Analyzing Bilateral Trade Flows of Bosnia and Herzegovina under the Framework of Gravity Model

Elif Nuroglu[*]
Nadja Dreca[**]

Abstract

This study applies a modified gravity model of total trade to analyze Bosnia and Herzegovina`s (BiH) trade flows with its major trade partners. The results of this study show that major determinants of Bosnian total trade flows and imports are distance, GDP per capita of Bosnia and Herzegovina, GDP and population of trade partners, ex-Yugoslavian dummy and similarity index. On the other hand, Bosnian exports are found to be determined by distance, GDP per capita of BiH and trade partner, ex-Yugoslavian dummy and similarity between countries` GDPs. The results support the hypothesis showing that higher GDP per capita leads to higher trade, distance is a trade diminishing factor and being part of the same country (Ex-Yugoslavia) in the past has future implications of more trade than otherwise similar countries.

Key Words: Gravity Model, Bosnia and Herzegovina`s Trade, BiH Exports, BiH Imports.

1. Introduction

This study investigates bilateral trade flows between Bosnia and Herzegovina and its 32 trade partners from 2005 to 2009 by employing panel

[*] Elif Nuroglu, Faculty of Business and Administration, International University of Sarajevo, Bosnia and Herzegovina, enuroglu@ius.edu.ba
[**] Najda Dreca, Faculty of Business and Administration, International University of Sarajevo, Bosnia and Herzegovina, nadja_n88@hotmail.com

data analysis. The basic gravity model explains bilateral trade flows of two countries as the product of their economic size and the distance between them (Krugman, and Obstfeld, 2009). By inserting some other factors into the basic gravity equation such as population and volatility of exchange rates, the gravity model is known as one of the best models for explaining trade flows among countries. There are some other factors that could be included into the model as dummy variables, such as being member of a regional trade association, common border, common language, having some common past and so on. If two countries were previously part of the same country or union like Balkan countries, they are expected to trade more. If they share a common border, it reduces transportation costs and will result in more bilateral trade flows. Signing a free trade agreement is also a trade stimulating factor.

As a newly formed country, Bosnia and Herzegovina tries to improve its political and economic situation. Since trade is a very essential factor determining a country`s well-being; in this study, trade relationships of Bosnia and Herzegovina have been analyzed by using the gravity model. The motivation is to find the most important factors which boost Bosnian trade flows and make appropriate policy recommendations to improve Bosnia and Herzegovina`s trade and as a result its GDP.

This study is organized as follows: Section 2 provides some theoretical background for the gravity model of trade. Section 3 describes some characteristics of Bosnia and Herzegovina`s macroeconomic situation and trade. Section 4 estimates bilateral trade flows of Bosnia and Herzegovina, its exports and imports using gravity equation and section 5 concludes.

2. Literature Review

The gravity model has been introduced by Tinbergen in 1960s and started to attract a new interest in 1980s with several studies such as Krugman and Helpman (1985), Bergstrand (1985, 1989) and Deardorff (1998).

Anderson (1979) and Krugman and Helpman (1985) use Differentiated Products Model to analyze the relationship between bilateral trade flows and the product of two countries` GDPs. Melitz (2003) introduces a model of international trade in differentiated products with different productivities. It is shown in this study that more productive firms export more.

Anderson (1979) explains the gravity model by using the properties of expenditure system with a hypothesis of identical homothetic preferences across regions. He assumes that products are differentiated by place and origin. Based on the assumption that income must be equal to sales, the basic gravity model of international trade is derived. Later, this equation is extended with population and income per capita by expecting that trade shares should increase with income per capita and decrease with the population of the country.

Bergstrand (1985) explains the basic gravity model proposed by Tinbergen (1962) by making similar assumptions as Anderson (1979) did about the size of the market, countries` production functions, perfect substitution of goods at the international level, zero tariffs and zero transport costs, but also includes price and exchange rate variables as well. Bergstrand (1989) extends the previous model (Bergstrand, 1985) by inserting income per capita, population, aggregate wholesale price index (WPI) and dummy variables for trade agreements to explain the patterns of international trade.

In Evenett and Keller (2002) a different factor proportion and product differentiation model is proposed. They empirically separate between Heckscher-Ohlin theory and increasing returns to trade theory, and conclude that both the Heckscher-Ohlin model and Differentiated Products Model can explain the gravity model.

Frankel and Romer (1999) investigate whether trade causes growth and how international trade raises standards of living. They conclude that international trade leads to better production, accumulation of capital and as a consequence higher economic growth.

Egger and Pfaffermayr (2003) discuss about the proper specification of

the gravity model and conclude that time and country effects model could be used depending on the interest of the analysis, country sample, properties of data and the theoretical model.

Distance is the main indicator of transport costs used in the gravity model. Anderson (1979) finds that distance and transport costs are related. Bergstrand (1985, 1989) develops an analysis of distance effects. Access to the information on the market can make it easier for a firm to investigate the market and to conduct business in this market (Anderson, and Wincoop, 2003 and 2004). Some economists use unobserved costs of trade such as cultural and institutional differences among countries to explain trade flows. Anderson and van Wincoop (2003) introduce "border puzzle" to explain the effects of border on trade. Moreover, Rose (2000) finds that larger distances between countries are expected to decrease bilateral trade because higher transportation costs make trade more difficult by incurring additional costs to trade such as informational and other costs. Anderson (2000), Anderson and van Wincoop (2003) and Huang (2006) support findings about barriers to trade, such as transportation costs, unfamiliarity and informational barriers.

Tinbergen (1962) finds a significant effect of FTAs on trade, while Bergstrand (1985) reports an insignificant effect. Frankel (1997) includes regional trading blocs, such as APEC, NAFTA and Mercosur in his model to see the effect of FTAs on bilateral trade flows. He concludes that an agreement that mutually eliminates tariffs does not produce more trade; but an agreement which also leads to the liberalization of domestic regulations tends to enhance trade. Frankel (1997) finds a positive significant effect of Mercosur and an insignificant effect of Andean Pact on trade flows. Frankel and Rose (2002) examine the influence of free trade agreements and currency unions on trade and they find positive and significant coefficients.

The ability to communicate in a common language is predicted to reduce the costs of trade. It is very obvious that countries speaking the same language can trade more easily with each other without having to pay higher transaction costs. Melitz (2002) demonstrates the importance of the ability to

communicate. Rose (2000) explains the effects of the common currency on trade. He finds that trade will be three times more if a country and its trading partner belong to the same currency union. Frankel and Rose (2002) conclude that being in the same currency union reduces cost of international trade by promoting bilateral trade and openness; hence, it raises overall trade volumes and income. Glick and Rose (2002) show that common currency increases trade and their findings prove that trade is even doubled sometimes. Melitz (2001) says that distance and currency union both have significant effect on trade flows. It is found in this study that distance has a negative effect while currency union has a positive effect on trade flows. Melitz (2002) is another further study which explains the effects of common border.

Rose and Spiegel (2003) develop a gravity model of international lending. They confirm that international trade patterns determine lending patterns. Two countries closer to each other will have more intertemporal trade, international lending and borrowing.

In the light of the literature review, it is seen that the gravity model of trade and its extensions with several variables are really powerful models in explaining international trade flows. On the other hand, the application of gravity model on Balkan countries` trade is limited. This study aims to contribute to the international trade literature by analyzing bilateral trade flows of Bosnia and its main trade partners which are mostly South East European countries using an extended version of the gravity model with population, GDP per capita, similarity index and a dummy which searches for the effect of being a former member of Social Federal Republic of Yugoslavia (SFRY) on trade flows in the Balkan region.

3. Bosnia and Herzegovina`s Trade

Bosnia and Herzegovina is a newly formed country which in general shows a slow recovery compared to its neighbors Slovenia, Serbia and Croatia. Table 1 shows data about the nominal GDP, GDP per capita, real GDP growth and population of the country. In the period from 2005 to 2008

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nominal GDP and GDP per capita increase but these figures show a decline in 2009 which might be due to the loss of jobs and lower production caused by the crisis in 2009.

Table 1
Gross Domestic Product (GDP) of Bosnia and Herzegovina 2005-2009

Year	2005	2006	2007	2008	2009
Nominal GDP (mill. USD)	10.889	12.346	15.222	18.481	17.047
GDP per capita (USD)	2.834	3.212	3.962	4.81	4.436
Real GDP Growth (%)	3.9	6.1	6.2	5.7	-2.9
Population (in thousands)	3.843	3.843	3.842	3.842	3.843

Source: Agency for Statistics of BiH and Central Bank of BiH

Bosnia and Herzegovina`s trade regime has been relatively liberal since the Dayton Agreement which was signed in 1995. Import barriers became lower due to the influence of many factors among which the main ones are (1) domestic production and production capacity was very low after the war in 1990s and the country needed to import for its people to survive, (2) international donors sent huge amount of money for reconstruction of Bosnia and introducing custom tariffs would reduce the benefits of this assistance, (3) administrative capacities and public finances were in poor conditions, and custom-related revenues were not appropriately monitored and collected. The conditions for foreign trade improved after the creation of State Border Service and the state-level Indirect Taxation authority (ITA) (Hadziomeragic et al., 2007).

The political dissolution of Social Federal Republic of Yugoslavia (SFRY) in mid-1991 brought about many changes in South- East Europe (SEE) and in Balkans. Military conflicts, ethnic cleansing policies, inward-oriented nationalistic policies, poor economic performance, international penalties against FR Yugoslavia, its long time isolation and NATO's bombardments in spring 1999, are among the most important reasons for the deferred process of EU integration (Uvalic, 2005).

Newly formed independent states and process of state-building created opportunities for trade but at the same time they gave rise to barriers to trade

and to the free movement of goods, services, labor and capital. The disintegration of Yugoslavian markets in 1991-92 caused trade relations to disappear and it was one of the main reasons why output in all successor states of Yugoslavia fell very sharply. Military conflicts, embargoes, and politically-oriented trade wars have had a direct impact on trade flows among SEE countries and it led to a much lower level of trade (Uvalic, 2005, & Christie, 2002).

Bosnia and Herzegovina started to improve its foreign trade relations by signing some trade agreements. In 2000, stability Pact Memorandum of Understanding (MoU) was signed and later BiH established a series of bilateral agreements with South- East European (SEE) countries to get easy access to other markets. Tariffs were removed gradually. In 2006, Bosnia and Herzegovina signed Central European Free Trade Agreement (CEFTA) reserving the right to use protective measures in agricultural trade.

Bosnia and Herzegovina is open to the foreign markets and foreign trade. After the war, it was import-oriented, but since 2003 it started to export more. The most important export industry is metal and there are some projects focused on improving steel and aluminum industries. Exports are mainly oriented to the neighbors and the EU market. Imports are also directed to those countries, but they may come from the non-EU and non-SEE countries. Production volumes in Bosnia and Herzegovina are not so high. Exports are based on the goods whose production requires exploitation of natural resources and low-skilled labor. Basic metals and metal products are the main exports. Agricultural products have a small share in the exports structure and they can only be exported to the SEE countries since Bosnia and Herzegovina does not have an acceptable inspection institution to be able to export agricultural products to the EU countries (Hadziomeragic et al., 2007).

Trade relations of Bosnia and Herzegovina with the ex-Yugoslavian republics are very strong. This could be explained by strong historical ties with those countries and strong industrial relations among the countries of ex Yugoslavia, common borders and common language (Hadziomeragic et al.,

2007).

Table 2 shows the value of exports and imports from 2005 to 2009. The lowest trade values are seen in 2005. Total trade sum of exports and imports have the highest values in 2008 but declined in 2009.

Table 2
BiH Exports and Imports 2005-2009 (in thousands of USD)

Year	Turnover of goods	Exports	Imports	Trade balance	Export/Import ratio %
2005	9,111.055	2,303.458	6,807.597	-4,504.139	33.8
2006	10,987.044	3,427.782	7,559.262	-4,131.480	45.3
2007	13,871.478	4,151.748	9,719.730	-5,567.982	42.7
2008	17,209.701	5,021.090	12,188.611	-7,167.521	41.2
2009	12,707.907	3,929.804	8,778.103	-4,848.299	44.8

Source: Agency for Statistics of BiH

Table 2 shows that Bosnia has a trade deficit in each year, but the lowest deficit is seen in 2006, and the highest trade deficit is in 2008. According to Table 2, exports of BiH increased from 2005 to 2008 and later declined in 2009. The reason for this decline might be the increase in BiH`s debt: its borrowings from the IMF and other sources which is especially very high in the last two years. Imports to BiH increased from 2005 to 2008 and declined in 2009.

Table 3
The Ratio of Total Trade, Exports and Imports to GDP 2005-2009

Year	Trade-GDP ratio	Export-GDP ratio	Import-GDP ratio
2005	84	21	63
2006	89	28	61
2007	91	27	64
2008	93	27	66
2009	75	23	51

Source: Agency for Statistics of BiH

Trade plays an important role in Bosnia and Herzegovina`s economy. Table 3 shows the trade-GDP ratio, the export-GDP ratio and the import-GDP ratio. This table shows an increase in export-GDP ratio from 2005 to 2009 meaning that BiH started to produce and export more. On the other hand, there is a decrease in import-GDP ratio from 2005 to 2009 showing that BiH imports less in the last years. It might be due to the fact that the country started to produce more of its own goods so that it needs less to import.

Table 4

The Proportion of Bosnian Exports, Imports and Total Trade to its Trade Partners

	% of Exports		% of Imports		% of Total Trade	
	2005	2009	2005	2009	2005	2009
Austria	4.32	5.88	4.37	3.68	4.35	4.36
Croatia	20.50	17.07	16.87	15.00	17.79	15.64
France	1.68	1.98	2.25	2.04	2.11	2.02
Germany	11.34	14.71	14.36	11.29	13.60	12.35
Hungary	3.77	1.66	3.66	3.25	3.69	2.76
Italy	13.12	12.70	8.95	10.05	10.00	10.87
Macedonia	0.94	1.11	0.83	1.04	0.85	1.07
Russia	0.13	0.46	2.88	7.00	2.19	4.98
Serbia	15.54	13.40	10.15	10.38	11.52	11.32
Slovenia	9.65	8.37	6.98	6.14	7.65	6.83
Switzerland	1.33	2.05	1.64	0.74	1.56	1.15
Turkey	0.62	0.94	2.81	2.97	2.26	2.34
Others	17.06	19.67	24.25	26.41	22.43	24.32

Source: Agency for Statistics of BiH

Table 4 represents the percentage share of Bosnia and Herzegovina`s exports, imports and total trade flows to its main trade partners. According to Table 4, in 2009 15 percent of BiH`s imports came from Croatia, 11.29 percent from Germany and 10.38 percent from Serbia. The highest proportion of exports in 2009 goes to Croatia (17.07 percent), Germany (14.71 percent) and Serbia (13.40 percent). Bosnia and Herzegovina`s trade with its neighbors, especially with Croatia and Serbia, can be called "ethnic

trading" that mostly occur between Republika Srpska and Serbia on the one hand, and to some extent between Croatia and the Federation on the other hand. The reasons for this could be strong historical and cultural relations with neighbors, common border, common language and low transportation costs. When the figures in 2005 and 2009 are compared, there appears to be no shift between countries. Croatia, Serbia, Germany and Italy are the main trade partners of BiH.

4. Data and Methodology

4.1 Data

This study covers a total of 32 trade partners of Bosnia and Herzegovina and Bosnia and Herzegovina itself. The countries in the sample are chosen on the basis of the strength of trade partnership with Bosnia and Herzegovina and the data availability. EU25, Serbia and Montenegro, Croatia, Macedonia, Turkey as well as Switzerland as the largest trading partners from the European Free Trade Agreement (EFTA) are included in the sample.

All observations are annual. The data are collected for the period from 2005 to 2009 from the Agency for Statistics of BiH, Central Bank of Bosnia and Herzegovina and from World Bank`s World Development Indicators. Data on distance (great circle distance) between Sarajevo (capital of Bosnia and Herzegovina) and capital cities of other countries in the sample are obtained from the website World Atlas, Flight Distance between Cities, mileage calculator[1].

GDP is measured in millions of US dollars, total exports and imports are measured in million US dollars. Population is in millions.

4.2 Methodology

Studies about gravity model generally use cross sectional or time series

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[1] http://www.worldatlas.com/travelaids/flight_distance.htm

data to estimate trade flows. However, using cross sectional data observed over several time periods (panel data) could give more useful information than cross-sectional or time series data alone. Panel data analysis has several advantages such as capturing relevant relationships among variables over time, and explaining unobservable individual effects of trade partners (Rahman, 2003; Gujarati, and Porter, 2009; Stock, and Watson, 2007).

According to the basic Gravity Model, trade flows between two countries depend on their income positively and on the distances between them negatively as shown in Equation 1:

$$T_{ij} = C \frac{Y_i \times Y_j}{D_{ij}}$$

(1)

where *c* is a constant term, T_{ij} is the value of trade between country *i* and country *j*, Y_i and Y_j denote the real GDP of countries *i* and *j*, respectively, and D_{ij} is the distance between countries *i* and *j* (Krugman, and Obstfeld, 2009). The gravity model assumes that an increase in GDP increases bilateral trade volumes since a large country with huge production capacity is more likely to produce large amounts and enjoy economies of scale. As a result, it can export more. Furthermore, since it has a large domestic market it imports more. Distance in the gravity model represents the distance between economic centers of countries although in most studies distance between capital cities is taken into account. As distance gets larger, transportation costs and time spent to transport goods increases. Therefore, distance is expected to have a negative impact on trade flows.

In this study, using our data set we estimated three models: (a) the gravity model of total trade (exports + imports) of BiH, (b) the gravity model of Bosnian exports, and (c) the gravity model of Bosnian imports.

4.3 The Gravity Model of Total Trade

The model used to estimate trade flows of Bosnia and Herzegovina is shown by Equation 2. Here all variables but not ex-Yugoslavian dummy and

similarity index are transformed into the natural logarithms:

$$lnTrade_{ijt} = \beta_0 + \beta_1 lnDist_{ij} + \beta_2 lnGDP_{it} + \beta_3 lnGDP_{jt} + \beta_4 lnPop_{it} + \beta_5 lnPop_{jt} +$$
$$\beta_6 ln(GDP_{it}/Pop_{it}) + \beta_6 ln(GDP_{jt}/Pop_{jt}) + \beta_8 \, exYu + \beta_9 sim + \epsilon_{ijt} \qquad (2)$$

where

$Trade_{ijt}$: is the sum of exports from country i (BiH) to the country j and imports from country j to county i in year t

$Dist_{ij}$: is distance between country i `s capital and country $j$ `s capital

GDP_{it} : is the GDP of country i (Bosnia and Herzegovina) in year t

GDP_{jt} : is the GDP of country j (trading partner of BiH) in year t

Pop_{it} : is population of country i in year t

Pop_{jt} : is population of country j in year t

$\dfrac{GDP_{it}}{Pop}_{it}$: is GDP per capita of country i in year t

$\dfrac{GDP_{jt}}{Pop}_{jt}$: is GDP per capita of country j in year t

$exYu$: is the dummy variable which takes the value of 1 if the country is one of the ex-Yugoslavian republics and zero otherwise

Sim   : is the similarity index which shows how similar two trading partners are in terms of their GDPs. The value of index is between 0 and 0.5. As it gets closer to 0.5, it means two countries are more similar to each other which is supposed to result in more trade between these countries.

$$sim_{BiHcntr} = \log\left[1 - \left(\frac{GDP_{BiH}}{GDP_{BiH} + GDP_{cntr}}\right)^2 - \left(\frac{GDP_{cntr}}{GDP_{BiH} + GDP_{cntr}}\right)^2\right]$$

ε_{ijt} : is the error term.

The gravity model of total trade is estimated by taking 160 observations from 33 countries for 5 years. In order to find the best model, several

regressions were done and the model which best explains Bosnia and Herzegovina`s total trade flows is chosen.

Table 5
Total Bilateral Trade: Balanced Panel Estimates with Period Fixed Effects
(2005-2009)

Explanatory variable	Coefficient	t-statistic	p-value
Intercept	10.62	10.07	0.00
Distance	-1.86	-12.90	0.00
GDP per capita BiH	-0.44	-1.22	0.22
GDP of trade partner	1.64	10.70	0.00
Population of trade partner	0.20	2.03	0.04
Ex-Yugoslavian dummy	2.50	9.04	0.00
Similarity index	2.24	4.63	0.00

Adjusted R^2 = 0.86, 160 observations, 5 time periods, 32 cross sections

The model which best explains Bosnian total trade flows is:

$$lnTrade_{ijt} = \beta_0 + \beta_1 lnDist_{ij} + \beta_2 ln\,(GDP_{it}/Pop_{it}) + \beta_3 lnGDP_{jt} + \beta_4\, lnPop_{jt} + \beta_5 exYu + \beta_6\, sim + \varepsilon_{ijt}$$

(3)

Table 5 shows the results of balanced panel estimates with period fixed effects for total trade flows. Adjusted R-squared shows that this model explains 86 percent of the variation in total trade flows as hypothesized. Distance is shown to have a negative impact on trade flows which supports the literature. According to the results of Table 5, 1 percent increase in distance is associated with a 1.86 percent decline in bilateral trade flows of Bosnia and Herzegovina. Moreover, as GDP of trading partner increases by 1 percent, its trade with Bosnia and Herzegovina has a tendency to increase by 1.64 percent. It means as the trading partner gets richer, it trades more with BiH. Furthermore, the impact of an increase in the population of trading partner on its trade flows with BiH is positive as well. If the trading partner is one of the ex-Yugoslavian countries, Bosnia and Herzegovina trades more with this country meaning that there are strong trade relations between

Bosnia and Herzegovina and other countries of the former Yugoslavia. Lastly, similarity index has a positive coefficient indicating that if two countries are similar in terms of their GDPs, they trade more.

4.4 The Gravity Model of Exports

In this section, export flows of Bosnia and Herzegovina to its trading partners will be estimated by using the following model:

$$lnExp_{ijt} = \beta_0 + \beta_1 lnDist_{ij} + \beta_2 lnGDP_{it} + \beta_3 lnGDP_{jt} + \beta_4 lnPop_{it} + \beta_5 lnPop_{jt} +$$
$$\beta_6 ln(GDP_{it}/Pop_{it}) + \beta_6 ln(GDP_{jt}/Pop_{jt}) + \beta_8 \ exYu + \beta_9 sim + \epsilon_{ijt} \quad (4)$$

where,

Exp_{ijt} : is exports from country i (BiH) to country j in year t. All other variables are the same as in Equation 2.

After performing several regressions and tests, the model found to best explain Bosnian exports is:

$$lnExp_{ijt} = \beta_0 + \beta_1 lnDist_{ij} + \beta_2 ln(GDP_{it}/Pop_{it}) + \beta_3 ln(GDP/Pop_{jt}) + \beta_4 exYu +$$
$$\beta_5 sim + \epsilon_{ijt} \quad (5)$$

Table 6 shows the results of panel estimates with period fixed effects. Since import data for Latvia in 2009 is missing, so unbalanced panel estimates were obtained with 159 observations for Bosnian imports. The results explicate that distance has a negative coefficient as it was in total trade model showing that as countries are further away they have a tendency to trade less since larger distances mean higher transportation costs, more time spent to receive and deliver the goods and some other additional costs to trade. According to Table 6, as GDP per capita of BiH increases, the country produces and exports more. The same holds for the GDP per capita of trading partner as well. The positive coefficient of GDP per capita of the trading partner indicates that as the per person income in the partner country increases, that country imports more from BiH.

Table 6
Exports: Unbalanced Panel Estimates with Period Fixed Effects
(2005-2009)

Explanatory variable	Coefficient	t-statistic	p-value
Intercept	15.01	8.45	0.00
Distance	-2.83	-11.85	0.00
GDP per capita BiH	1.30	2.26	0.03
GDP per capita of trading partner	0.68	4.32	0.00
Ex-Yugoslavian dummy	2.13	4.67	0.00
Similarity index	-3.14	-13.36	0.00

Dependent variable is log of exports
Adjusted R^2 = 0.76, 159 observations, 5 time periods, 32 cross sections

The dummy variable which shows the impact of being one of ex-Yugoslavian countries on Bosnian exports has a positive coefficient. Interestingly however the coefficient of similarity index is negative in the exports case. Table 6 shows that as two countries are similar in terms of their GDPs, they export less to each other, since the variety of goods they produce might not differ much.

4.5 The Gravity Model of Imports

The gravity model of imports used to estimate Bosnian imports from 2005 to 2009 is shown in Equation 6. This equation is estimated by 160 observations, from 33 countries for 5 years.

$$lnImp_{ijt} = \beta_0 + \beta_1 lnDist_{ij} + \beta_2 lnGDP_{it} + \beta_3 lnGDP_{jt} + \beta_4 lnPop_{it} + \beta_5 lnPop_{jt} + \beta_6 ln(GDP_{it}/Pop_{it}) + \beta_6 ln(GDP_{jt}/Pop_{jt}) + \beta_8\ exYu + \beta_9 sim + \epsilon_{ij} \qquad (6)$$

In this equation, Imp_{ijt} represent imports from country j to country i (BiH) in year t. All other variables are the same as explained in section 4.3. The model that best explains Bosnian imports from its trade partners is represented in Equation 7:

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$$lnImp_{ijt} = \beta_0 + \beta_1 \ln Dist_{ij} + \beta_2 \ln\left(\frac{GDP_{it}}{Pop_{it}}\right) + \beta_3 \ln GDP_{jt} +$$
$$\beta_4 \ln Pop_{jt} + \beta_5 exYu + \beta_6 sim + \varepsilon_{ijt} \tag{7}$$

Table 7
Imports: Balanced Panel Estimates with Period Fixed Effects (2005-2009)

Explanatory variable	Coefficient	t-statistic	p-value
Intercept	8.22	7.04	0.00
Distance	-1.61	-10.10	0.00
GDP per capita BiH	-0.62	-1.54	0.13
GDP of trading partner	1.73	10.20	0.00
Population of trading partner	0.31	2.88	0.00
Ex-Yugoslavian dummy	3.00	9.80	0.00
Similarity index	2.49	4.68	0.00

Adjusted R^2 = 0.85, 160 observations, 5 time periods, 32 cross sections

Table 7 shows that distance has a negative impact on Bosnian imports, while GDP per capita of BiH has also a negative effect on its imports which is significant at the 13 percent significance level. This result is contradictory with the theory, as per capita income increase in a country it should increase their consumption and therefore it imports more. On the other hand, the influence of increase in GDP and population of trading partner on Bosnian imports is positive. It means, when the trading partner gets richer and/or has higher population they produce and export more to Bosnia and Herzegovina. The results of Table 7 also show that trade relations between ex-Yugoslavian countries are very strong due to their historical and cultural ties. Lastly, the positive coefficient of the similarity index shows that if the GDP of BiH and its trading partners are similar, Bosnia imports more from that country.

5. Conclusion

In this study, extended versions of gravity model of trade/ exports/ imports are estimated for Bosnia and Herzegovina and its major trade partners from 2005 to 2009. Results show that Bosnian trade as well as its exports and imports are positively determined by the economic size (which is

measured by GDP) and population of the trade partner. Similar GDPs are indicated to have a positive impact on trade flows. Distance is found to be a significant factor influencing Bosnian trade in a negative way. Increase in GDP per capita of BiH appears to boost Bosnian exports significantly.

Results of the estimated gravity model of trade/exports/ imports show that Bosnia and Herzegovina`s trade relations with its ex-Yugoslavian neighbors are very strong. It can be explained by strong historical and industrial relations they had in the past. According to our findings, there seem to be some cases of "ethnic trading" in BiH`s trade, for example trade relations between Croatia and Federation of Bosnia and Herzegovina, and Republic of Srpska and Serbia appear to be very strong.

Bosnia and Herzegovina is recommended to increase its trade flows to enjoy higher GDP and better standards of living as a newly formed country which is much less developed compared to its neighbors. To achieve this, it should first focus on trade with its neighbors and the Ex-Yugoslavian countries to which there are not high transportation costs and with which it shares a common past, culture and language which altogether have a stimulating effect on trade flows. After improving its trade relations with the neighbors and producing some gains from trade with low transportation and transaction costs, it may start to export to further away countries.

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