing services by owner-occupiers, or, in the other words, imputed rentals.

There is no universally-accepted definition of imputed rentals. However, imputed rentals should be understood as rentals that owner-occupiers hypothetically pay to themselves. The actual rentals are defined in CD 95/309/EC as rentals due for the right to use an unfurnished dwelling, which should exclude charges for heating, water, electricity, etc.

Methodology

The total dwelling stock was estimated by using figures on the population, household size, and households per dwelling unit. The number of owner-occupied dwellings was estimated using the share of owner-occupied dwellings in the total housing stock. The average rent per month in 2004 was adjusted by living cost price indices in order to determine the average rent per month in 2001. Output of imputed rentals was calculated by multiplying the number of owner-occupied dwellings by the average rent. The value added of imputed rentals was estimated with the ratio of the value added and the output.

$${}_{2001}VA_{BiH}^{imput. \text{ rent.}} = \sum_{i=FBiH, RS \& DB} \left(P_i * SHH_i * HHL D_i * SOOD_i * \frac{{}_{2004}MR_i}{{}_{LCPI}_i} * \frac{{}_{2001}VA_i^{official}}{{}_{2001}OUT_i^{official}} \right)$$

Where:

P : Population

SHH : Average size of household

HHL D : Average number of households living in the same dwelling

SOOD : Average share of owner-occupied dwellings in the total dwelling stock

MR : Average annual rent per dwelling in 2004

LCPI : Living costs price indices

VA : Value Added

OUT : Output

Data sources

Data	Value	Source
Population	Total BiH 3,798,300 Federation 2,307,000 RS+DB 1,491,300	Official Statistics of Bosnia and Herzegovina
Average size of household	Federation 3,34 persons RS+DB 3,31 persons	Living standard measurement survey in BiH (LSMS) 2002
Average number of households living in the same dwelling	1.5 ²	Authors' opinion
Average share of owner-occupied dwellings in the total dwelling stock	Federation 81,6% RS+DB 72,3%	Living standard measurement survey in BiH (LSMS) 2002
Average annual rent per dwelling in year 2004	200 KM	Authors' observation
Living costs price indices		Official Statistics of Bosnia and Herzegovina
Ratio of value added and output (VA/OUT)	0,8 ³	Authors' opinion bases on the average ratio calculated by other countries

2.2.2 NOE for Economical Reasons – Shadow Economy (T4, T5, T6)

T4 Under-reporting of value added

Description

This type of the NOE occurs often in developing economies and is connected with the enterprise/business sector (limited liability companies, joint ventures, etc). Weak tax enforcement, low tax morality, and open borders are the main roots of under-reporting of income by business units. All these problem areas are relevant for BiH.

² Average number of households living in the same dwelling could be less than 1 or even more than 2. The 1.5 was chosen as average.

³ Phare 2000 Project of Dwelling Services for CC countries.

Under-reporting of value added could be performed in two different ways:

- By under-reporting of output (turnover, sales), or
- By over-reporting of intermediate consumption.

Under-reporting of the output means that legal units (officially registered producing units) deliberately fail to declare their total output. In other words, some business operations are not recorded in the official bookkeeping accounts. Over-reporting of intermediate consumption often takes place in the form of producing fictitious bills for business expenditures or declaring private final consumption expenditures as business costs.

Methodology

Tax inspection data for the period through August 31, 2004 were used to estimate the share of under-reporting of value added. Data on undeclared sales taxes discovered in tax inspections, declared sales taxes, and tax rates were used to calculate the undeclared and declared turnover of the large taxpayers. The ratio of undeclared sales to total declared sales was calculated; this ratio was about 7% of declared sales. The Tax Board indicated that only one third of units was inspected. An assumption was made that the other two thirds of production units under-declared their turnover in the same proportion as did the inspected units. Then, the total share of under-declared value added for all units was calculated by multiplying the share of under-declaration of inspected units by three. In terms of the ratios of turnover/output and output/intermediate consumption, the authors assumed that these ratios were also the same for declared sales and for undeclared sales. Considering this supposition, it was assumed that value added was underestimated in the same proportion as were the sales—by 21%.

The Authors guessed that the level of under-declaration of value added for the small taxpayers was the same as for the large taxpayers and that it was the same in 2001 and in 2004. It was assumed that in FBiH, the level of under-reporting of value added is as same as in RS and DB. Calculations were performed by sectors and are detailed in Appendix 1 (except public administration and defense, education and health and social work activities).

Data sources

Data	Value	Source
<i>Undeclared sales taxes of large tax payers discovered in tax inspections through August 31, 2004</i>	Confidential	Republic of Srpska Tax Administration
<i>Declared sales taxes of large tax payers through August 31, 2004</i>	Confidential	Republic of Srpska Tax Administration
<i>Share of inspected large taxpayers in the total number of large taxpayers</i>	1/3	Republic of Srpska Tax Administration
<i>Tax rates</i>	Sales tax of goods and services - 18%, Sales tax - 8%	Professor R.Tomaš

T4' Tips

Description

Although tips are paid by customers to the employees of the restaurants, bars, hotels, etc, tips have been usually considered as unreported output. Customer pay tips for services provided, which means that the real cost of a service provided to a client is higher than recorded on the bill. Because of this, the output and value added of these activities should be adjusted (increased) by the amount of received tips.

Methodology

Tips were estimated to average about 5% of the total value added by restaurant activities (adjusted with the value of estimated non-response, under-reporting, and underground value added).

Data sources

Data	Value	Source
<i>Information about tipping habits</i>	Tipping by local citizens not common practice, Foreign citizens are obviously more likely to leave tips	Authors' observation
<i>Usual share of tips in the total value of the bill</i>	About 0-15%, sometimes even more	Authors' observation
<i>Possible share of value added by restaurants in the NACE "H" sector value added</i>	75%	National Accounts of Statistical Office of Estonia
<i>Average share of tips in the output of restaurants</i>	5%	Authors' opinion

T5 Underground for economic reasons – Not registered units

Description

It is important to mention that this type of the NOE is again mostly associated with the enterprise sector. In practice, it is not easy for an enterprise to function totally underground or as unregistered. To operate in the market and to deserve confidence of partners, the enterprise needs an official appearance. The Authors discovered that business units in Bosnia and Herzegovina may use different forms of concealed underground functioning:

- Declaring a wrong business address – to avoid tax inspections,
- Using falsified business documentation – to operate as a legal unit,
- Using the registration information of other firms – to operate as a legal unit,
- Operating parallel firms – one firm is official, with full registration, the other firm is underground and uses registration information of the first firm.

However, these types of the NOE are not widespread.

Methodology

There is no universally-accepted methodology to estimate this kind of the NOE. As a result, the Authors of the report decided to use the Tax Audit data. The total number of possible underground units was estimated using the number of underground units discovered in tax audits in addition to the expected period to achieve a full coverage of all units (businesses) in tax audits/inspections. The total number of legal (registered) units was then decreased by the number of units that could not have been inspected (unavailable for inspection) and the share of underground units in the adjusted total number of legal units was calculated. This share was 5%. The assumption was made that the underground value added is in the same proportion to the recorded value added as is the share of underground units to the total number of adjusted legal units. Next, the share of underground units was used to estimate the underground value added by activities (excluding the NACE categories L, M, N).

Data sources

Data	Value	Source
<i>Number of underground units discovered during 2 years by inspections</i>	confidential	Federation Tax Administration
<i>Expected period of total coverage with inspection of all business units</i>	5 years	Federation Tax Administration
<i>Total number of legal units in FBiH</i>	61,101 units (legal, crafts)	Official Statistics of Bosnia and Herzegovina

T6 Informal Production

Description

This part of the NOE concerns the households as producers. These are sole proprietors, self-employed, or unincorporated enterprises, which are of small size and could not be separated from their owners. Usually, they are involved in agriculture, trade, and servicing activities. As long as agriculture and trade constitute a substantial part of the BiH economy, the informal sector will have a considerable importance in estimating NOE.

The international definition of the informal sector included in the 1993 SNA states that the informal sector may be broadly characterized as consisting of units engaged in the production of goods or services with the primary objective to generate employment and incomes for the persons concerned. The informal sector represents an important part of the economy and, particularly, of the labor market in many countries (especially developing countries) and plays a major role in employment creation, production, and income generation. In BiH, this statement is corroborated by data; in fact, it is estimated that about 50.9% of the NOE depends on the informal production (29.4% of the official GDP).

To estimate this kind of unrecorded value added, the Authors applied an Adjusted Labor Input Method. As the OECD (2002) states, “it is a complete approach to GDP estimation that has been designed for Italy but can be applied in any other country with similar features, namely: (1) many small enterprises, which may be missing from, or misclassified in, the business register; (2) because they are unregistered or because of their high turnover rate; (3) high volume of irregular, i.e., unregistered, labor; (4) considerable underreporting of production by enterprises; and (5) strong labor force survey.” According to our sources of data and the World Bank (2002) analysis of the labor market, this method is considered the best in estimating this category of the NOE (informal production). The procedure followed by the Italian national accountants in estimating the NOE has been extensively discussed and widely accepted at the European Community level and, in comparison with procedures in other countries, it is an important reference in terms of the transparency and the efficiency of the method.

In this section, the methodology that has been modified from the original version presented in the OECD (2002) is described. The adjustment was necessary due to the lack of data and a low reliability of some data sources. The main data used was obtained from World Bank (2002) and the official statistics published by Agency for Statistics of Bosnia and Herzegovina, Bureau for Statistics of the FBiH, and Bureau for Statistics of RS, for the year 2001.

Methodology

In symbols, the Value Added of Informal production in BiH is calculated as follows:

$${}_{2001}VA_{BiH}^{informal} = \alpha * \left[\left(\sum_{i=1}^{15} \frac{{}_{2001}VA_i}{{}_{2001}E_i^{(form)}} * {}_{2001}E_i^{(inform)} \right)_{FBiH} + \left(\sum_{i=1}^{15} \frac{{}_{2001}VA_i}{{}_{2001}E_i^{(form)}} * {}_{2001}E_i^{(inform)} \right)_{RS,DB} \right] \quad [1]$$

where:

VA_i : Official Value Added for the sector (official statistics are published by Agency for Statistics of BiH)

$E_i^{(form)}$: Number of formal workers in the sector i (official statistics are provided by the Statistical Offices of the Entities);

$E_i^{(inform)}$: Number of informal workers in the sector i (World Bank, 2002).

α : Coefficient to adjust for a lower productivity per worker in the informal sector ($\alpha = 0,9$).

Thus, the accuracy of estimates obtained through the labor input method depends on the quality and degree of harmonization of the data sources used. In order to increase the reliability of estimates:

1. The informal Value Added is calculated separately for each entity: FBiH and RS (for the estimation purposes, the District of Brcko is included in RS).
2. The number of informal workers is calculated by applying the share of informal workers in each sector, published by World Bank (2002), to the official statistics of (formal) employment.

The productivity of formal workers for each branch and each entity are checked separately: we adjusted these values when the estimated values seemed unreliable according to our experience and in comparison to the productivity calculated by Italian National Account (NA) for the year 1979/1980. The choice of the Italian NA is based on the fact that, in addition to the experience of one of the Authors with this NA system, the quantity and quality of the Italian NA statistics are quite good. These two factors permitted a comparison between the absolute value of Italian sector productivity per worker in the year(s) between 1970 and 2003 and the Bosnian values for 2001 in order to find comparable values. At the end of this process, the average of the Italian labor productivities over the years 1979 and 1980 was chosen. This procedure is used as a check (and for the agriculture sector as an adjustment as well) for the reliability of data on the Bosnian sector productivity per worker.

The **adjustment procedure** consists of calculating a coefficient to convert the value added per worker in **Public administration (sector L)**, considered undistorted by informal activities, in the productivity per worker in some other sector. In particular,

- The figures for the **Agriculture (sector A)** in both entities (FBiH and RS+DB), estimated using the official data, were unbelievably high⁴. Therefore, these data were adjusted with Italian data, applying the formula below:

$$\frac{2001 VA_{Agric}}{2001 E_{Agric}^{form}} = \left(\frac{2001 VA_{pub.adm.}}{2001 E_{pub.adm.}^{form}} \right)_{entity} * \left(\frac{\frac{1979 VA_{Agric}}{1979 E_{Agric}^{form}} + \frac{1980 VA_{Agric}}{1980 E_{Agric}^{form}}}{\frac{1979 VA_{pub.adm.}}{1979 E_{pub.adm.}^{form}} + \frac{1980 VA_{pub.adm.}}{1979 E_{pub.adm.}^{form}}} \right)_{Italy}$$

- Similar strategy was applied to adjust the productivity for **Fishing (sector B)** and “**Other social and personal services**” (**sector O**) in RS and DB. For these activities, the figures of FBiH are used as a benchmark, in symbols:

⁴ For example, if the estimated productivity per worker is used then the value added produced by informal workers in agriculture is equal to the formal value added produced by all Bosnian activities; again a Bosnian farmer in 2001 is more productive (+17%) than the Italian colleagues in the 2003. These reasons suggest an adjustment to official figures.

$$\left(\frac{2001VA_i}{2001E_i^{form}} \right)_{RS,DB} = \left(\frac{2001VA_{pub.adm.}}{2001E_{pub.adm.}^{form}} \right)_{RS,DB} * \left(\frac{\frac{2001VA_i}{2001E_i^{form}}}{\frac{2001VA_{pub.adm.}}{2001E_{pub.adm.}^{form}}} \right)_{FBiH} \quad i = \text{sector } B, \text{ sector } O$$

- For **Trade, repair of motor vehicles, motorcycles, personal and household goods (sector G)** in RS and DB, too low labor productivity was detected (almost a half of the FBiH and Italian productivity). There are no economic reasons to explain such a big difference between two entities. Therefore, this value was adjusted upward. The adjustment consists of setting the RS and DB productivity in the sector G to equal the average estimated value of the productivity per formal worker in the FBiH and in the RS and DB. The FBiH productivity data present more reliable values, according to the Italian data and the author's experience. The following formula was applied:

➤

$$\left(\frac{2001VA_G}{2001E_G^{form}} \right)_{RS,DB}^{adjusted} = \frac{1}{2} \left(\frac{2001VA_G}{2001E_G^{form}} \right)_{FBiH} + \frac{1}{2} \left(\frac{2001VA_G}{2001E_G^{form}} \right)_{RS,DB}^{estimated}$$

Once the value-added for all activities is estimated, it is assumed that the productivity of an informal worker is equal to 90% of the productivity of a formal worker in the same sector, entity, and the year⁵. Subsequently, these productivities are multiplied by the number of informal workers, estimated by the World Bank (2002) [equation 1]. Finally, the informal sector value added is calculated by Entity and for BiH as a whole.

⁵ Usually, it is observed that the productivity level in the informal market is lower than that prevailing productivity in the formal market. The lower value of output per informal worker can be explained by two factors: (1a) the informal market usually has access to less advanced equipment than the formal market has, which implies a lower productivity per workers employed in the informal labour market; (2a) in the informal labour market are employed those who cannot find a job in the formal sector. They have fewer skills and lower abilities implying lower productivity. At the same time, there are factors that can increase the value added produced by the informal activities: (1b) in terms of the cost of labor, since it is expected that productivity will be lower in the informal sector, the irregular employees normally receive a lower wage; (2b) Products and services offered by informal activities are produced without having to pay taxes and contributions, therefore they could be sold with a higher mark-up. These two factors that (on the one hand) lower the value of the output and (on the other) decrease the cost of labour and the tax burden in the production process could generate very similar amounts of value added between the formal and informal worker. To take into account mainly the first two components, the V.A. produced by an informal worker is lower by 10% than that of the regular worker.

Data sources

Data	Value	Source
<i>Gross value added by activities and Gross Domestic Product</i>	BiH, RS and DB, official statistics	Agency for Statistics of BiH
<i>Formal workers by activity/sector</i>	Official statistics	Federation Office of Statistics
<i>Formal workers by activity/sector</i>	Confidential	Institute of Statistics of RS and DB
<i>Share of Informal workers by activity/sector</i>	FBiH, RS + DB	World Bank (2002)
<i>Gross value added and number of formal workers by activities/sectors</i>	1979, 1980	ISTAT

T6'' Actual rentals

Description

This is a part of the informal sector of the NOE and concerns the households as producers. The Authors of the report found that the rental market of dwellings is, to a great extent, non-observed. Because of that, the indirect method of estimation of the actual rentals was used. The actual rental value added in BiH consists of two parts: rental services provided to foreigners (staff of international community in BiH) and rental services provided to local citizens in BiH. The first part (renting to foreigners) was estimated by CBBH and the estimated amount was 103 million KM in the year 2001. The other part of actual rentals, dwellings rented out to residents, was estimated during this project and the methodology is described below.

Methodology

The number of rented dwellings was estimated using the total dwelling stock figure estimated in the calculation of imputed rentals and the share of rented dwellings in the total dwelling stock. The average rent per month in 2004 was adjusted by living cost price indices in order to determine the average rent per month in 2001. Output of actual rentals was calculated by multiplying the number of rented dwellings by the average rent. The value added of actual rentals was estimated with the ratio of the value added and output.

Data sources

Data	Value	Source
<i>Average share of rented dwellings in the total dwelling stock</i>	Federation 1,5% RS+DB 2,5%	Living standard measurement survey in BIH (LSMS) 2002
<i>Average rent per dwelling per month in year 2004</i>	200 KM	Authors' observation
<i>Living costs price indices</i>		Official Statistics of Bosnia and Herzegovina
<i>Ratio of value added and output (VA/OUT)</i>	0,8 ⁶	Authors' opinion based on the average ratio calculated by other countries

⁶ Phare 2000 Project of Dwelling Services for CC countries

2.3 Illegal production (T7)

Description

There is an international agreement among statisticians⁷ regarding what kind of activities should be treated as illegal activities. These activities are as follows:

- Smuggling (tobacco, weapons, alcohol, food etc);
- Trade and production of narcotics;
- Prostitution;
- Clandestine gambling;
- Corruption;
- Usury;
- Fake brands or money; and
- Dealing with stolen goods.

It was difficult to separate smuggling activities in BiH between under reporting of value added and production activities of underground units. Because of that, smuggling is not estimated as illegal activity but it is included as other type of the NOE. There was no available information on clandestine gambling, usury, fake brands or money, and dealing with stolen goods. For this reason, these types of illegal activities were not estimated. The Authors did not estimate the trade and production of narcotics, but these activities should be included in the GDP estimates for BiH⁸. In this study, two types of illegal activities were taken into account—prostitution and bribes.

T7' Prostitution

Methodology

Estimated prostitution activity value added was divided between the two entities in proportion to the population numbers.

Data sources

Data	Value	Source
<i>Estimated value added of prostitution activity</i>	90 million KM	Estimation of CBBH
<i>Population in both entities</i>	Federation 2,307,000 RS+DB 1,491,300	Official Statistics of Bosnia and Herzegovina

⁷ Paragraph 9.2 page 152 in the Handbook of OECD “Measuring the Non-Observed Economy”, Materials of the CC Exhaustiveness Project, Phare 2000.

⁸ Paragraphs 6.30-6.33 of SNA 1993, Paragraph 9.2 page 152 in the Handbook of OECD “Measuring the Non-Observed Economy”, Materials of the CC Exhaustiveness Project, Phare 2000.

T7'' Bribes

Methodology

The population and the share of persons who had paid bribes were used to estimate the total number of cases involving the payment of bribes. Output of corruption was calculated by multiplying the number of cases with the average value of the bribe. Since there should not be any intermediate expenses, all output of corruption is counted as value added.

Data sources

Data	Value	Source
<i>Population</i>	BiH 3,798,300 Federation 2,307,000 RS+DB 1,491,300	Official Statistics of Bosnia and Herzegovina
<i>Share of persons who had paid bribes to different officials</i>	Public administration FBiH 51,1% and RS 37,5%; Police 23% and 19,7%; Doctors 28,8% and 19,4%; Teachers 2,4% and 1,3%; Professors 4,7% and 1,6%; Banking sector 2,5% and 0,8%	Transparency International Bosnia and Herzegovina 2004, Corruption Perception study Bosnia and Herzegovina
<i>Average value of bribes in education and health activities</i>	Doctors 196,2 KM; Teachers 226,5 KM; Professors 480,8 KM	Transparency International Bosnia and Herzegovina 2004, Corruption Perception study Bosnia and Herzegovina
<i>Average value of bribes in other activities (public administration, police, banking sector)</i>	Public administration 200 KM Police 50 KM Banking sector 200 KM	Authors' opinion
<i>Average ratio of value added and output</i>	1,00	Authors' opinion

2.4 Estimates of NOE in Bosnia and Herzegovina for 2001

Utilizing the above specified methodologies to estimate different components of the NOE, the following results were obtained by Entities and by different types of the NOE, as shown in tables 1, 2 and 3.

Table 1: Structure of NOE in BiH

Components of NOE	KM (million)	% of official BiH GDP
Illegal Activities	761.7	7.27%
Shadow Economy	3,588.2	34.24%
Statistics Reasons	1,700.5	16.23%
TOTAL NOE	6,050.4	57.74%

Table 2: Structure of NOE in FBiH

Components of NOE	KM (million)	% of official FBiH GDP	% of official BiH GDP
Illegal Activities	535.5	7.36%	5.11%
Shadow Economy	2,204.0	30.30%	21.03%
Statistics Reasons	1,131.9	15.56%	10.80%
TOTAL NOE	3,871.4	53.22%	36.94%

Table 3: Structure of NOE in RS & DB

Components of NOE	KM (million)	% of official RS&DB GDP	% of official BiH GDP
Illegal Activities	226.2	7.06%	2.16%
Shadow Economy	1,384.2	43.17%	13.21%
Statistics Reasons	568.6	17.74%	5.43%
TOTAL NOE	2,179.0	67.97%	20.80%

3. Development of the NOE in Bosnia and Herzegovina

To estimate the Bosnian NOE in 2002 and 2003 the authors used different strategies according to the different nature of the NOE. As explained in the first section of this study, a different aggregation of the NOE with respect to the ISTAT framework was followed in this report. The proposed classification was needed because it was not possible to build an econometric/statistical model that would be able to estimate all components of the NOE in BiH at the same time. In particular, Shadow Economy is defined as the non-observed economy caused by economic reasons (T4, T5, T6). Illegal Activities correspond to T7, and the “Statistical part” includes T1, T2, T3 and imputed rentals.

- For the Shadow Economy (T4, T5, T6), an econometric technique called MIMIC model is used.
- For the “Illegal activities” (T7): Prostitution is assumed to be constant from 2001 to 2003 and the corruption (bribes paid) is calculated by using the data published in the *Transparency International Bosnia and Herzegovina* (2004) for 2001 and 2003. The value of activities in 2002 is estimated by linear interpolation.
- For the “statistical part” (T1, T2, T3 and imputed rentals) it was assumed that this component of the NOE was constant from 2001 to 2003. The imputed rentals were estimated for 2001 and 2003. Again, the value in 2002 was calculated by linear interpolation.

Particular attention was paid to the estimate of the Shadow Economy because, for policymakers and economic institutions, the Shadow Economy represents the most important component in terms of the size and consequences on the economic system.

3.1 The MIMIC Approach for the Shadow Economy

The “model or MIMIC approach” considers the dimension of the Informal sector as a “latent variable.” Therefore it applies statistical modeling, namely **Structural Equation Modeling (SEM)**, usually utilized by social research (psychology, sociology, marketing, etc.) to explore this kind of unobservable variables (for example: attitudes, personality, belief, satisfaction, etc.). This approach is based on the statistical theory of latent variables, which considers several causes and several indicators of the hidden economy. Frey – Wech-Hannerman [1984] were the first to consider the size of the hidden economy as an “unobservable variable.” They introduced the MIMIC model of Zellner [1970], Jöreskog -- Goldberger [1975] and others in this field. This model belongs to the LISREL ‘**L**inear **I**nterdependent **S**tructural **R**elationships’ family of models (see Jöreskog—Sörbom [1993]). Following Frey – Wech-Hannerman’s example, other economists used this approach for their statistical analysis of the “unofficial” economy: Aigner *et al.* [1988], Helberger – Knepel [1988], Loayza [1996], Giles [1995, 1999a 1999b], Eilat -- Zinnes [2000], Salisu [2000],

Cassar [2001], Giles – Tedds [2002], Chatterjee, *et al.* [2003], Dell’Anno [2003], Dell’Anno – Schneider [2003].

To comment on the reliability of the model approach, statistical accuracy of this model has been improved since the time the first numbers were produced by Frey and Weck-Hannemann (1984). According to Schneider and Enste (2000); the MIMIC approach shows some progress in the estimation techniques of the underground economy. This methodology allows wide flexibility in its framework, and is therefore potentially inclusive of all the indirect methods. It is thus theoretically superior to others.

3.1.1 Specification of Model and Theoretical Background

The Model Approach needs a theoretical (economic) background to estimate the unobserved variable. This is a critical factor because the reliability of the results depends on the economic consistency of casual relationships between causes and indicators and the Shadow Economy. For the Lisrel classification, the equations system with the relationships between the latent variable (η) and the causes (X_q) is called the ‘structural model’; the links between indicators (Y_p) and underground economy is the ‘measurement model’.

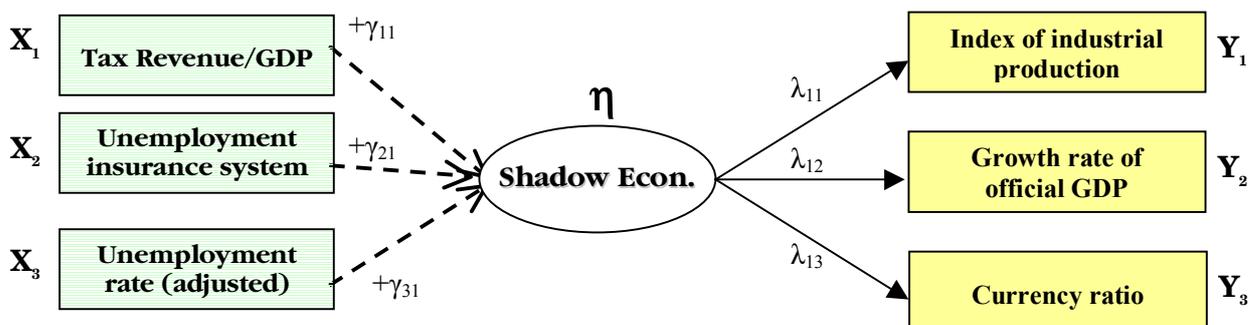
The analytical representation of the model is identified (MIMIC 3-1-2) below:

Structural Model: $\eta = \gamma_{11}X_1 + \gamma_{12}X_2 + \gamma_{13}X_3 + \zeta$ [2]

Measurement Model: $Y_1 = \lambda_{11}\eta + \varepsilon_1$; $Y_2 = \lambda_{21}\eta + \varepsilon_2$ and $Y_3 = \lambda_{31}\eta + \varepsilon_3$ [3]

Another way to show the underlying economic theory of this method is by a path diagram (figure 2), which shows, on the left-side, potential causes of the Shadow Economy and, on the right side, the indicators.

Figure 2: MIMIC Model (3-1-3) for BiH



Explanatory variables (Causes)

(1) *Tax Burden*

In literature, the most popular determinant of the underground production is tax rates. The common hypothesis is that an increase in the tax burden is a strong incentive to work in the unofficial economy. In the econometric framework, this variable is measured by a ratio of total direct taxes, indirect taxes, and social contributions as a percentage of (official) gross domestic product⁹. It might be useful to analyze the impact of the three main components of tax revenue (direct, indirect, and social security contribution) separately, but the limited number of observations has prevented any possibility of developing a more complex econometric framework (in terms of the number of potential causes of Shadow Economy). The test of statistical significance shows that the tax burden is a relevant cause of the Bosnian Shadow Economy.

(2) *Unemployment insurance system*

FBiH and RS adopted new unemployment insurance systems in 2000. As World Bank (2002) states, both systems are quite similar and provide a modest, affordable system of income support to the unemployed. In comparison to other transition economies, the generosity of the benefit system is on the lower side, in line with lower revenues. Average benefit duration is in the general range of that in the neighboring countries.

This variable is considered as one of the causes of Shadow Economy because there is a vast number of registered unemployed in Bosnia and Herzegovina who are, in principle, eligible to participate in both active and passive labor market programs. This unemployment insurance could be considered an incentive to become and remain an irregular worker. However, there have been very few participants in such programs. In the Federation, the number of recipients of unemployment benefits varied from 27,000 to 36,000 in the 1998-2001 period; there were even fewer beneficiaries in Republic of Srpska. According to the World Bank (2002) research, the main reason for unemployment registration appears to be access to free healthcare, obtained upon registration. Unfortunately, if participation in the “health insurance program” is used instead of and in addition to the participation in the “unemployment insurance system,” a convergence problem arises in the iterative process to estimate the parameters of the LISREL model. If it were possible to use the data on health insurance program participation, the authors believe that the value of the coefficient of X_2 could be larger than the value of the coefficient estimated using the time series of the unemployment insurance system. In this analysis, in fact, a weak statistical relation between the unemployment insurance participation rates and the Shadow Economy was found.

⁹ The data are extract by IMF (2004b), tab 4b, pp. 38.

(3) *Unemployment rate*

The labor force of the hidden economy is composed of very heterogeneous workers. One part of the hidden labor market is classified as unemployed but belongs to the official labor force. The other part of ‘hidden’ workers consists of retirees, minors, and housewives who are not part of the official workforce. Furthermore, there are persons who simultaneously hold an official and an unofficial job [Tanzi, 1999, p. 343]. In this sense, the official unemployment rate could be weakly correlated with the Shadow Economy. For these reasons, the Authors considered an adjusted unemployment rate for Bosnia and Herzegovina. It was calculated following the recommendations of the IMF (2004a) that consider the LSMS (2002) estimates of the unemployment rate more reliable than the official statistics. The share of “discouraged people” must be added to the LSMS estimates in order to correct the (implausibly) too low participation rate in the labor force. Finally, the data from 1999 to 2003 were adjusted by the coefficient of adjustment that was calculated by the IMF (2004a) for the year 2001. The outcomes indicate that the most important cause of the Bosnian Shadow Economy should be sought in the Labor Market.

Indicators

Three variables are used as the indicators of development of the Shadow Economy: (1) **Index of Industrial Production**; (2) **Growth Rate of (Official) Gross Domestic Product**; and (3) **Currency in circulation outside of banks divided by the monetary aggregate M1 (Currency ratio)**.

According to the monetary approach, it is assumed that the “Currency ratio” is positively correlated to the Shadow Economy. This method is based on the hypothesis that irregular transactions are only paid for in cash, and not by cheques or credit cards, in order to circumvent auditing controls. Hence, if this assumption is accepted, it is possible to replicate the dynamics of the hidden economy by comparing the actual demand for cash with a wider monetary aggregate (M1). In the estimated models the ratio between the time series of the currency in circulation outside of banks and the M1 confirms a positive sign.

3.2 Estimated Coefficients, Development of NOE and Caveats

The *estimated coefficients* of the Bosnian informal economy are presented in the table below:

Table 4: Estimated Coefficients of the MIMIC Models ($\hat{\gamma}_{q1}, \hat{\lambda}_{1p}$) and descriptive statistics

Models	Tax Burden	Unempl. Insurance	Unempl . Rate	Index of Industrial Product.	Growth Rate of GDP	Currency/ M1	Chi-square ¹	RMSEA ²
MIMIC 3-1-2	0.31*	0.02	0.81*	- - -	5.33*	1.00	25.95	0.956
MIMIC 3-1-3	0.16*	0.17*	0.97*	- 2.41*	- 1.00	0.25*	45.75	0.887
Descriptive statistics of variables								
Mean ('98-'03) ³	51.9%	31.0%	31.8%	214.98	6.5%	52.6%		
Variance('98:'03)	19.68	1.15	9.92	271.01	7.76	35.55		

* Means |t-statistic|>1.96, therefore the coefficients with “*” denote that the variables are relevant to explain the development of the Shadow Economy.

¹ If the structural equation model is correct, the perfect fitting corresponds to the p-value of Chi-square equal to 1. This test has a statistical validity if there are large sample and multinormal distributions. Unfortunately, it was not possible to test the multinormality of distributions for the too small sample size. Therefore this value should be considered not statistically reliable. In our case, the tests are rejected.

² Test of Close Fit (RMSEA < 0,05) are rejected.

³ This value indicates the mean of the time series used as causes and indicators of the Shadow Economy.

Estimates of the NOE:

The MIMIC models are built to estimate the size of the Shadow Economy as a percentage of official GDP. The index of the Shadow Economy is estimated by multiplying the structural coefficients for the dataset, in symbols:

$$\hat{\eta} = \hat{\gamma}_{11}X_1 + \hat{\gamma}_{12}X_2 + \hat{\gamma}_{13}X_3 \quad [2]$$

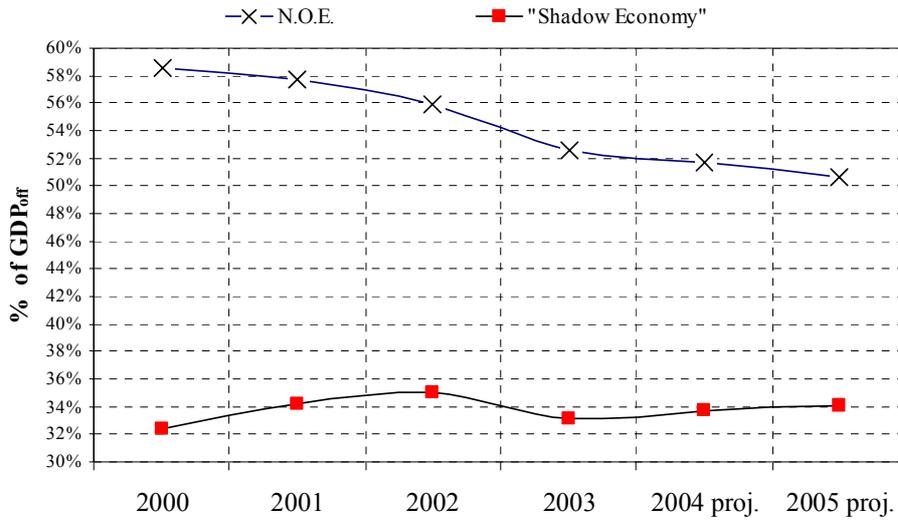
In order to obtain the actual values of the Shadow Economy in terms of official GDP, an *a priori* known value is required. The year selected is 2001 because it was possible to obtain the estimates by utilizing the OECD methodology.

Table 5: Shadow Economy estimated by MIMIC model

Year	2000	2001	2002	2003	2004 proj	2005 proj.
Shadow Economy	32.42%	<u>34.24%</u>	35.06%	33.15%	33.72%	34.04%

The estimates of the other two components of the NOE are added to these values: Transparency International Bosnia and Herzegovina (2004) and unofficial CBBH and IMF (2002) estimates for the *Illegal Activities* as well as the authors' estimates of the “*Statistical part*” of the NOE using LSMS data and others sources. The values are shown in the table 6. In the Figure 3 below, the development of the NOE and its main component (Shadow Economy) are shown. For 2000, 2004, and 2005, the shares of the “illegal” and “statistical” components of the NOE (as a percentage of GDP) are calculated by the moving average procedure.

Figure 3: *The Estimates of the Size of the NOE and Shadow Economy (2000-2005)*



3.2.1 Caveats for Shadow Economy Estimations by MIMIC model

The size of the Shadow Economy is restricted to being examined as a linear combination of a small set of variables. Certainly, other and/or more suitable data can be employed, to explain a very complex phenomenon such as the informal economy. Clearly, in order to represent exhaustively the dynamics of the NOE, one should take into consideration additional causes (structural variables) such as: the size of the public sector and the degree of regulation of the economic system¹⁰; the rate of self-employment as a percentage of the labor force; some indices of the “Rule of Law” such as the index of Efficiency of Judicial System, Index of Tax Enforcement, etc. However, these data are either unavailable or available in the form of insufficiently long time series, including only a few annual values.

Moreover, the reliability of the used explanatory variables can be questioned for two main reasons:

1. The reliability of existing official statistics that are invalidated by the huge share of the unregistered and underreported units and values;
2. The impossibility to use the best model structure because it would be too complex for the (too small) sample size. The very small sample used in this analysis makes it impossible to determine the assumptions that should be respected in order to use this technique appropriately: test of multinormality, independence between measurement and structural errors, unit root detection, etc. (see Dell’Anno 2003 for details).

Consequently, the numerical outcomes should be interpreted cautiously.

¹⁰ The expected signs for these variables are ambiguous. Some authors find a negative sign arguing that, in some sectors, the presence of the state could discourage people to operate in the Shadow Economy. Other research finds a positive relationship, arguing that these indicators are capturing the degree of regulation in the economy, so the more regulated the economy is, the more firms face an incentive to develop their activities in the underground economy.

4. Conclusions

The estimation strategy used in this research consisted of a two-step procedure:

- I) To estimate the level of the NOE in 2001 by the OECD discrepancy method¹¹.
- II) From 2002 to 2003, different estimation methods were applied for each of the three components of NOE:
 - The MIMIC model for the Shadow Economy;
 - Transparency International Bosnia and Herzegovina 2004 and authors' estimates for illegal activities;
 - Authors' estimation for the "statistical part" of the NOE using LSMS data and other sources.

The econometric conclusions from our estimates, with respect to the development of the BiH Shadow Economy for the period 2000 to 2004, are:

- The size of the NOE ranges from 59 percent, in the 2000, to 53 percent (2003) of official GDP; the Shadow Economy varies around 34%.
- The tax burden (X_1) is statistically significant and positively related to the Shadow Economy.
- The participation rate in the unemployment insurance program (the number of recipients of unemployment insurance benefits) used as a proxy of the incentive to remain an unregistered worker (X_2), is positively correlated to the Shadow Economy. The authors assume that the participation in this assistance program is less relevant in the decision to remain "Informal" than is the free access to public health services, but it has not been possible to estimate the statistical relation between the non-observed economy and this variable.
- The variation in the unemployment rate (X_3) has the most important role in explaining the high level of the Shadow Economy. In terms of its quantitative influence on the variance in size of the shadow economy, its contribution is almost six times more important than the tax burden.
- The relationship between underground economy and growth rate of GDP (Y_1) is positive.

The outcomes aggregated according to the three components for 2001, 2002 and 2003, are shown in Table 6.

¹¹ 2001 is chosen as the "benchmark year" because better information is available than for later years, mainly in terms of Labour Standard Measures Survey (LSMS) and official statistics.

Table 6: NOE as percentage of Official GDP

Components of NOE	2001	2002	2003
Illegal Activities	7.27%	5.58%	4.36%
Shadow Economy	34.24%	35.06%	33.15%
Statistics Reasons	16.23%	15.28%	15.09%
TOTAL NOE	57.74%	55.92%	52.60%

The aggregates by sectors for BiH, FBiH, and RS & DB, expressed in terms of official BiH GDP, are presented below.

Table 7: Structure of NOE as percentage of official GDP in Bosnia and Herzegovina

Sectors/ NACE Groups <i>Bosnia and Herzegovina</i>	Type of non-exhaustiveness adjustment							Total NOE
	T1	T2	T3	T4	T5	T6	T7	% of GDP
1	2	3	4	5	6	7	8	9
<i>Non-financial corporations</i>	5.6%			12.2%	2.2%		0.9%	20.8%
<i>Financial corporations</i>	0.3%			0.7%	0.1%		0.1%	1.3%
<i>General Government</i>							6.3%	6.3%
<i>Non-Profit Institutions Servicing Households (NPISH)</i>								0.0%
<i>Households</i>						29.4%		29.4%
A Agriculture, hunting and forestry	1.1%			2.2%	0.5%	3.3%		7.0%
B Fishing	0.0%			0.0%	0.0%	0.0%		0.0%
C Mining	0.0%			0.1%	0.0%	0.3%		0.4%
D Manufacturing industry	1.0%			1.1%	0.5%	1.7%		4.2%
E Electricity, gas and water supply	0.6%			0.7%	0.0%	0.0%		1.3%
F Construction	0.4%			0.9%	0.2%	6.0%		7.5%
G Trade; repair of motor vehicles, motor cycles, personal and household goods	1.0%			3.0%	0.4%	0.8%		5.2%
H Catering trade	0.2%			0.5%	0.1%	1.3%		2.1%
I Transport, storage and communication	0.9%			2.9%	0.1%	0.6%		4.8%
J Financial intermediation	0.3%			0.7%	0.1%	0.4%	0.1%	1.7%
K Real estate, renting, business services	0.2%			0.4%	0.1%	11.7%		12.4%
L Public administration, defence, compulsory soc.sec.							3.7%	3.7%
M Education						0.6%	0.8%	1.4%
N Health and social welfare						0.6%	1.8%	2.4%
O Other social and personal services	0.2%			0.4%	0.1%	2.1%	0.9%	3.6%
Total	5.9%	0.0%	0.0%	12.7%	2.3%	29.4%	7.3%	57.7%

4.1 Other Classifications of NOE: Shadow Economy by Sector and by Entity

By reading table 8, it is possible to point out the sectors where the unrecorded value added is greatest. For instance, it might be interesting for policymakers, to know that (1) Fishing, (2) Construction, (3) Agriculture, (4) Personal Services and (5) Catering Trade, are the sectors where more than 50% of their value added (VA) is unregistered.

Table 8: Structure of informal VA as percentage of formal VA produced by the same sector in BiH

Gross Value Added by Activities (Sectors)	Shadow Economy for Activities	% of Total Shadow Economy
Bosnia and Herzegovina	<i>informal V.A.I/ official V.A.I</i>	<i>informal V.A.I/ tot. Informal V.A.I</i>
A Agriculture, hunting and forestry	56.38%	17.48%
B Fishing	120.67%	0.06%
C Mining	20.33%	1.18%
D Manufacturing industry	31.16%	9.32%
E Electricity, gas and water supply	10.55%	1.93%
F Construction	162.19%	20.69%
G Trade; repair of motor vehicles, motor cycles, personal and household goods	44.55%	12.36%
H Catering trade	99.90%	5.65%
I Transport, storage and communication	42.72%	11.28%
J Financial intermediation	39.08%	3.59%
K Real estate, renting, business services	38.76%	2.16%
L Public administration, defence, compulsory soc.sec.	-	-
M Education	13.38%	1.88%
N Health and social welfare	13.48%	1.72%
O Other social and personal services	139.15%	7.39%
Total by activities	41.71%	100.00%

In terms of the geographic distribution of the unrecorded production between the entities, the NOE in FBiH equals KM 3,871,400,000 and its structure as a ratio of official BiH GDP is shown in table 9.

Table 9: Structure of NOE in the Federation of BiH as a ratio of BiH official GDP

Sectors/ NACE Groups	Type of non-exhaustiveness adjustment							Total NOE
	T1	T2	T3	T4	T5	T6	T7	% of GDP
<i>Federation of Bosnia and Herzegovina</i>	1	2	3	4	5	6	7	8
Non-financial corporations	3.7%			8.1%	1.5%		0.6%	13.9%
Financial corporations	0.2%			0.5%	0.1%		0.1%	0.9%
General Government							4.4%	4.4%
Non-Profit Institutions Servicing Households (NPISH)								0.0%
Households						17.7%		17.7%
A Agriculture, hunting and forestry	0.5%			1.1%	0.2%	1.0%		2.8%
B Fishing	0.0%			0.0%	0.0%	0.0%		0.0%
C Mining	0.0%			0.1%	0.0%	0.2%		0.3%
D Manufacturing industry	0.8%			0.9%	0.4%	1.2%		3.3%
E Electricity, gas and water supply	0.4%			0.5%	0.0%	0.0%		0.9%
F Construction	0.3%			0.6%	0.1%	3.6%		4.5%
G Trade; repair of motor vehicles, motor cycles, personal and household goods	0.7%			2.1%	0.3%	0.5%		3.6%
H Catering trade	0.1%			0.3%	0.1%	0.8%		1.3%
I Transport, storage and communication	0.6%			2.1%	0.3%	0.5%		3.5%
J Financial intermediation	0.2%			0.5%	0.1%	0.4%	0.1%	1.3%
K Real estate, renting, business services	0.1%			0.3%	0.1%	7.7%		8.2%
L Public administration, defence, compulsory soc.sec.							2.5%	2.5%
M Education						0.4%	0.6%	1.0%
N Health and social welfare						0.4%	1.2%	1.6%
O Other social and personal services	0.1%			0.3%	0.1%	1.1%	0.6%	2.2%
Total	4.0%	0.0%	0.0%	8.6%	1.6%	17.7%	5.1%	36.9%

In the Republic of Srpska and District of Brčko, the NOE equals KM 2,179,000,000 and could be described as follows:

Table 10: Structure of NOE in the RS and DB as ratio of BiH official GDP

Sectors/ NACE Groups <i>Republic Srpska and District of Brčko</i>	Type of non-exhaustiveness adjustment							Total NOE
	T1	T2	T3	T4	T5	T6	T7	% of GDP
1	2	3	4	5	6	7	8	9
<i>Non-financial corporations</i>	1.8%			4.1%	0.0%		0.2%	6.9%
<i>Financial corporations</i>	0.1%			0.2%	0.0%		0.0%	0.3%
<i>General Government</i>							1.9%	1.9%
<i>Non-Profit Institutions Servicing Households (NPISH)</i>								0.0%
<i>Households</i>						11.7%		11.7%
A Agriculture, hunting and forestry	0.6%			1.2%	0.3%	2.3%		4.3%
B Fishing	0.0%			0.0%	0.0%	0.0%		0.0%
C Mining	0.0%			0.0%	0.0%	0.1%		0.1%
D Manufacturing industry	0.2%			0.2%	0.1%	0.4%		0.9%
E Electricity, gas and water supply	0.2%			0.2%	0.0%	0.0%		0.4%
F Construction	0.2%			0.4%	0.1%	2.4%		3.0%
G Trade; repair of motor vehicles, motor cycles, personal and household goods	0.3%			0.9%	0.1%	0.3%		1.6%
H Catering trade	0.1%			0.2%	0.0%	0.5%		0.9%
I Transport, storage and communication	0.3%			0.8%	0.1%	0.1%		1.3%
J Financial intermediation	0.1%			0.2%	0.0%	0.0%	0.0%	0.4%
K Real estate, renting, business services	0.0%			0.1%	0.0%	4.0%		4.2%
L Public administration, defence, compulsory soc.sec.							1.2%	1.2%
M Education						0.2%	0.2%	0.4%
N Health and social welfare						0.2%	0.5%	0.8%
O Other social and personal services	0.0%			0.1%	0.0%	1.0%	0.2%	1.4%
Total	1.9%	0.0%	0.0%	4.3%	0.8%	11.7%	2.2%	20.8%

5. Recommendations

The Shadow Economy is of great importance to Government and International Organizations because it has relevant repercussions on many aspects of the economic and social life of a country, both positive and negative. On the one hand:

1. The Shadow Economy is one of the causes behind an inefficient functioning of the goods and labor markets. It creates a distortion in competition within countries.
2. It harms workers because they are deprived of their rights and guarantees.
3. The decision by entrepreneurs to work outside of the fiscal regulatory framework produces a vicious circle, as their exit from the formal economy reduces State revenues and consequently decreases public expenditures (e.g. on infrastructure, education, research, etc.). Moreover, an increase in the tax burden increases their incentive to remain in the Shadow Economy.
4. Hidden activities favor corruption and links between criminal and illegal activities.
5. It hampers policy making as it calls into question the reliability of the national account aggregates.
6. The Shadow Economy increases the lack of trust in the Institutions and feeds resentment among citizens.

On the other hand:

7. It creates an extra value added that can be spent in the official economy.
8. Typically, people with low personal income are involved in informal production activities. Therefore, underground production modifies (improves) the distribution of income in society.
9. For countries with a high unemployment rate, the Informal sector represents a type of social buffer.

In light of these considerations, it is evident that the Shadow Economy has not only negative effects on the economic system, but also generates positive externalities. For this reason, the first objective of the policymakers should be to adopt economic policies that drive shadow activities into the formal economy rather than simply try to combat them. To achieve this objective, the knowledge of the size, distribution by sector, dynamics and the main causes of the Shadow Economy are necessary conditions to adopt a coherent plan of economic policies. Historically, the reduction of the size of the Shadow Economy follows the development of the economic system. As several studies confirm (e.g. Dr. Schneider's research) as per capita GDP and the degree of economic liberalization increase, informal activities tend to decrease.

5.1 Expected Effects of Select Economic Policies on the Shadow Economy

In this section, some economic policies directed at reducing the level of the Shadow Economy are evaluated on the basis of the MIMIC outcomes.

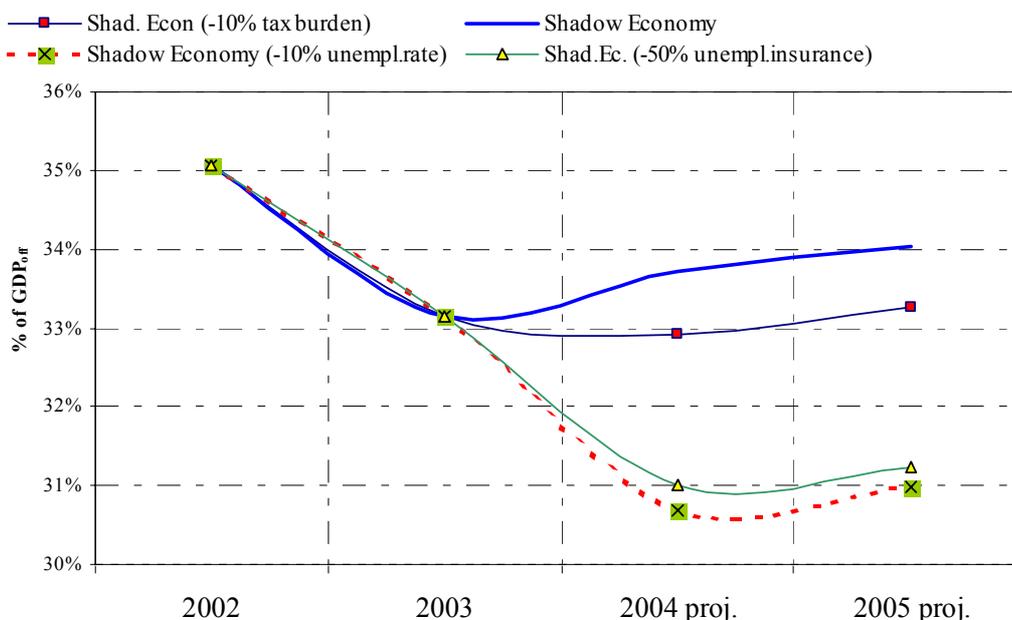
The projections are calculated according to equation 2, where the estimated structural coefficients ($\hat{\gamma}_{q1}$ shown in table 4) are multiplied by the modified (reduced) observed data X_q .

The authors have considered three possible policy measures, hypothetically taken in 2003, and have evaluated their effects in 2004 and 2005.

1. The impact of a ten percent decrease in tax burden on the size of the Shadow Economy is evaluated. In this case, the NOE would be reduced by (only) 0.8%.
2. If the State is able to decrease the unemployment rate by ten percent¹², the hidden economy would be reduced by 3.1%.
3. The third economic policy projection consists of a 50% reduction in unemployment insurance system participation; this measure reduces the NOE by 2.8%¹³.

Unfortunately, our analysis was not able to evaluate the effect of an increase in tax enforcement (of its perceptions by taxpayers). This factor is usually the main reason why informal operators remain in the non-observed economy.

Figure 3: Analysis of Economic Policies on the Shadow Economy



¹² By reducing the unemployment rate by 30%, the Shadow Economy decreases by 9.2%.

¹³ By decreasing the number of beneficiaries of the unemployment insurance system by 30%, the NOE decreases by 1.7%.

In commenting on the previous projections, it is clear that combating the Shadow Economy is not an easy task. Wider economic reforms and a long-term perspective are both needed. This process should include social and institutional transformation in order to move from a “*bad equilibrium*” (with high NOE and high unemployment) towards a better economic situation.

To combat effectively the Shadow Economy and avoid losing its contribution to Bosnian wealth creation, two kinds of actions would be useful.

In order to provide disincentives to informal operators:

1. Support the introduction of VAT (it is planned to come into force in 2006) without several exemptions or many differentiated tax rates. This value-added taxation system should be combined with a wider fiscal simplification. The Value Added Taxation should be effective in reducing the Shadow Economy because it produces conflicts of interest to under-declare sales or/and over-declare costs of semi-manufactured products and intermediate services and it further becomes more complicated for registered and unregistered firms to engage in business relationships.
2. Increase the efficiency of tax inspections and reduce the “perception” of impunity for crimes related to tax evasion that seems common in BiH¹⁴. These two aims are achieved in several ways: (1) intensify number of inspections and increase the amount of fines; (2) improve the criteria for selecting units for inspection (by sector, sales, etc); (3) oblige local tax offices to publish each year their results in terms of tax evasion discovered in the area of their competence.
3. Do not subordinate free access to health services to unemployment. (It might be more appropriate to consider a mix of more variables for eligibility and admission to the system, such as age, number of family components, a lower bound of personal income, etc.).

To provide incentives for entry into the legal market:

4. Reduce bureaucracy and the tax burden for small enterprises and the self-employed. The informal sector constitutes the most important part of the Shadow Economy, so providing an alternative tax system will encourage these subjects to become formal.
5. Introduce state aid for new investments (encourage investment with a softer tax rate) and provide loan guarantee schemes to improve access to credit for sectors with high presence of Shadow Economy.

¹⁴ Authors gathered that taxpayers in BiH perceive that there is a low level of tax enforcement. This feeling can be attributed to the lack of Rule of Law, corruption, low number of tax evasion detections and the application of adequate penalties, lack of political interest for reforms, etc.

6. Reform the labor market in order to introduce collective apprenticeship agreements in some specific sectors that allow, for a limited number of years and for some special categories of people (e.g. youth, women, unemployed, etc.) an employer to pay lower than minimum wage and lower social security contributions.
7. Improve the reliability and frequency of updating of the business register as it could be a very useful tool for tax authorities and statistical offices. This could be possible with low registration costs and the extension of useful services to registered units.
8. Encourage a stronger policy to fight corruption in the public services. This could be achieved by increasing the transparency of administrative measures. These kinds of actions have multiple effects as they reduce illegal activity, increase tax morality and social stigma, and improve the attitude of citizens toward the State.

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Appendix One
Structure of NOE and Unrecorded VA by Entities

Federation of Bosnia and Herzegovina

Table 11: Structure of NOE in the FBiH as ratio of FBiH official GDP.

Sectors/ NACE Groups	Type of non-exhaustiveness adjustment							Total NOE
	T1	T2	T3	T4	T5	T6	T7	% of FBiH GDP
<i>Federation of Bosnia and Herzegovina</i>	2	3	4	5	6	7	8	9
<i>Non-financial corporations</i>	5,4%			11,7%	2,1%		0,9%	20,1%
<i>Financial corporations</i>	0,3%			0,7%	0,1%		0,2%	1,3%
<i>General Government</i>							6,3%	6,3%
<i>NPISH</i>								0,0%
<i>Households</i>						25,5%		25,5%
A Agriculture, hunting and forestry	0,7%			1,5%	0,3%	1,4%		4,0%
B Fishing	0,0%			0,0%	0,0%	0,0%		0,0%
C Mining	0,0%			0,1%	0,0%	0,3%		0,4%
D Manufacturing industry	1,2%			1,2%	0,5%	1,8%		4,7%
E Electricity, gas and water supply	0,6%			0,6%	0,0%	0,0%		1,3%
F Construction	0,4%			0,8%	0,2%	5,2%		6,5%
G Trade; repair of motor vehicles, motor cycles, personal and household goods	1,0%			3,1%	0,4%	0,7%		5,2%
H Catering trade	0,2%			0,4%	0,1%	1,2%		1,8%
I Transport, storage and communication	0,9%			3,0%	0,4%	0,7%		5,0%
J Financial intermediation	0,3%			0,7%	0,1%	0,6%	0,2%	1,9%
K Real estate, renting, business services	0,2%			0,5%	0,1%	11,1%		11,8%
L Public administration, defence, compulsory soc.sec.							3,6%	3,6%
M Education						0,6%	0,9%	1,5%
N Health and social welfare						0,5%	1,8%	2,3%
O Other social and personal services	0,2%			0,4%	0,1%	1,6%	0,9%	3,2%
Total	5,7%	0,0%	0,0%	12,4%	2,3%	25,5%	7,4%	53,2%

Table 12: Structure of informal VA as percentage of formal VA produced by the same sector in FBiH

Gross Value Added by Activities (Sectors)	Shadow Economy by Activities	% of total Shadow Economy
<i>Federation of Bosnia and Herzegovina</i>	<i>informal V.A.i/ official V.A.i</i>	<i>informal V.A.i/ Tot. Informal V.A.</i>
A Agriculture, hunting and forestry	45,47%	10,77%
B Fishing	142,84%	0,01%
C Mining	18,87%	1,30%
D Manufacturing industry	29,99%	11,67%
E Electricity, gas and water supply	10,55%	2,14%
F Construction	161,58%	20,30%
G Trade; repair of motor vehicles, motor cycles, personal and household goods	42,94%	13,85%
H Catering trade	99,70%	5,51%
I Transport, storage and communication	43,48%	13,40%
J Financial intermediation	42,33%	4,59%
K Real estate, renting, business services	37,34%	2,64%
L Public administration, defence, compulsory soc.sec.	-	-
M Education	11,77%	2,02%
N Health and social welfare	11,75%	1,78%
O Other social and personal services	106,33%	6,87%
Total by activities	37,16%	100,00%

Republika Srpska and District of Brcko

Table 13: Structure of NOE in the RS & DB as ratio of RS & BD official GDP

Sectors/ NACE Groups	Type of non-exhaustiveness adjustment							Total NOE
	T1	T2	T3	T4	T5	T6	T7	% of RS&DB GDP
<i>Republic Srpska and District of Brcko</i>	2	3	4	5	6	7	8	9
<i>Non-financial corporations</i>	6,0%			13,3%	2,4%		0,8%	22,5%
<i>Financial corporations</i>	0,3%			0,6%	0,1%		0,1%	1,1%
<i>General Government</i>							6,2%	6,2%
<i>NPISH</i>								0,0%
<i>Households</i>						38,2%		38,2%
A Agriculture, hunting and forestry	1,8%			3,9%	0,8%	7,5%		14,0%
B Fishing	0,0%			0,0%	0,0%	0,0%		0,1%
C Mining	0,0%			0,1%	0,0%	0,3%		0,4%
D Manufacturing industry	0,7%			0,7%	0,3%	1,4%		3,1%
E Electricity, gas and water supply	0,6%			0,7%	0,0%	0,0%		1,3%
F Construction	0,6%			1,2%	0,3%	7,8%		9,8%
G Trade; repair of motor vehicles, motor cycles, personal and household goods	0,9%			2,8%	0,4%	1,1%		5,2%
H Catering trade	0,3%			0,7%	0,1%	1,8%		2,8%
I Transport, storage and communication	0,8%			2,6%	0,4%	0,4%		4,2%
J Financial intermediation	0,3%			0,6%	0,1%	0,1%	0,1%	1,2%
K Real estate, renting, business services	0,1%			0,3%	0,1%	13,2%		13,7%
L Public administration, defence, compulsory soc.sec.							3,9%	3,9%
M Education						0,7%	0,5%	1,2%
N Health and social welfare						0,7%	1,8%	2,5%
O Other social and personal services	0,2%			0,3%	0,1%	3,2%	0,8%	4,5%
Total	6,3%	0,0%	0,0%	13,9%	2,5%	38,2%	7,1%	68,0%

Table 14: Structure of informal VA as percentage of formal VA produced by the same sector in RS & DB

Gross Value Added by Activities (Sectors)	Shadow Economy for Activities	% of Total Shadow Economy
<i>Republic Srpska and District of Brcko</i>	<i>informal V.A.i/ official V.A.i</i>	<i>informal V.A.i/ Tot. informal V.A.</i>
A Agriculture, hunting and forestry	66,02%	28,17%
B Fishing	117,81%	0,12%
C Mining	24,27%	0,99%
D Manufacturing industry	35,81%	5,57%
E Electricity, gas and water supply	10,55%	1,59%
F Construction	163,11%	21,32%
G Trade; repair of motor vehicles, motor cycles, personal and household goods	48,56%	10,00%
H Catering trade	100,20%	5,87%
I Transport, storage and communication	40,79%	7,91%
J Financial intermediation	30,53%	2,00%
K Real estate, renting, business services	43,78%	1,39%
L Public administration, defence, compulsory soc.sec.	-	-
M Education	18,19%	1,67%
N Health and social welfare	18,17%	1,63%
O Other social and personal services	235,99%	8,23%
Total by Activities/Sectors	51,83%	100,00%

Appendix Two

Review of Preliminary Estimate of NOE – “Unofficial Study of 2002”

It is difficult to evaluate NOE estimates, because full scope information for these types of estimates is never available. The exercise to estimate something that is intentionally concealed (the hidden or Shadow Economy components of NOE), is very complicated and time-consuming. In reviewing an unofficial study of Preliminary Estimates of the Nonobserved Economy of 2002, whose method was also applied to 2003 estimates by the CBBH, the following observations can be made:

1. In discussing the preliminary estimates of NOE, the main issue is not in the results but the methodology and assumptions applied.
2. Although the current method is simple (not totally systematic and comprehensive) it does not mean that the results gained are incorrect or biased. It is important to note that very often, more sophisticated methods produce the same result as less progressive techniques.
3. The most important share of non-observed economy should include market-producers such as non-financial corporations and households, because of underreporting of value-added, underground units and informal activities.
4. The study estimates these types of NOE through unrecorded imports, exports and assumptions of underreporting of sales and unregistered units.
5. It is, generally, a very difficult exercise to estimate value-added by analyzing unrecorded imports and exports. The weakest points of these estimates are the assumptions applied. It is assumed that because of unrecorded imports, the trade of goods produced in BiH is under recorded by the same proportion. At the same time, it is assumed that the trade margin and share of intermediate consumption in output of unrecorded imports is the same as that recorded in the estimates of trade activity in the national accounts. Authors of the report found that these assumptions are quite “soft” and might be incorrect.
6. Applying a slightly adjusted share of unrecorded imports to the total value-added of transportation and communication activity, as was described in the preliminary study of NOE, means that, due to the under recording of imports, the passenger transport and communication services are under recorded with the same share. It is difficult to understand how unrecorded imports can have an effect on the value added of the transportation of passengers and communication services.
7. In addition, the study does not describe why the share of transportation and communication services adjustments is decreased by 10% (30% in trade activity versus 20% in transportation activity).

8. The shares of trade and transportation activities in GDP for 2001 used in the unofficial study seems to be different from the shares that are available from official statistics at present. When the estimates are built up using this data, the use of incorrect information might lead to misleading results.
9. The hypothesis related to the understated value added and underground units is reached without relying on any identified research or analysis. It is recommended that estimation of the unrecorded value added should rely on special estimates or studies, where the share of under declaration of output or over declaration of intermediate consumption is at least indirectly surveyed.
10. The study does not clarify how the value added of underground units (10%) is estimated.
11. One of the significant items missing from GDP estimates are imputed rentals. By the aforementioned definition, imputed rentals should include estimates of housing services provided by owner-occupied dwellings without value on charges for utilities. Taken into consideration that more than 70% of total dwelling stock is owner-occupied, the estimation of 0.5% of GDP for imputed rentals is too low.
12. The estimates produced for rental services provided to the international community in BiH are to some extent acceptable. However, one should take into consideration that probably the other part of actual rentals (renting to local citizens) is underestimated in GDP calculations too.
13. The question whether the wages and salaries of employees of the international community should be included into GDP is not simple.
 - a. If the international community is considered to be a resident of BiH, then all value-added, not just the wages and salaries, should be included in the GDP estimates of BiH.
 - b. If the international community is considered as a non-resident unit, then the compensation of employees (wages, salaries and social contributions) is part of incomes from abroad and should be taken into account as part of gross national income (GNI).
14. It is difficult to understand why the “Formal activities not recorded in entity GDP” with its share of 1% is added to official GDP in the preliminary study of the NOE. Gross fixed capital formation is a part of the expenditure approach estimates and should be included in the production account through output of construction or manufacturing activities. Value-added of these activities should be adjusted using other methods.

Recommendations

There does not exist any common methodology for estimating the NOE. For this reason, the results of NOE estimates are always subjective and depend on the data, methods applied and

subjective decisions of estimators. NOE estimates are never very strong and absolute, and there is always space for questions and discussion.

1. In order to avoid confusion by end-users, when publishing the adjusted GDP the publisher should point out not only that this is an adjusted estimate of GDP, but also by whom the adjustments are estimated and which methodology is used;
2. To avoid double counting of some areas of GDP, it is recommended to have a better understanding of the current process of how official GDP is calculated;
3. For any type of GDP estimates, it is recommended to establish the estimation at a more detailed level. The detailed level estimates are usually more close to reality. When the production approach of GDP calculation is concerned, the possible activity levels are A17 or A60 (ESA 95, Annex IV, Classifications and accounts). Under the same reasons, the estimation of NOE should be performed for both entities separately, each for the Federation of BiH and for Republika Srpska & District Brčko;
4. Use more special studies and research for NOE estimates and provide special surveys, where the NOE part of GDP is investigated, such as described in the 6th and 7th chapter of the OECD handbook;
5. For the calculation of imputed rentals, it is recommended to use the stratification method or user-cost, as other methods are not acceptable by international standards. Unfortunately these methods are extremely demanding of detailed data and are quite technical;

Include the production and trade of drugs, smuggling of weapons and other types of illegal activities into GDP estimates.