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APLICATION OF GRAVITY MODEL FOR ANALYSIS OF BOSNIA AND HERZEGOVINA EXPORT

ПРИМЈЕНА ГРАВИТАЦИОНОГ МОДЕЛА У АНАЛИЗИ ИЗВОЗА БОСНЕ И ХЕРЦЕГОВИНЕ

Summary: *During the last two decades, the gravity model has become very popular in analysis of bilateral trade, regardless of the real limitations of econometrics methods in estimation of model parameters. In this research we analyzed Bosnia and Herzegovina export in period from 2002 to 2011, using gravity model of trade. Gravity model is constructed on the basis of experience from previous empirical and theoretical research, and on the basis of achieved exports results of Bosnia and Herzegovina. The resulting gravity model of exports is used as the basis for the analysis of potential export growth opportunities and identifying potential markets which are not fully utilized. At the same time we got information about the risk of a possible reduction of exports in some countries. Research results should be used as the basis for the adjustment measures of foreign trade policy of Bosnia and Herzegovina in order to use the potential export indicated by this analysis.*

Key words: *Gravity model of trade, export, foreign trade policy.*

JEL classification: *C33, F10, F14, F15.*

Резиме: *Током посљедње двије деценије, гравитациони модел је постао популаран у анализи билатералне трговине, без обзира на реална ограничења у економетријским методама оцјене параметара модела. У овом истраживања смо анализирали остварени извоз Босне и Херцеговине у периоду од 2002. до 2011. године употребом гравитационог модела трговине. Гравитациони модел је конструисан на бази искустава из досадашњих емпиријских и теоријских истраживања, као и на основу остварених извозних резултата Босне и Херцеговине. Тако добијени гравитациони модел извоза је кориштен као основа за анализу потенцијалних могућности раста извоза и идентификовања тржишта чији потенцијали нису у цјелости искориштени. Истовремено су добијене и информације о постојању ризика за смањење извоза у поједине земље. Резултати истраживања треба да послуже као основа за кориговање мјера спољнотрговинске политике Босне и Херцеговине у циљу кориштења извозних потенцијала на које указује ова анализа.*

Кључне ријечи: *Гравитациони модел трговине, извоз, спољнотрговинска политика*

ЈЕЛ класификација: *C33,F10,F14,F15*

1. INTRODUCTION

Fact is that Bosnia and Herzegovina (BH) takes a rather liberal foreign trade policy, and in particular on the use of non-tariff instruments. There is a serious lack of protection of domestic production as a result of regional trade integration and the lack of planned and coordinated activities of institutions at all levels. Due to the high level of liberalization of trade with countries of Central European Trade Agreement (CEFTA) and European Union (EU), it is necessary for BH to focus on pro trade policy, providing a stronger and more competent support for the export sector. When creating the appropriate measure of trade policy, which will favor the export of BH, it is necessary at beginning to identify what are the markets that offer the potential for export growth and make the quantification of space for growth. With the aim of identifying those markets, the paper used the gravity model of trade. The general gravity model of trade is tailored to the needs of the study, which was later explained in the text.

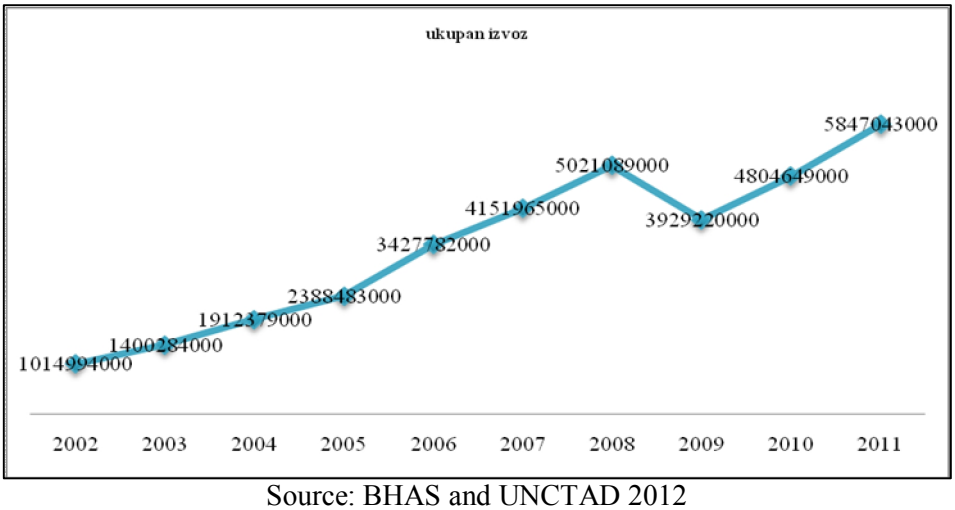
Gravity model of trade is classified as a new trade theory in the field that combines international trade and geography. This theory is based on economies of scale, and is a basis to consider taking the size of the market. Indicators of market size are: gross domestic product (GDP) and population of the country, a geographical element is the distance between markets. The logic of this theory is derived from Newton's law of gravitation, which states that the force that attracts two bodies depends on the masses of these bodies and their mutual distances. Similarly, the volume of trade between two countries depends on their economic weight (GDP) and their mutual distances. The first formalization of this model was made by Jan Tinbergen in 1962 and Pentti Poyhonen in 1963. Based on the baseline model, it was done for developing and adapting to the specific research. When constructing a model that was used in this study, we have had in mind econometric limitations in collecting, organizing and processing information, to get a more realistic estimation of model parameters, from which quality of a complete analysis depends. By comparing the real exports results and estimated exports using the gravity model, we have identified markets that ensure the growth of exports and markets in which there is a risk of decline in exports. Using two different models of gravity (the basic model and the model that takes into account the CEFTA, preferential trade with the EU, the existence of common borders) we can evaluate the effects of accession to the CEFTA agreement, that is, the effects of trade creation.

The paper is organized as follows: the first section provides the basic movement of BH exports, in the second section we discuss about some basic issues related to the gravity model, in the third part we design a model and make the organization of data, in the fourth part we make regression analysis using the cross section and panel data, in the fifth section we present the results of the analysis, and finally, we derived conclusions on the basis of the results.

2. EXPORT TRENDS OF BH

In this analysis we used the export results achieved in the period from 2002 to 2011, to cover period immediately before advent of the global crisis and crisis period. Figure 1 gives us an overview of developments in BH exports in dollars (USD) in the period from 2002 to 2011.

Figure 1: BH exports in period from 2002 to 2011 in USD



Source: BHAS and UNCTAD 2012

Based on the data from the Agency for Statistics of BH, the relative share of EU countries in BH exports rose from 54.25% in 2009, up to 57.28% in 2007. Therefore, the EU is the most important market for BH exporters. Participation of the countries that appeared from the disintegration of Yugoslavia was from 32.06% in 2011 to 35.74% in 2009. These two groups of countries (EU and the former Yugoslavia) account for about 90% of BH exports.

Table 1: The structure of BH exports from 2008 to 2011

	2008	2009	2010	2011
According to NACE Rev2.				
Manufacturing	90,66%	87,59%	89,11%	86,68%
Production of el. energy and water	5,44%	8,25%	6,84%	9,33%
By main industrial groupings, by intended use				
Intermediate products	40,62%	38,26%	41,69%	38,64%
Non-durable products	18,36%	21,21%	18,74%	19,03%
Energy	9,65%	13,62%	15,46%	14,26%
Capital products	21,80%	14,49%	11,86%	11,69%
By SITC sections				
Manufactured goods classified chiefly by material	31,32%	34,74%	25,67%	26,08%
Miscellaneous manufactured articles	20,31%	33,44%	21,30%	21,01%
Mineral fuels, lubricants and related materials	9,81%	19,24%	15,55%	14,33%
Crude materials, inedible, except fuels	12,94%	15,42%	12,77%	13,61%
Machinery and transport equipment	14,80%	19,08%	11,86%	12,07%

Source: Calculated on bases of data of the Agency for Statistics of BH 2012

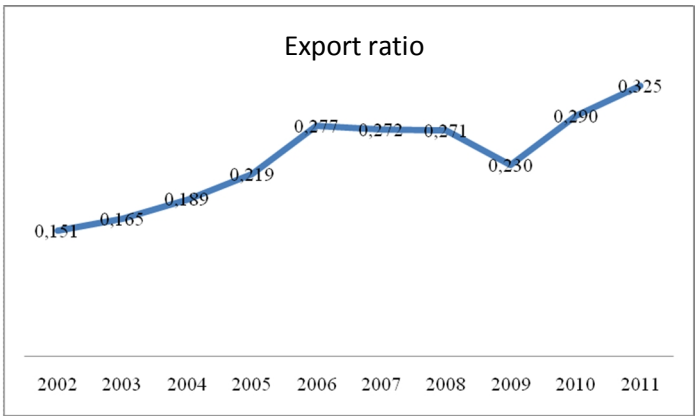
Based on the data in Table 1 we concluded that the BH export is dominated by manufacturing sector, which is mainly concentrated in the production of intermediate products. It is evident that a relatively small share of products was for final consumption. As an indicator of the orientation of BH to exports, we calculated export coefficients for all observed years according to the formula that we give below.

$$Ek = E / Y \quad (1)$$

Where is:

Ek-export ratio
E-total exports
Y-gross domestic product

Figure 2: Export coefficients for BH in the period from 2002 to 2011



Source: Calculated on the basis of data on total exports and total GDP taken from the database of the International Monetary Fund (IMF).

Obtained export coefficients indicate that the outbreak of the global economic crisis had a negative impact on the BH export and its role in creating of GDP. In the last two observed years, we can see an intensification of BH exports. It is indicative that in the period from 2006 to 2008 we have stagnation of importance of BH exports, despite the favorable environment on export markets.

3. GENERAL REMARKS ABOUT GRAVITY MODEL OF TRADE

Gravity model is based on the logic of Newton's law of gravity. The physical law of gravity says that the force with which two bodies act on each other is directly proportional to the masses of these bodies, and inversely proportional to the square of the distance between them. Mathematically formalized, the law of gravity has the following form:

$$F=g\, m_1\, m_2 / D^2 \qquad (2)$$

where is*:*

F – the force with which two bodies interact
g – constant (gravitational acceleration)
m_1,m_2 – mass of bodies 1 and 2
D – distance between the bodies.

Using this logic, we derived gravity model of trade, which says that the volume of trade between the two countries is directly proportional to their economic masses and inversely proportional to their distance (trade barriers), with existence of constants as in physical laws of gravity. GDP is taken as a measure of economic mass or GDP per capita as a measure of distance is usually taken for physical distance between the major trading centers or capitals. Volume of trade between countries depends on the conditions of supply of the exporting country (defined by the exporter GDP) and demand conditions in importer's country (determined by the importer GDP), which is in the context of trade theory. These would be preliminary assumptions of gravity model. Gravity model of trade has the following form:

$$T_{ij}=k\, Y_i^{\alpha}\, Y_j^{\beta} / D_{ij}^{\delta} \qquad (3)$$

Where is:

k – constant
Ti – volume of trade between countries i,j
Y_i – GDP country i
Y_j – GDP country j
D_{ij} – distance between countries i,j
α,β,δ – *parameters (estimated in the logarithmic form of the equation).*

Application of gravity model is not restricted only to the analysis of trade flows between countries. We have its application in: analysis of the effects of accession to the World Trade Organizations (WTO), analyses of the effects of accession to regional trade agreements, migration analysis, analysis of foreign direct investment trends, analysis of choice of supermarkets by consumers, and for the similar problems. In order to provide more accurate estimation of the gravity model parameters, the basic equation is extended by dummy variables, which should lead to more reliable estimate trade costs. With the distance, for estimation of costs of trade (trade barriers), variables are introduced such as: a common border, common language, common history, common currency, quality of infrastructure, economic integration and affiliation, etc. The extended gravity model has the following form:

$$T_{ijk}=k\, Y_{ik}^{\alpha}\, Y_{jk}^{\beta}\, D_{ij}^{\delta}\, A_{ijk}^{\gamma}\, u_{ij} \qquad (4)$$

Where is:

k – constant
T_{ijk} – trade between countries i,j in period k
Y_i – GDP country i in period k
Y_j – GDP country j in period k
D_{ij} – distance between countries i,j
A_{ijk} – dummy variable that reflects the existence of any barriers to trade between countries i and j, in period k
$\alpha,\beta,\delta,\gamma$ *– parameters*
u_{ij} – random error of model.

Of course, there is a possibility of further extension of the model depending on the subject of research. As stated in the introduction to this paper, the first formalization of the gravity model that was used for analysis of foreign trade was brought by the Dutch economist Tinbergen in 1962. The most comprehensive analysis of trade using the gravity model is made by Hans Linnemann in 1966. Walter Isard and Merton Peck (1954) demonstrated the negative impact of distance on trade, using the logic of the electric potential. Gravity model of Tinbergen has been improved in order to obtain reliable results of the analysis. Improvements of the model are going in two directions: toward expansion of model with additional variables, and the organization of data in empirical research. At the beginning of its application, gravity model did not have a strong theoretical foundation, so it is characterized as intuitive method, but in the later studies it was defined as relationship between the standard trade theory and gravity models in the works of James Anderson 1979, Jeffrey Bergstrand 1985 and 1989, Elhanan Helpman 1987, Alan Deardorff 1995 and Eric Van Wincoop 2003. The first study used a gravity model of trade and cross section data for one year which resulted in the problem of choosing a representative year, and problem of high level heteroscedasticity of random error of models. To eliminate these problems, estimations were calculated on basis of average of more years, and by means of the analysis based on the pooled cross sectional data. Maximum reliability of gravity model is achieved by using panel data, which was analyzed in the work of Radmila Dragutinović-Mitrovic 2005. The application of cross section data and pooled cross section data with averages calculated on the basis of longer time series can be found in work by Carl Hamilton and Alan Winters (1992), while Jan Fidrmuc and Jarko Fidrmuc 2003 used repeated regression analysis of cross sectional data. I-Hui Cheng and Howard Wall 2005 showed that ignoring unobserved heterogeneity leads to unrealistic estimates of bilateral trade.

There is a large number of works which have improved the gravity model by including new explanatory variables in the basic equation. Here we will mention only some of them. Laszlo Matayas 1998, Cheng and Wall 1999, Fritz Breuss and Peter Egger 1999, Egger 2000 contributed to improving the econometric specification of equation. On the other hand, Bergstrand 1985, Helpman 1987, Shang-Jin Wei 1996, Soloaga Isidro and Winters 1999, Spiros Boughes 1999, like many others, have contributed to the development of models through their refinement by introducing new explanatory variables.

4. CONSTRUCTION OF MODEL AND DATA USED IN ANALYSIS

BH exports were indirectly analyzed using a gravity model in several studies, which is the subject of observation in the CEFTA and SEE countries. Matthieu Bussiere, Jarko Fidrmuc and Bernd Schantz 2005 indicate that BH is untapped potential in trade, especially in the industrialized countries located in the greater distance from BH. Some potential exists in the trade with the EU, but it is significantly smaller. Edward Christie 2001 analyzed the potential trade of the Balkan countries using the gravity model based on pooled cross section data from 1996 to 1999. One of the conclusions of the study was that trade between Bosnia, Serbia (FRY) and Croatia, which significantly exceeds the estimation obtained based on the gravity model.

For this study, a gravity model is constructed on basis of the model of Helga Kristjansdottir 2005 and model by Dragutinovic-Mitrovic 2005. Kristjansdottir 2005 has applied the gravity model to analyze export of Iceland. The model was used in this paper has the following form:

$$X_{ijt}=e^{\beta 0}Y_{it}^{\beta 1}Y_{jt}^{\beta 2}N_{it}^{\beta 3}N_{jt}^{\beta 4}D_{ij}^{\beta 5}e^{uijt} \qquad (5)$$

where is:

X_{ijt} – exports from the country and in country j in time t
Y_t – exporting country's GDP in time t
Y_{jt} – j importing country's GDP in time t
N_{it} – population of the exporters in time t
N_{jt} – population of the importer j in time t
D_{ij} – distance between the capital cities of countries i and j
u_{ijt} – random error of model.

Since the observation concerned exports of one country, in that study it was Iceland, then equation is corrected to cover export only of a single country. Index i becomes irrelevant because we have no observation of exports of several countries. Now the above-mentioned equation has the following form:

$$X_{jt}=e^{\beta 0}Y_t^{\beta 1}Y_{jt}^{\beta 2}N_t^{\beta 3}N_{jt}^{\beta 4}D_j^{\beta 5}e^{ujt} \qquad (6)$$

This is equitation of the basic model. WE expand equation of basic models with dummy variable to indicate the following: membership of BH and partner country in CEFTA (Ic), membership of importing country in EU (Ie), the importing country with which BH has a preferential trade (Ip), and a dummy variable that indicates a common border of Bosnia and Herzegovina and the country (Ib). After making a logarithm operation and including the dummy variables equation has the following form:

$$\ln X_{jt}=\beta_0+\beta_1\ln Y_t+\beta_2\ln Y_{jt}+\beta_3\ln N_t+\beta_4\ln N_{jt}+\beta_5\ln D_j+\beta_6 Ic_{jt}+\beta_7 Ie_{jt}+\beta_8 Ip_{jt}+\beta_9 Ib_{jt}+u_{jt} \qquad (7)$$

Equations are transformed into linear form (linearity by parameters), in order to be proper for regression analysis. The basic equation in logarithmic form:

$$\ln X_{jt}=\beta_0+\beta_1\ln Y_t+\beta_2\ln Y_{jt}+\beta_3\ln N_t+\beta_4\ln N_{jt}+\beta_5\ln D_j+u_{jt} \qquad (8)$$

Basic (8) and extended (7) models were used in the analysis for the estimation of parameters based on the panel and cross section data. Expected signs of coefficients of explanatory variables in the model are: Y_t (+), Y_{jt} (+), N_t (+), N_{jt} (+), D_j (-), I_{cjt} (+/-), I_{ejt} (+/-), I_{pjt} (+/-), I_{bjt} (+/-). To estimate the parameters in equations we used next methods: OLS (Ordinary Least Squares) and WLS (Weighted Least Squares).

In this study we used data for export of BH in the period from 2002 to 2011, expressed in USD in current prices. These data include exports to 37 countries over 10 years, which means that the total number of data pairs is 370. Sample of 37 countries were surveyed, covering 92,69% of BH exports in 2007, 92,01% in 2008, 94,08% in 2009, 96,59% in 2010 and 96,06% in 2011. We chose two specific time periods before the outbreak of the global crisis (from 2002 to 2008) and the period (from 2009 to 2011) after the onset of the crisis. Source of data was Monthly statements of foreign trade of the BH Statistics Agency.

For GDP, we used data from the online IMF database (World Economic Outlook Database), expressed in current dollars. For certain countries, GDP estimations by the IMF were used for 2011, which are available in the same database. Data for BH GDP were taken from this database. Data on population were also taken from these databases. In Table 2 in appendix we give log value of exports by country, in Table 3 we give log of the GDP value of observed countries. Also, Table 4 in the appendix presents data on the log of population.

For distance between BH and other countries, we took the distance between Sarajevo and capitols. Data on air distance in kilometers are taken from the online database www.geobytes.com. Log of the distances are given in Table 5 in appendix.

For CEFTA membership, we assume that the initial year of implementation of agreements was 2008, although the agreement entered into force in November 2007. The reason for this is that countries that were surveyed before the entry into force of the CEFTA had entered into bilateral free trade agreements with BH. BH in the period granted unilateral trade preferences by the EU, and therefore in the model introduces the dummy variable indicating membership in the EU. Data about unilateral preferential from other countries that are included in the study were taken from the online WTO database. Russia had unilateral preferential for BH until 2010. It abolished preferential after entry into force of Agreement on customs union between Russia, Belarus and Kazakhstan. Data belonging to CEFTA, EU, unilateral trade, preferential and preferential trade are given in Table 6, Table 7 and Table 8 in the appendix. We have the value 1 when the country belongs to the CEFTA, EU, when unilateral preferences is granted and where we had preferential trade agreement with BH. In the absence of these variables it gets the value 0.

Based on the conclusions by Dragutinović-Mitrovic 2005, superiority analysis of panel data, the data collected in this study are organized as a panel data using the WLS method and the method of OLS for data organized as pooled cross section.

5. REGRESSION ANALYSIS OF EMPIRICAL DATA

Based on collected and systematized data, which are given in the tables from 5 to 7 in appendix, regression analysis was performed using the method of ordinary least squares OLS. Two models are used as follows: the basic model according to equation (8) and the extended model according to equation (7). Regression results of the basic model using OLS are presented in Table 8. Regression was performed based on 370 observations and based on equation (8). During the period of 10 years (from 2002 to 2011) the export was observed in 37 exporting countries, accounting for 92% to 96% of the total export of BH. And in all other models, regression was performed based on 370 observations. All calculations were performed using software Gretl 1.7.1.

Table 9: Results of regression of basic model using the OLS method

Variable	*Coefficient*	*Stand. error*	*t-statistics*	*p-value*	
Constant	-469,131	179,794	-2,6093	0,00945	***
Yjt	0,686338	0,085854	7,9942	<0,00001	***
Yt	0,241252	0,118113	2,0426	0,04182	**
Njt	0,316044	0,0947818	3,3344	0,00094	***
Nt	31,1134	11,9161	2,6110	0,00940	***
Dj	-2,18236	0,098955	-22,0541	<0,00001	***

Arithmetic mean of the dependent variable = 16,3351
Standard deviation of dependent variable = 2,46635
The sum of squared residuals = 808,935
Standard error of residuals = 1,49075
Unadjusted R^2 = 0,639606
Adjusted R^2 = 0,634656
F-statistics (5, 364) = 129,201 (p-value < 0,00001).

The results of the regression extended model using OLS method, according to equation (7), are given in Table 10. Regression is done on the basis of identical data.

Table 10: Results of the regression extended model using the OLS method

Variable	*Coefficient*	*Stand. error*	*t-statistic*	*p-value*	
Constant	-249,715	172,999	-1,4434	0,14977	
Yjt	0,823022	0,08533	9,6452	<0,00001	***
Yt	0,156849	0,110576	1,4185	0,15692	
Njt	0,177752	0,09409	1,8892	0,05967	*
Nt	16,5836	11,4515	1,4482	0,14844	
Dj	-2,04736	0,105191	-19,4632	<0,00001	***
Icjt	1,46197	0,489149	2,9888	0,00299	***
Iejt	0,524982	0,267134	1,9652	0,05016	*
Ipjt	1,27089	0,299315	4,2460	0,00003	***
Ibjt	1,45107	0,373713	3,8829	0,00012	***

Arithmetic mean of dependent variable = 16,3351
Standard deviation dependent variable = 2,46635
The sum of square residuals = 660,083
Standard error of residuals = 1,35409
Unadjusted R^2 = 0,705922
Adjusted R^2 = 0,69857
F-statistic (9, 360) = 96,0185 (p-value < 0,00001).

The extended model gives a better estimation of the parameters, since the value of adjusted R^2 for the extended model is bigger than for basic model. For basic model it is 63.47% of variance explained, and for the extended model it is 69.86%. Another method that was used is method of weighted least squares (WLS). In the following table we give the results of regression for basic model.

Table 11: Results of regression for basic model using WLS method

Variable	*Coefficient*	*Stand. error*	*t-statistic*	*p-value*	
Constant	-441,696	80,0042	-5,5209	<0,00001	***
Yjt	0,855972	0,0541872	15,7966	<0,00001	***
Yt	0,245026	0,0523201	4,6832	<0,00001	***
Njt	0,0853192	0,0664445	1,2841	0,19994	
Nt	29,3011	5,30029	5,5282	<0,00001	***
Dj	-2,29072	0,0623144	-36,7606	<0,00001	***

Statistics based on weighted data (weighted based on the error variance per unit):

The sum of squared residuals = 357,368
Standard error of residuals = 0,990848
Not adjusted R^2 = 0,870886
Adjusted R^2 = 0,869113
F-statistics (5, 364) = 491,045 (p-value <0,00001).

The results of the regression extended model using the WLS method are given in the following table:

Table 12: Results of the regression of extended model using the WLS method

Variable	*Coefficient*	*Stand. error*	*t-statistic*	*p-value*
Constant	-273,918	73,8166	-3,7108	0,00024
Yjt	0,979483	0,0550045	17,8073	<0,00001
Yt	0,109467	0,049673	2,2038	0,02817
Njt	-0,033642	0,0646495	-0,5204	0,60312
Nt	18,2511	4,8893	3,7329	0,00022
Dj	-2,12061	0,0598125	-35,4544	<0,00001
Icjt	1,14932	0,196859	5,8383	<0,00001
Iejt	0,48283	0,14031	3,4412	0,00065
Ipjt	0,922168	0,158232	5,8280	<0,00001
Ibjt	1,74778	0,142734	12,2450	<0,00001

Statistics based on weighted data (weighted based on the error variance per unit):

The sum of squared residuals = 340,176
Standard error of residuals = 0,972077
Not adjusted R^2 = 0,905466
Adjusted R^2 = 0,903103
F-statistic (9, 360) = 383,128 (p-value <0,00001).

Estimated exports in 2011 were calculated by using coefficients from Tables 11 and 12, and this assessment was compared with the level of exports in the same year by the surveyed countries. In Table 13 in the appendix, we gave an overview of the estimated export based on the regression results obtained using WLS in 2011 and real exports.

6. ANALYSIS OF RESULTS

In the previous section regression was performed and coefficients were obtained by appropriate regression models. All the obtained coefficients have the expected sign. With expanded WLS model, the coefficient of the population of the importing country is negative, which is explained by the increase in the market consumers directed to domestic products. The coefficients of the dummy variables are positive, which is to be expected. Accession to multilateral free trade agreements positively affect volume of exports, unilaterally granted trade preferences of EU, unilateral preferences granted from other countries and bilateral trade agreements, have a positive impact on BH export. Also, a common border has positive impact on export performance of BH. The coefficients give us the flexibility of BH exports in relation to the value of independent variables. The interpretation of the

obtained coefficients is not simple, since it is a form of regression equations of log-log. The coefficients of the dummy variables (CEFTA, EU, preferences, and common border) have a different interpretation than the coefficients for other independent variables. Thus, the coefficients of independent variables that are not dummies are interpreted as the elasticity of dependent variable in comparison to the independent variable, that is, 1% change of independent variables results in a corresponding percentage changes in the dependent variable, provided that all other variables remain unchanged. If we look at the regression coefficients obtained from Table 12, we have the following explanation, a 1% increase in variable Y_t (GDP growth of Bosnia and Herzegovina) will result in changes of BH export: $\square_2$=0,1095 we take from the table, then according to form $((1,01)^{\square 2}-1)*100$ we get the percentage change in exports. Finally, increase of 1% of BH GDP leads to increase in exports for 0,109%. In the same way we interpret the other coefficients. Increase of GDP of importing country by 1% leads to increase in BH exports by 0,979%, increase in the importing country's population by 1% leads to decreasing of BH exports by 0,033%, increasing the distance between BH and the partner country by 1% results to a decrease in exports by 2,132%. In dummy variable interpretation of coefficients it is different. If the country is a member of CEFTA, exports of that country increased by 215,60%, provided that other variables remain unchanged. The conversion coefficient has been done according to the form $(e^{\square\square}-1)*100$. Other coefficients with the dummy variable are interpreted in the same way. If the partner country is member of EU its exports increased by 62,07%, if a country grants unilateral preferential its exports increased by 151,47%, and if the country has common border with BH is exports increased by 474,18%.

Based on comparison of exports in 2011 and estimated exports with WLS method, for the same year, we derived some conclusions. Looking at the total exports in the observed countries, BH has exceeded the potential of the market by nearly USD 2 billion, which makes BH run the risk of a possible reduction in exports. The potential market for the EU exceeded by USD 1,935 billion, while the CEFTA market has untapped potential by USD 75 million, which is a slight amount. In general, BH has used the market potential of countries that make up over 90% of the BH export market. Individually, the greatest potential exists in the Serbian market (over USD 340 million), while the market potential in Germany largely exceeded (over USD 670 million). From results of regression analysis we can see that changes in export markets have positive or negative implications for BH exports, depending on the direction and intensity of these changes. The introduction of protectionist measures by the EU and CEFTA countries would have great negative implications for exports. Negative changes in GDP of partner countries, changes in population in BH and partner countries can expose BH export to decreasing. Trade policy of BH should help to find new markets with new potential for export, and change export structure.

7. CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

As we noted in the previous section, the results of estimation of exports suggest need to redefine the measure of trade policy of Bosnia and Herzegovina. BH has exceeded the potential of the EU market, but in the observed CEFTA countries there is scope for further increasing exports. The expected direct effect of Croatia accession to EU will be a decrease in exports due to the coefficient of the I_{ejt} smaller than the coefficient I_{cjt}. According to results extended by WLS we have 0,483 <1,149. It means that membership of trade in CEFTA has higher importance than membership of partners to EU. It is necessary for BH export sector to find new markets in order to provide export growth and growth of domestic manufacturing. According to results of analyses that the market potential of the region is in a large percentage used, it is necessary for export sector to find new markets, primarily in Europe, Mediterranean and North Africa, due to lower transportation costs. We have identified a relatively large impact of these costs, which approximated by distance between countries. Coefficient for distance obtained from the extended WLS model is -2,121, indicating a very high negative significance of the distance factor. In addition to new markets, it is necessary to create products that are more differentiated, products which contain higher levels of knowledge, in order to overcome the problem of transport costs and reduce their relative importance in the final price. Results of this paper are partially consistent with earlier papers, those discussed in the third part of this work. This study indirectly suggests need to focus BH exports on industrialized countries that are at greater distances. We found that potential Serbian market are not fully utilized, and Christie 2001 in their results indicates that trade between Bosnia, Serbia and Croatia significantly exceeds potential. We must bear

in mind that in the meantime there was a significant change in the political environment, so that the characteristics of trade between these three countries have significantly changed.

In future studies, it would be necessary to expand number of observed countries. The main problem in extending is availability of data for dummy variables and problem of zero exports. The problem of zero exports can be solved by using appropriate econometric methods, but the problem of unavailability of data is solvable harder. In addition, it would be desirable to do sectoral gravity model, in order to identify export sectors of manufacturing industry with potential for export growth. Due to the considerably high level of economic sovereignty realized in entities in BH, it would be expedient to construct a gravity model to analyze the total export of BH by the entity segments.

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APPENDIX

Table 2: Logarithm value of BH export in period 2002–2011

	ln export	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
1	Austria	19,9028	19,5796	19,2587	19,5541	19,3703	19,3190	18,6800	18,5077	18,3588	17,8806
2	Belgium	16,9787	17,4995	16,9932	17,2516	17,0786	16,5484	16,2105	16,1755	15,9573	15,4213
3	Bulgaria	16,3838	15,8392	15,6502	16,9569	17,3793	16,9662	15,5465	14,3458	13,8556	14,0104
4	Cyprus	14,7916	15,0310	13,2339	13,2231	13,3423	11,7629	11,6836	11,9897	13,4109	12,4630
5	Czech Republic	18,1128	17,7648	17,7799	17,8393	17,5504	17,2963	16,9756	15,8304	15,8467	15,2789
6	Denmark	15,2167	15,2137	15,5498	15,4167	15,5307	14,7575	14,2353	14,5449	14,1676	14,9211
7	Estonia	12,1063	8,0064	6,9078	11,8204	13,3342	10,8517	8,9213	9,9050	11,5008	11,4802
8	Finland	13,6423	12,5209	13,7851	14,0561	12,1808	13,4051	15,0190	12,6562	13,3356	12,0585
9	France	17,9860	17,8910	18,1691	18,1258	17,9772	18,3210	17,7697	17,7469	17,8850	17,0846
10	Greece	15,8632	15,7446	15,4082	15,6447	15,7924	16,1755	15,9434	15,8528	17,0703	17,0718
11	Ireland	13,7462	13,8205	13,7515	14,4844	14,2296	14,3882	13,1720	12,5140	12,7440	12,3576
12	Italy	20,3452	20,1849	20,0281	20,2623	20,1160	19,9734	19,7062	19,6613	19,6353	19,3530
13	Lithuania	16,0479	14,3325	16,6925	13,9903	14,7030	12,7563	14,5941	15,1641	11,9660	12,0636
14	Luxembourg	17,4490	17,0089	16,7566	16,8478	16,7169	14,7412	12,8906	14,1568	14,2548	14,6702
15	Hungary	18,5865	18,2633	17,9925	18,8429	18,8489	18,8713	18,5371	18,1419	16,9109	15,7779
16	Malta	14,1563	10,4913	11,9316	13,2691	6,9078	13,5568	9,0632	8,5943	12,0295	12,1724
17	Netherlands	18,4216	17,8186	17,6008	17,8549	17,4982	16,7437	16,9160	16,0844	16,3538	16,1313
18	Germany	20,5779	20,4158	20,1749	20,3426	20,0941	19,7803	19,4396	19,5972	19,1999	18,6161
19	Poland	18,0852	17,7808	17,3892	17,6102	17,6955	18,0897	17,4140	15,9160	15,3312	15,1971
20	Portugal	15,7732	14,7722	15,1389	15,5363	15,6971	15,3472	14,7888	14,8391	14,7587	12,2829
21	Romania	17,5987	17,7056	17,5122	18,0156	17,4881	18,1164	17,4876	16,6970	13,3859	13,0237
22	Slovakia	18,1760	17,2773	16,9471	17,1723	17,3731	16,0977	15,4153	15,6333	15,5504	14,4298
23	Slovenia	20,0354	19,8419	19,6117	19,9467	19,9277	19,9631	19,4604	18,7449	18,3489	18,0351
24	Spain	17,7647	17,3923	17,1295	17,1194	16,9873	16,9426	17,0514	17,1657	16,8417	14,9616
25	Sweden	17,4655	17,3605	16,9808	17,3640	17,0347	16,7526	17,0131	15,8259	15,6753	15,1182
26	United Kingdom	16,7638	16,9012	16,8440	17,6585	16,5434	16,4723	16,1702	15,7971	15,6756	15,3434
27	Norway	15,8992	15,5065	15,5148	16,0897	15,3507	15,5609	14,9100	14,8861	14,2621	13,3673
28	Switzerland	18,5122	18,5030	18,2048	18,7273	18,2009	16,6640	15,7825	16,4210	16,4616	17,2265
29	Australia	14,0003	13,8662	13,6808	13,8470	13,6967	14,4261	15,8547	13,4960	13,5529	12,9939
30	Canada	15,8013	15,0431	15,0295	15,4937	15,1565	15,1114	14,7922	14,9589	14,9369	14,1007
31	SAD	16,4293	16,3484	16,5477	18,5001	18,4764	17,3281	17,9842	16,3073	16,3503	16,3962
32	Turkey	18,4856	17,8282	17,4221	16,5469	16,6797	16,0484	16,4222	16,2571	15,9363	15,5192
33	Montenegro	19,1798	19,1628	18,9093	18,9697	18,5059	18,4023	17,9775	17,8831	17,2276	17,3016
34	Croatia	20,5684	20,4016	20,3240	20,5787	20,4519	20,2237	19,8109	19,6426	19,2740	18,8731
35	Macedonia	18,3338	17,6737	17,5934	17,7163	17,3434	17,1019	16,8474	16,5723	16,2869	16,2658
36	Serbia	20,3843	20,2222	20,0823	20,3733	20,0032	19,5685	19,2287	19,1343	18,4787	18,5528
37	Russia	17,4484	17,0606	16,7182	16,2313	15,4832	15,2784	14,7890	16,6302	14,5162	12,9863

Table 3: Logarithm value of GDP in period 2002–2011

	ln GDP	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
1	Austria	26,7617	26,6628	26,6707	26,7542	26,6517	26,5079	26,4453	26,3994	26,2623	26,0621
2	Belgium	26,9643	26,8765	26,8847	26,9565	26,8545	26,7152	26,6579	26,6154	26,4672	26,2594
3	Bulgaria	24,7032	24,5888	24,6063	24,6711	24,4637	24,2261	24,0869	23,9534	23,7519	23,4945
4	Cyprus	23,9401	23,8588	23,8792	23,9521	23,8038	23,6368	23,5518	23,4743	23,3017	23,0723
5	Czech Rep.	26,0951	26,0099	26,0022	26,1413	25,9189	25,7230	25,5913	25,4593	25,2802	25,0854
6	Denmark	26,5321	26,4662	26,4634	26,5636	26,4644	26,3378	26,2750	26,2234	26,0828	25,8816
7	Estonia	23,8245	23,6649	23,6795	23,8964	23,8140	23,5445	23,3556	23,2103	23,0097	22,7137
8	Finland	26,3092	26,1975	26,2051	26,3336	26,2306	26,0628	26,0020	25,9667	25,8266	25,6334
9	France	28,6521	28,5721	28,5987	28,6757	28,5814	28,4462	28,3909	28,3515	28,2170	28,0082
10	Greece	26,4372	26,4449	26,5143	26,5774	26,4638	26,3042	26,2151	26,1628	25,9962	25,7199
11	Ireland	26,1062	26,0559	26,1335	26,3026	26,2852	26,1344	26,0396	25,9554	25,7948	25,5438
12	Italy	28,4189	28,3542	28,3808	28,4718	28,3873	28,2595	28,2129	28,1836	28,0480	27,8376
13	Lithuania	24,4779	24,3216	24,3362	24,5851	24,3950	24,1324	23,9852	23,8437	23,6517	23,3792
14	Luxembourg	24,7908	24,7016	24,6760	24,7844	24,6626	24,4749	24,3536	24,2536	24,0979	23,8438
15	Hungary	25,6671	25,5802	25,5645	25,7617	25,6367	25,4465	25,4267	25,3475	25,1486	24,9188
16	Malta	22,9089	22,8182	22,8143	22,8725	22,7384	22,5755	22,5132	22,4546	22,3576	22,1826
17	Netherlands	27,4572	27,3835	27,4028	27,4974	27,3873	27,2429	27,1841	27,1379	27,0136	26,8086
18	Germany	28,9056	28,8208	28,8271	28,9232	28,8336	28,6976	28,6502	28,6353	28,5183	28,3310
19	Poland	26,9651	26,8747	26,7883	26,9950	26,7761	26,5571	26,4402	26,2567	26,1023	26,0126
20	Portugal	26,1992	26,1569	26,1815	26,2571	26,1703	26,0314	25,9817	25,9471	25,8124	25,6118
21	Romania	25,9691	25,8258	25,8252	26,0431	25,8627	25,5330	25,3201	25,0513	24,8087	24,5516
22	Slovakia	25,2885	25,1919	25,1945	25,2741	25,0427	24,7471	24,5940	24,4667	24,2301	23,9235
23	Slovenia	24,6270	24,5733	24,6188	24,7281	24,5813	24,3864	24,3005	24,2458	24,0971	23,8668
24	Spain	28,0322	27,9639	28,0091	28,1016	27,9981	27,8441	27,7557	27,6760	27,5095	27,2581
25	Sweden	27,0116	26,8590	26,7291	26,9098	26,8599	26,7124	26,6383	26,6152	26,4749	26,2486
26	U. Kingdom	28,5138	28,4478	28,4106	28,6083	28,6656	28,5263	28,4566	28,4206	28,2528	28,1100
27	Norway	26,9046	26,7575	26,6495	26,8413	26,6984	26,5523	26,4405	26,2840	26,1389	25,9804
28	Switzerland	27,1786	26,9922	26,9223	26,9443	26,7966	26,6926	26,6434	26,6176	26,5073	26,3531
29	Australia	28,0286	27,8504	27,6228	27,6842	27,5751	27,3800	27,3192	27,2079	27,0132	26,7720
30	Canada	28,1831	28,0866	27,9219	28,0383	27,9845	27,8768	27,7566	27,6232	27,4870	27,3227
31	SAD	30,3453	30,3070	30,2657	30,2907	30,2721	30,2246	30,1665	30,1036	30,0418	29,9959
32	Turkey	27,3801	27,3226	27,1439	27,3167	27,1989	26,9946	26,9026	26,6951	26,4379	26,1712
33	Montenegro	22,2353	22,1386	22,1469	22,2364	22,0245	21,7158	21,5391	21,4537	21,2586	20,9740
34	Croatia	24,8797	24,8314	24,8734	24,9701	24,8070	24,6329	24,5255	24,4373	24,2544	24,0021
35	Macedonia	23,0580	22,9383	22,9571	23,0148	22,8245	22,6055	22,5144	22,4322	22,2854	22,0485
36	Serbia	24,5313	24,3616	24,4157	24,5875	24,3857	24,1019	23,9515	23,8867	23,6960	23,4376
37	Russia	28,2464	28,0280	27,8321	28,1383	27,8932	27,6209	27,3614	27,1054	26,7877	26,5672
38	BiH	23,6117	23,5315	23,5594	23,6417	23,4472	23,2378	23,1129	23,0381	22,8606	22,6270

Table 4: Logarithm value of population in period 2007–2011

	ln population	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
1	Austria	15,9458	15,9423	15,9393	15,9362	15,9319	15,9279	15,9227	15,9159	15,9096	15,9051
2	Belgium	16,2090	16,1988	16,1907	16,1827	16,1749	16,1679	16,1617	16,1569	16,1531	16,1486
3	Bulgaria	15,8212	15,8311	15,8389	15,8446	15,8489	15,8540	15,8592	15,8646	15,8698	15,8755
4	Cyprus	13,6122	13,5961	13,5886	13,5785	13,5658	13,5489	13,5265	13,5008	13,4800	13,4674
5	Czech Republic	16,1697	16,1676	16,1638	16,1555	16,1464	16,1429	16,1400	16,1390	16,1382	16,1385
6	Denmark	15,5313	15,5266	15,5223	15,5159	15,5106	15,5069	15,5039	15,5015	15,4989	15,4960
7	Estonia	14,1082	14,1082	14,1082	14,1089	14,1097	14,1119	14,1141	14,1164	14,1200	14,1237
8	Finland	15,5021	15,4973	15,4928	15,4881	15,4832	15,4789	15,4749	15,4713	15,4680	15,4653
9	France	17,9600	17,9554	17,9529	17,9475	17,9421	17,9361	17,9293	17,9220	17,9149	17,9081
10	Greece	16,2932	16,2299	16,2279	16,2258	16,2235	16,2213	16,2192	16,2172	16,2153	16,2134
11	Ireland	15,3374	15,3131	15,3104	15,3021	15,2832	15,2601	15,2348	15,2130	15,1968	15,1808
12	Italy	17,9202	17,9155	17,9106	17,9035	17,8953	17,8888	17,8839	17,8740	17,8642	17,8585
13	Lithuania	14,9994	15,0055	15,0212	15,0269	15,0322	15,0375	15,0434	15,0498	15,0550	15,0594
14	Luxembourg	13,1500	13,1343	13,1163	13,0981	13,0815	13,0647	13,0498	13,0346	13,0214	13,0081
15	Hungary	16,1167	16,1195	16,1212	16,1226	16,1247	16,1258	16,1278	16,1297	16,1322	16,1354
16	Malta	12,9551	12,9480	12,9384	12,9312	12,9215	12,9141	12,9092	12,9017	12,8967	12,8892
17	Netherlands	16,6303	16,6258	16,6207	16,6156	16,6117	16,6095	16,6079	16,6056	16,6021	16,5974
18	Germany	18,2195	18,2193	18,2207	18,2237	18,2254	18,2267	18,2279	18,2283	18,2286	18,2281
19	Poland	17,4518	17,4585	17,4579	17,4571	17,4564	17,4563	17,4568	17,4575	17,4579	17,4585
20	Portugal	16,1818	16,1799	16,1789	16,1781	16,1763	16,1735	16,1696	16,1645	16,1580	16,1505
21	Romania	16,8795	16,8811	16,8828	16,8844	16,8859	16,8870	16,8886	16,8900	16,8922	16,9205
22	Slovakia	15,5104	15,5084	15,5065	15,5041	15,5021	15,5008	15,4999	15,4991	15,4982	15,4980
23	Slovenia	14,5191	14,5176	14,5166	14,5151	14,5136	14,5136	14,5102	14,5077	14,5067	14,5062
24	Spain	17,6475	17,6439	17,6404	17,6284	17,6104	17,5942	17,5776	17,5614	17,5451	17,5282
25	Sweden	16,0615	16,0579	16,0499	16,0329	16,0408	16,0252	16,0171	16,0131	16,0091	16,0054
26	U. Kingdom	17,9530	17,9462	17,9394	17,9325	17,9260	17,9196	17,9138	17,9073	17,9024	17,8985
27	Norway	15,4195	15,4064	15,3930	15,3814	15,3677	15,3571	15,3485	15,3413	15,3357	15,3300
28	Switzerland	15,8744	15,8684	15,8624	15,8500	15,8372	15,8283	15,8220	15,8156	15,8087	15,8013
29	Australia	16,9392	16,9267	16,9125	16,8943	16,8725	16,8540	16,8381	16,8238	16,8118	16,7997
30	Canada	17,3546	17,3440	17,3323	17,3200	17,3085	17,2978	17,2876	17,2781	17,2687	17,2593
31	SAD	19,5583	19,5512	19,5436	19,5349	19,5256	19,5157	19,5063	19,4970	19,4879	19,4785
32	Turkey	18,1189	18,1060	18,0929	18,0795	18,0671	18,0553	18,0433	18,0309	18,0183	18,0053
33	Montenegro	13,3375	13,3770	13,3723	13,3692	13,3661	13,3439	13,3423	13,3407	13,3375	13,3310
34	Croatia	15,3007	15,3007	15,3037	15,3050	15,3053	15,3062	15,3066	15,3059	15,3066	15,3068
35	Macedonia	14,5377	14,5363	14,5343	14,5329	14,5309	14,5285	14,5270	14,5250	14,5216	14,5196
36	Serbia	15,8185	15,8164	15,8146	15,8146	15,8146	15,8186	15,8225	15,8255	15,8279	15,8304
37	Russia	18,7742	18,7777	18,7706	18,7706	18,7713	18,7727	18,7770	18,7818	18,7867	18,7922
38	BiH	15,1739	15,1757	15,1775	15,1793	15,1806	15,1816	15,1813	15,1737	15,1657	15,1579

Table 5: Logarithm value of distance between capitals

Austria	6,23048	Slovakia	6,19032
Belgium	7,17778	Slovenia	5,96871
Bulgaria	6,04025	Spain	7,52564
Cyprus	7,38088	Sweden	7,45182
Czech Republic	6,62539	United Kingdom	7,39018
Denmark	7,22839	Norway	7,52833
Estonia	7,48829	Switzerland	6,82220
Finland	7,53316	Australia	9,66612
France	7,20638	Canada	8,85181
Greece	6,67456	SAD	8,92492
Ireland	7,64108	Turkey	7,15149
Italy	6,26720	Montenegro	5,15329
Lithuania	7,17396	Croatia	5,66296
Luxembourg	7,03086	Macedonia	5,30827
Hungary	6,01372	Serbia	5,29330
Malta	6,85013	Russia	7,55119
Netherlands	7,22475		
Germany	6,93925		
Poland	6,86066		
Portugal	7,76599		
Romania	6,42811		

Table 6: Membership to CEFTA

	CEFTA	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1	Austria	0	0	0	0	0	0	0	0	0	0
2	Belgium	0	0	0	0	0	0	0	0	0	0
3	Bulgaria	0	0	0	0	0	0	0	0	0	0
4	Cyprus	0	0	0	0	0	0	0	0	0	0
5	Czech Republic	0	0	0	0	0	0	0	0	0	0
6	Denmark	0	0	0	0	0	0	0	0	0	0
7	Estonia	0	0	0	0	0	0	0	0	0	0
8	Finland	0	0	0	0	0	0	0	0	0	0
9	France	0	0	0	0	0	0	0	0	0	0
10	Greece	0	0	0	0	0	0	0	0	0	0
11	Ireland	0	0	0	0	0	0	0	0	0	0
12	Italy	0	0	0	0	0	0	0	0	0	0
13	Lithuania	0	0	0	0	0	0	0	0	0	0
14	Luxembourg	0	0	0	0	0	0	0	0	0	0
15	Hungary	0	0	0	0	0	0	0	0	0	0
16	Malta	0	0	0	0	0	0	0	0	0	0
17	Netherlands	0	0	0	0	0	0	0	0	0	0
18	Germany	0	0	0	0	0	0	0	0	0	0
19	Poland	0	0	0	0	0	0	0	0	0	0
20	Portugal	0	0	0	0	0	0	0	0	0	0
21	Romania	0	0	0	0	0	0	0	0	0	0
22	Slovakia	0	0	0	0	0	0	0	0	0	0
23	Slovenia	0	0	0	0	0	0	0	0	0	0
24	Spain	0	0	0	0	0	0	0	0	0	0
25	Sweden	0	0	0	0	0	0	0	0	0	0
26	United Kingdom	0	0	0	0	0	0	0	0	0	0
27	Norway	0	0	0	0	0	0	0	0	0	0
28	Switzerland	0	0	0	0	0	0	0	0	0	0
29	Australia	0	0	0	0	0	0	0	0	0	0
30	Canada	0	0	0	0	0	0	0	0	0	0
31	SAD	0	0	0	0	0	0	0	0	0	0
32	Turkey	0	0	0	0	0	0	0	0	0	0
33	Montenegro	0	0	0	0	0	0	1	1	1	1
34	Croatia	0	0	0	0	0	0	1	1	1	1
35	Macedonia	0	0	0	0	0	0	1	1	1	1
36	Serbia	0	0	0	0	0	0	1	1	1	1
37	Russia	0	0	0	0	0	0	0	0	0	0

Tabe 7: Membership to EU

	EU	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1	Austria	1	1	1	1	1	1	1	1	1	1
2	Belgium	1	1	1	1	1	1	1	1	1	1
3	Bulgaria	0	0	0	0	0	1	1	1	1	1
4	Cyprus	0	0	1	1	1	1	1	1	1	1
5	Czech Republic	0	0	1	1	1	1	1	1	1	1
6	Denmark	1	1	1	1	1	1	1	1	1	1
7	Estonia	0	0	1	1	1	1	1	1	1	1
8	Finland	1	1	1	1	1	1	1	1	1	1
9	France	1	1	1	1	1	1	1	1	1	1
10	Greece	1	1	1	1	1	1	1	1	1	1
11	Ireland	1	1	1	1	1	1	1	1	1	1
12	Italy	1	1	1	1	1	1	1	1	1	1
13	Lithuania	0	0	1	1	1	1	1	1	1	1
14	Luxembourg	1	1	1	1	1	1	1	1	1	1
15	Hungary	0	0	1	1	1	1	1	1	1	1
16	Malta	0	0	1	1	1	1	1	1	1	1
17	Netherlands	1	1	1	1	1	1	1	1	1	1
18	Germany	1	1	1	1	1	1	1	1	1	1
19	Poland	0	0	1	1	1	1	1	1	1	1
20	Portugal	1	1	1	1	1	1	1	1	1	1
21	Romania	0	0	0	0	0	1	1	1	1	1
22	Slovakia	0	0	1	1	1	1	1	1	1	1
23	Slovenia	0	0	1	1	1	1	1	1	1	1
24	Spain	1	1	1	1	1	1	1	1	1	1
25	Sweden	1	1	1	1	1	1	1	1	1	1
26	United Kingdom	1	1	1	1	1	1	1	1	1	1
27	Norway	0	0	0	0	0	0	0	0	0	0
28	Switzerland	0	0	0	0	0	0	0	0	0	0
29	Australia	0	0	0	0	0	0	0	0	0	0
30	Canada	0	0	0	0	0	0	0	0	0	0
31	USA	0	0	0	0	0	0	0	0	0	0
32	Turkey	0	0	0	0	0	0	0	0	0	0
33	Montenegro	0	0	0	0	0	0	0	0	0	0
34	Croatia	0	0	0	0	0	0	0	0	0	0
35	Macedonia	0	0	0	0	0	0	0	0	0	0
36	Serbia	0	0	0	0	0	0	0	0	0	0
37	Russia	0	0	0	0	0	0	0	0	0	0

Table 8: States that grant unilateral preferential to BH or countries that have bilateral agreement about free trade with BH

		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1	Austria	0	0	0	0	0	0	0	0	0	0
2	Belgium	0	0	0	0	0	0	0	0	0	0
3	Bulgaria	0	0	0	1	1	0	0	0	0	0
4	Cyprus	0	0	0	0	0	0	0	0	0	0
5	Czech Republic	1	1	0	0	0	0	0	0	0	0
6	Denmark	0	0	0	0	0	0	0	0	0	0
7	Estonia	0	0	0	0	0	0	0	0	0	0
8	Finland	0	0	0	0	0	0	0	0	0	0
9	France	0	0	0	0	0	0	0	0	0	0
10	Greece	0	0	0	0	0	0	0	0	0	0
11	Ireland	0	0	0	0	0	0	0	0	0	0
12	Italy	0	0	0	0	0	0	0	0	0	0
13	Lithuania	0	0	0	0	0	0	0	0	0	0
14	Luxembourg	0	0	0	0	0	0	0	0	0	0
15	Hungary	1	1	0	0	0	0	0	0	0	0
16	Malta	0	0	0	0	0	0	0	0	0	0
17	Netherlands	0	0	0	0	0	0	0	0	0	0
18	Germany	0	0	0	0	0	0	0	0	0	0
19	Poland	0	0	0	0	0	0	0	0	0	0
20	Portugal	0	0	0	0	0	0	0	0	0	0
21	Romania	0	0	0	1	1	0	0	0	0	0
22	Slovakia	0	0	0	0	0	0	0	0	0	0
23	Slovenia	0	1	0	0	0	0	0	0	0	0
24	Spain	0	0	0	0	0	0	0	0	0	0
25	Sweden	0	0	0	0	0	0	0	0	0	0
26	United Kingdom	0	0	0	0	0	0	0	0	0	0
27	Norway	0	0	0	0	0	0	1	1	1	1
28	Switzerland	0	0	0	0	0	1	1	1	1	1
29	Australia	1	1	1	1	1	1	1	1	1	1
30	Canada	1	1	1	1	1	1	1	1	1	1
31	USA	1	1	1	1	1	1	1	1	1	1
32	Turkey	0	0	1	1	1	1	1	1	1	1
33	Montenegro	0	1	1	1	1	1	0	0	0	0
34	Croatia	1	1	1	1	1	1	0	0	0	0
35	Macedonia	0	0	1	1	1	1	0	0	0	0
36	Serbia	0	1	1	1	1	1	0	0	0	0
37	Russia	0	0	0	0	1	1	1	1	1	0

Table 13: Comparison of estitmated export by WLS method and real export in 2011

	Country	Value of export in USD (2011) (1)	Estimation of export by basic model WLS (2)	Estimation of export by extended model WLS (3)	(1)-(2)	(1)-(3)
1	Austria	440223000	132196499	114227199	308026501	325995801
2	Belgium	23645000	18362113	18522560	5282887	5122440
3	Bulgaria	13043000	34767723	22889755	-21724723	-9846755
4	Cyprus	2654000	694398	679763	1959602	1974237
5	Czech Republic	73499000	30873229	25582012	42625771	47916988
6	Denmark	4060000	10676974	11163946	-6616974	-7103946
7	Estonia	181000	513343	475537	-332343	-294537
8	Finland	841000	4375800	4703888	-3534800	-3862888
9	France	64745000	84807963	85977827	-20062963	-21232827
10	Greece	7750000	37284938	32030528	-29534938	-24280528
11	Ireland	933000	2831735	3083574	-1898735	-2150574
12	Italy	685213000	595016682	501944443	90196318	183268557
13	Lithuania	9322000	1990308	1704360	7331692	7617640
14	Luxembourg	37845000	3083266	3337725	34761734	34507275
15	Hungary	118031000	86374236	61564748	31656764	56466252
16	Malta	1406000	916759	780586	489241	625414
17	Netherlands	100096000	26064896	26791628	74031104	73304372
18	Germany	864711000	198678798	192556466	666032202	672154534
19	Poland	71502000	42338187	34903581	29163813	36598419
20	Portugal	7083000	2474874	2518565	4608126	4564435
21	Romania	43955000	46237421	33528286	-2282421	10426714
22	Slovakia	78298000	39649940	29877015	38648060	48420985
23	Slovenia	502644000	34459663	25916749	468184337	476727251
24	Spain	51893000	23335818	24017661	28557182	27875339
25	Sweden	38473000	10086415	10912287	28386585	27560713
26	United Kingdom	19074000	49411809	50855559	-30337809	-31781559
27	Norway	8034000	7320579	13261823	713421	-5227823
28	Switzerland	109589000	48486696	76339419	61102304	33249581
29	Australia	1203000	162820	406931	1040180	796069
30	Canada	7285000	238	146	7284762	7284854
31	USA	13650000	8070290	17332606	5579710	-3682606
32	Turkey	106709000	32824968	42896466	73884032	63812534
33	Montenegro	213646000	25947868	162745795	187698132	50900205
34	Croatia	856521000	91706150	688413340	764814850	168107660
35	Macedonia	91675000	40771750	43876964	50903250	47798036
36	Serbia	712473000	166066688	1054360227	546406312	-341887227
37	Russia	37821000	29139348	16686324	8681652	21134676
	totally	5419726000	1968001181	3436866291	3451724819	1982859709