Determinants of lending to Bosnia and Herzegovina under the gravity model approach

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Abstract

The analysis of a data set of observation for 11 countries in period from 2005 to 2012 shows how capital flow (lending to Bosnia and Herzegovina) is influenced by many factors such as: gross domestic product of lending country, gross domestic product of Bosnia and Herzegovina, distance between two countries, amount of bilateral trade flows, exchange rate, bank ownership, being part of European Union and Euro Zone, signing Free Trade Agreement and area of partner country.

Selected variables are chosen on the previous research, availability of data and analysis is done through several methods and some diagnostics tests are performed in order to determine the most appropriate model that explains determinants of lending to Bosnia and Herzegovina. Results indicate based on data that gross domestic products GDP of selected country, distance, exchange rate, area of country and bilateral trade flows have significant effect on borrowings. On the other hand variables EURO, EU, FTA, GDP of B&H and bank ownership do not appear to have significant effect on lending to Bosnia and Herzegovina. Variables GDPcntr, Distance, EU and bankownership have negative effect on lending, while variables EURO, exchange rate, FTA, GDPB&H, Areacntr and amount of bilateral trade flows are positively related with borrowing of Bosnia and Herzegovina. Selected Variables, except of GDPcntr, Bankownership and EU, have expected signs.

This paper contributes to both theoretical and the empirical literature about gravity models of Bosnia and Herzegovina. The aim of study is to show that there is positive relationship between lending and bilateral trade flows and how gravity model of trade can be applied to lending model. This study should provide incentives for further research and to apply gravity model to explain determinants of lending to Bosnia and Herzegovina.

Key words:

Gravity Model, Lending, Bilateral Trade, Gross Domestic Product, Distance, Econometric Modeling

Introduction

Importance of the Study

The purpose of this paper is to examine lending flows to Bosnia and Herzegovina using gravity model analysis. Gravity model has performed remarkably well over a long period of time in explaining bilateral trade flows so the aim of this research is to apply gravity model to explain lending flows.

Study Objectives and Hypothesis

The aim of study is to show that there is positive relationship between lending and bilateral trade flows and how gravity model of trade can be applied to lending model, what represents our hypothesis. This paper contributes to both theoretical and the empirical literature about gravity models of Bosnia and Herzegovina.

The heart of the gravity model of trade is an emphasis on countries' GDP being a positive determinant of trade and the distance between countries being a negative determinant of trade. The gravity model of trade comes from physics, the Newtonian law of universal gravitation that states that force between two bodies is directly proportional to product of their masses, and inversely proportional to the square distance between them.

The gravity model of trade (Equation 1 and 1a) says that trade flows between countries is proportional to the product of each country's economic mass, generally measured by GDP divided by the distance between the countries economic centers of gravity, which is the distance between their capital cities. (Krugman and Obstfeld, 2009)

$$M_{ij} = KY_i^\beta Y_j^\gamma D_{ij}^\delta \quad \text{Equation (1)}$$

The linear form of the model is as follows:

$$\text{Log}(M_{ij}) = \alpha + \beta \log(Y_i) + \gamma \log(Y_j) + \delta \log(D_{ij})$$

Equation (1a)

Where

M_{ij} : is trade flows from trade from country i to country j

Y_i : is country i's GDP

Y_j : is country j's GDP

D_{ij} : is the geographical distance between countries' capitals

By taking into account geographical factors, such as distance, population, the gravity model is now recognized as one of the best models for explaining international exchange volumes.

The gravity model enlarged by population, area, border, location and other geographic factors represents one of the best models that represent international flows. Some other factors, such as dummy variables for trade agreement, common currency, common characteristics like language, common border, historical ties such as being one of the former member of the common country or common religion and other social similarities, can be included in the modified gravity model. Inclusion of one of these variables leads to better representation of models and features of the flows. Countries with similar cultural and social characteristics tend to trade more. Each of these variables should lead to higher trade, to trade creation

Rose and Spiegel (2003) use the gravity model to explain international lending. They show that international trade patterns determine lending patterns. According to them same rules of gravity models can be applied for monetary flows, international trade in financial capital. Chitu et al (2012) use also gravity model to explain international finance.

Data and Methodology

This is descriptive research because it describes information which is taken from annual reports and other reports. Data has been analyzed and interpreted using the references and personal judgment. Also research is quantitative and empirical because there is analyze of numerical data. A model formulated and related hypothesis will be tested using an appropriate statistical analysis using software STATA 11. Some graphs are also used to analyze the findings. The most important methodology used in this research is method of the econometric modeling, where for specific problems appropriate

model should be defined and tested. In the study panel data would be used to estimate flow equation by using extended econometric gravity model

Expected Outcomes

This paper contributes to both theoretical and the empirical literature about gravity models of Bosnia and Herzegovina. The aim of study is to show that there is positive relationship between lending and bilateral trade flows and how gravity model of trade can be applied to lending model.

Study Outline

This paper consist of the following sections: Section 2 gives some review of gravity model of international economy. Section 3 explains data and selection of variables. Section 4 represents methodology of gravity model analysis of lending flows and section 5 is discussion of empirical results while Section 6 provides conclusion.

Literature Review

The gravity model of the trade among the countries has been first introduced by Tinbergen in 1960s and in 1980s several studies on international trade put the gravity model in the center of the interest. In the beginning gravity model was just based on empirical evidence without any justification by theory. Later, studies by Krugman and Helpman(1985), Bergstrand (1985, 1989) and Deardorff(1998) use theory and shows that gravity model can be applied in other models of international trade.

Frankel and Romer (1999) use geographical factors, such as distance, common border, population and land lock of area , to determine the bilateral trade flows. It searched if the international trade leads to growth that improves production, accumulation of capital and economic growth.

Egger and Pfaffermayr (2003) discuss about the proper econometric model by concluding that use of fixed or random effects models depends on the subject of the study, the sample, characteristics of data and the model.

Distance represents the most important factor of transportation costs that are used in the gravity model. According to Anderson (1979) the distance and transportation costs are related.

Additional information costs arise from the cultural and institutional differences and it leads that firms have incomplete information about the foreign markets. Anderson and van Wincoop (2003) uses the “border puzzle” to explain the effect of the border on the trade. Rose (2000) shows that larger distance between two countries leads to the decrease in bilateral trade by increasing the transportation costs which produces difficulties by incurring some other costs such as informational and other costs.

The communication in the common language and ability to use language of the trading partner predict to decrease the trade costs and leads to higher trade. Melitz (2002) supports the importance of the ability to communicate. It is also important to look for these effects language as native and second spoken language. Rose (2000) finds the large impact of common currency on trade. According to him trade can increase three times if the trading partners are members of the same currency union. Formulation of the currency union lowers trade barriers and also reduces uncertainty of the exchange rates. Frankel and Rose (2002) find that the same currency union reduces costs of international trade leading to higher bilateral trade and openness. It raises overall trade, and trade raises income. Glick and Rose (2002) find the explanation of an effect of the common currency on trade. It also supports the theory that common currency increases trade, sometimes even trade is doubled according to their findings.

Melitz (2002) uses the work of Rose and others and his findings also support that work, that distance and currency union have large effects trade flows, distance has negative and same currency union has positive effects, because transportation costs and costs of trade are lower when countries are closer.

International bank lending data can be explained by the gravity model that explains international trade patterns. (Buch,2005)

Rose and Spiegel (2003), Okawa and van Wincoop (2012) use the gravity model to explain international lending. They show that international trade patterns determine lending patterns. According to them same rules of gravity models can be applied for monetary flows.

Data

The purpose of this study is to apply gravity model approach on lending flows to Bosnia and Herzegovina. In the study panel data

would be used to estimate flow equation by using extended econometric gravity model. In this research total of 11 countries were included and Bosnia and Herzegovina itself. The availability of required data and literature review determine the choice of the countries and variables.

All observations are annual. Data are collected for period 2005 to 2012 from Bank for International Settlements (BIS), Agency for Statistics of B&H (BHAS), Central Bank of B&H (CBBH), World Bank's World Development Indicators (WB).

Data on distance (great circle distance) between Sarajevo (capital of Bosnia and Herzegovina) and capital cities of other trading partners in sample are obtained from web the site World Atlas, Flight Distance between Cities, mileage calculator (Dreca, 2011).

Methodology and Model

Classical gravity models generally use cross sectional or time series data to estimate trade effects and trade relationships for a particular time period, for example one year. In reality it is better to use cross sectional data observed over several time periods (panel data) and it will result in more useful information than cross-sectional data alone. The advantages of this method are those that panel data capture the relevant relationships among the variables over time, and panels can monitor unobservable trading-partner-pairs' individual effects. (Gujarati and Porter, 2009; Stock and Watson, 2007).

The aim of study is to show that there is positive relationship between lending and bilateral trade flows and how gravity model of trade can be applied to lending model.

$$Lending = f \left\{ \begin{matrix} GDP_{BiH}, GDP_{cntr}, Distance_{BiHcntr}, EURO, EXRATE, \\ EU, FTA, BANKOWNERSHIP, AREA_{cntr}, Trade_{BiHcntr} \end{matrix} \right\}$$

Equation (2)

In the gravity model of lending, the dependent variable is lending to Bosnia and Herzegovina, and independent variables are incomes of countries from sample and income of Bosnia and Herzegovina both measured in GDP, distance between capitals, and EX RATE between countries, dummy variable for trade agreements FTA, EURO if country belongs to Euro Zone, EU dummy if the partner is a member of European Union (EU), bankownership if country has its branches in B&H, area of country, and total bilateral trade flows of Bosnia and Herzegovina and trading partner.

The gravity model can be linearized by taking the natural logarithm of all variables. The model is defined in a logarithmic form (log-log and log-lin), which means that values of all quantitative variables, except exchange rate and area of country were transformed into natural logarithms (ln), therefore the whole equation is in the logarithmic form. The model will be estimated in logarithmic form, based on the assumption that dependent and independent variable are not linearly related. For 1% change in independent variable there is $\beta\%$ change in the dependent variable, in lending or 1 unit change in independent variable leads to $100\beta\%$ change in dependent variable.

Econometric Model is represented by Equation 3:

*Lending*_{BiHcntr}

$$= \beta_0 + \beta_1 GDP_{BiH} + \beta_2 GDP_{cntr} + \beta_3 Dist_{BiHcntr} + \beta_4 EURO \\ + \beta_5 EXRATE + \beta_6 EU + \beta_7 FTA + \beta_8 BANKOWNERSHIP \\ + \beta_9 AREAcntr + \beta_{10} trade + U_{BiHcntr}$$

Equation (3)

Where:

*Lending*_{BiHcntr}: Natural logarithm of lending to B&H from the pair country

*GDP*_{BiH}: Natural logarithm GDP of Bosnia and Herzegovina

*GDP*_{CNTR}: Natural logarithm GDP of partner of Bosnia and Herzegovina

*Dist*_{BiHcntr}: Natural logarithm of Distance between Sarajevo and the pair country's capital

EURO: Dummy variable which takes value of 1 if partner is using EUR as currency, zero otherwise

EXRATE: Exchange Rate between currencies of selected countries

EU: Dummy variable which takes value of 1 if partner is member of EU, zero otherwise

FTA: Dummy variable which takes value of 1 if Bosnia and Herzegovina and partner have common FTA, zero otherwise

BANKOWNERSHIP: Dummy variable which takes value of 1 if partner is has its branches in Bosnia and Herzegovina, zero otherwise

AREAcntr= Area of pair country

*Trade*_{BiHcntr}: Natural Logarithm of bilateral trade flows of Bosnia and Herzegovina and pair country

Where β_0 is constant and β is coefficient of variables while u_i is the residual error of regression. This represents the initial model that will be tested through research.

This research should identify factors influencing lending to Bosnia and Herzegovina. Sample consists of 11 countries and Bosnia and Herzegovina itself, mostly because of the availability of data. This study uses the secondary data and data obtained from annual and quarterly reports of above mentioned sources for period 2005 to 2012. In this analysis the panel data methodology is supposed to be used, but after the tests performed, the methodology that is the best appropriate for this analysis is pooled OLS. It analyzed the relationship between incomes of countries from sample and income of Bosnia and Herzegovina both measured in GDP in millions of US dollars, distance between capitals, and dummy variable for trade agreements FTA, EURO if country is part of Euro Zone, EU dummy if the partner is a member of European Union (EU), bank ownership, exchange rate between selected countries and B&H, area of country and total bilateral trade flows between B&H and partner country as independent variables and lending to Bosnia and Herzegovina which represents dependent variable.

The selection of those variables is based on their influence on lending and trade, theoretically and empirically proven.

H_0 : Hypothesis used for empirical purpose for each variable is that the selected variable has no significant impact on lending flows.

Trade patterns can be applied to lending flows so in this model several hypothesis were tested, such as:

GDP represents the size of the economy. As it gets bigger, there is potential for higher flows between the two countries, so a positive sign is expected for GDP. Area of country should have positive effect as the power of country size increases.

Distance represents the distance between economic centers of countries or between their capital cities. The distance variable is a trade resistance factor that represents trade barriers such as transport costs, time, cultural unfamiliarity and market access. Larger distance between countries means higher costs of transportation, so the expected sign for distance is negative. Dummy variable for many cases takes the value one when a certain condition is satisfied, zero otherwise. EURO should have positive sign because of fixed exchange rate be-

tween BAM and EUR. EXRATE can have both signs because increase in the exchange rate leads to higher incentives to lend, but from other side lower incentives to borrow. TRADE is expected to have positive sign because increase in trade flows leads to increase in financial capital flows.

The expected relationship between the specific independent variables and the lending to Bosnia and Herzegovina as dependent variable is indicated in the Table 1.

Table1: Predicted Signs of Variables` Coefficients

Variable	Predicted Sign
GDP B&H	+
GDP cntr	+
Distance B&Hcntr	-
EURO	+
EXRATE	+/-
EU	+
FTA	+
BANKOWNERSHIP	+
AREA cntr	+

Source: Author`s own calculations based on data obtained from BHAS, BIS, CBBH, WB

Results

Various descriptive statistics are calculated of the variables under study in order to describe the basic characteristics of these variables. Table 2 shows the descriptive statistics of the data containing sample means, standard deviations, minimum and maximum value. There are 5 Dummy variables that can take on only two variables 0 or 1 so there are no variation those variables. In the case for variables for both GDP there is no huge variation due to the choice of time period, when most of countries faced slow GDP growth. In sample USA is considered and it explains large maximum value for most of variables such as GDP and distance as well as GPB what is the reason for maximum value for EXRATE of 2.869188 as well as for other variables as it is presented in Table 2 below.

Table 2: Descriptive Statistics

Variable	No.	Mean	Std.Dev.	Min	Max
Lending	88	762.7386	1710.216	1	7368
GDPB&H	88	15843.6	2619.443	10948.05	18543.29
GDPcntr	88	2652384	3951853	304983.6	16244600
DistanceB&H-cntr	88	1792.497	1896.389	532.86	7622.22
EURO	88	0.625	0.4868973	0	1
EXRATE	88	1.821843	0.4023426	0.840992	2.869188
EU	88	0.7159091	0.4535648	0	1
FTA	88	0.0909091	0.2891272	0	1
BANKOWNERSHIP	88	.3636364	.4838024	0	1
AREAcntr	88	1094.072	2571.758	30.28	9147.42

Source: Author's own calculations based on data obtained from BHAS, BIS,CBBH, WB

The dependent and independent variables are tested for multicollinearity based on a simple correlation covariance matrix. As depicted in Table 3 there is no significant multicollinearity problem of independent variables and coefficients presented shows that there is no high level of relation between variables. Coefficients show that there is positive relationship between Lending and trade, while there is negative with distance, as it is assumed in model and positive relationship between GDPBiH and FTA and trade.

Table 3: Correlation Matrix

Variable	Lending	GDPB&H	GDPcntr	Distance B&H-cntr	EURO	EX-RATE	EU	FTA	BANK OWNER	AREAcntr	TRADE
Lending	1.000										
GDPB&H	0.1498	1.000									
GDPcntr	-0.1198	0.0498	1.000								
Distance				1.000							
B&Hcntr	-0.5909	-0.0114	0.6532	-0.4504	1.000						
EURO	0.3060	-0.0569	-0.1846	0.4923	1.000						
EXRATE	0.0313	-0.0881	0.0714	0.8528	0.8117	1.000					
EU	0.1929	-0.0355	-0.1777	-0.4296	-0.3357	-0.6034	1.000				
FTA	0.0719	0.1403	-0.1594	-0.0050	-0.3936	1.000					
BANK OWNER-SHIP	0.7698	0.0308	-0.0883	0.2946	-0.0601	0.2010	0.3165	1.000			
AREAcntr	-0.1856	-0.0310	0.7317	0.8312	-0.4477	-0.3279	-0.5277	-0.0311	-0.2267	1.000	
TRADE	0.7530	0.1436	0.2648	-0.3863	0.2713	-0.1028	0.1023	0.0405	0.8380	0.0325	1.000

Source: Author's own calculations based on data obtained from BHAS, BIS,CBBH, WB

The initial methodology was panel data, and the regression for fixed and random effects was performed. In order to select which model is better fixed or random effect model, Hausman test is run. The Hausman test based on Chi-squared statistic (7.32, df.6 with prob. 0.2927) suggested that corresponding effects are statistically insignificant, so the null hypothesis is accepted and random effect model is preferred. LM test is performed that helps to decide between a random effects regression and a simple OLS regression. There is no significant difference across units and the results were in favor of OLS (Chi-squared = 0.93 with prob. 0.3353).

The final model that best explains the determinants of the Lending Flows to Bosnia and Herzegovina is pooled OLS regression model. The model was tested for OLS assumptions, and the results of tests show that it does not suffer from omitted variable bias.

The null hypothesis is that the model does not have omitted-variables bias, the p-value (0.9003) is higher than the usual threshold of 0.05 (95% significance), so we fail to reject the null and conclude that we do not need more variables. The model was tested for Heteroskedasticity and there was no problem of Heteroskedasticity ($p=0.2685$).

The dependent variable is Lending and in Table 4 estimation results of Pooled OLS Regressions are presented.

Table 4: Models OLS

Variable	OLS	Std. Error	t-stat	p-value
GDPB&H	1.634367	1.090262	1.50	0.139
GDPcntr	-1.212299	0.5307782	-2.28	0.026
Distance-B&Hcntr	-2.84274	0.9282583	-3.06	0.003
EURO	0.97205	1.150456	0.84	0.401
EXRATE	4.321527	1.585336	2.73	0.008
EU	-1.779976	1.830908	-0.97	0.335
FTA	3.232898	1.944849	1.66	0.101
BANKOWN-ERSHIP	-0.9107625	1.578947	-0.58	0.566
AREAcntr	0.0008575	0.002113	4.06	0.000
TRADE	1.957509	0.8053678	2.43	0.018
intercept	6.298262	11.53757	0.55	0.587

Variable	OLS	Std. Error	t -stat	p-value
R2	0.7819			
Adj.R2	0.7478			
Std. Error of the Estimate	1.4052	Sum of the Squares of the Residual	126.37	
		Sum of the Squares of the Regression	452.96	
F- Statistics	22.94			
Prob (F- Statistics)	0.0000			

Source: Author's own calculations based on data obtained from BHAS, BIS,CBBH, WB

In Equation 4 estimated regression line is shown.

$$\begin{aligned}
Lending_{BiHcntr} &= 6.298262 + 1.634367GDP_{BiH} - 1.212299GDP_{cntr} - 2.84274Dist_{BiHcntr} \\
&+ 0.97205EURO + 4.321527EXRATE - 1.779976 EU \\
&+ 3.232898FTA - 0.9107625BANKOWNERSHIP \\
&+ 0.0008575AREAcntr + 1.957509Trade + U_{BiHcntr}
\end{aligned}$$

Equation (4)

The standard error (SE) of β_0 is 11.53757, of β_1 is 1.090262, of β_2 is 0.5307782, of β_3 is 0.9282587, of β_4 is 1.150456, of β_5 is 1.585336, of β_6 is 1.830908 of β_7 is 1.944849, of β_8 is 1.578947, β_9 is 0.0002113 and β_{10} is 0.8053678.

The R-square of regression is 0.7819, while adjusted R- square is 0.7478. Adjusted R-square is used as better measure of fit, and it means that model can explain 78.19% or 74.78% of variability in dependent variable, Lending flows to Bosnia and Herzegovina can be explained by the independent variables, incomes of countries from sample and income of Bosnia and Herzegovina both measured in GDP , distance between capitals, and dummy variable for trade agreements FTA, EURO, EU dummy if the partner is a member of European Union (EU), bankownership, exchange rate, area of country and total bilateral trade flows of Bosnia and Herzegovina. Other factors that are not included in this regression $U_{BiHcntr}$ explains remaining percents, but our tests shows that our model does not suffer from omitted variable bias so these independent variables are good explanation for dependent variable. The standard error of regression is 1.4052 and it is statistically significant at 5% with F-stat= 22.94 (Prob=0.000).

Table 5: Summary of Hypothesis Testing

Variable	Sign	Reject H0	Signf.
Level			
GDPB&H	+	No	-
GDPcntr	-	Yes	0.05
DistanceB&Hcntr	-	Yes	0.01
EURO	+	No	-
EXRATE	+	Yes	0.01
EU	-	No	-
FTA	+	No	-
BANKOWNER-SHIP	-	No	-
AREAcntr	+	Yes	0.001
TRADE	+	Yes	0.05

Source: Author's own calculations based on data obtained from BHAS, BIS,CBBH, WB

Statistical significance is determined by comparing t-statistics with critical values. It is shown (Table 5): that variables GDPcntr, DistanceBiHcntr, EXRATE, Areacntr and TradeBiHcntr have statistically significant influence on Lending while, GDPBiH, EURO, EU, FTA and BANKOWNERSHIP have no statistically significant effect, but according to the rule of thumb if t- statistics >1, those variables are kept in the model.

The results of performed regression shows that increase in 1% in GDPBiH will lead to 1.634367% increase in lending to Bosnia and Herzegovina, while 1% increase in GDPcntr will lower lending to Bosnia and Herzegovina by 1.212299% as well as 1% more in distance will decrease lending flows by 2.84274%, larger area of country implies higher flows by 0.08575% and 1 change in exchange rate will lead to 4321527 % increase in flows because of incentive to lend at higher rates and 1% higher level in bilateral trade flows will increase lending flows by 1.957509%, scatter plot upwards and our hypothesis is proven, same assumptions can be applied to the financial flows and there is positive relationship between bilateral trade flows and financial flows (Figure 1) as it is stated in beginning

Figure 1: Scatter Plot Lending and Trade

Source: Author's own calculations based on data obtained from BHAS, BIS,CBBH, WB

If partner country belongs to EuroZone, lending to Bosnia and Herzegovina will be higher by 0.97205, if it has common FTA it will increase flows by 3.232898, if it has its branches it will crease trade by 0.9107625 and if it is part of EU by 1.779976. agreements for trade flows. Tinbergen (1962) examines the effect of FTA on trade. He finds a significant effect of FTA on trade while Bergstrand (1985) finds an insignificant effect. But those effects are not statistically significant. It can be explained by the fact that FTA agreements still do not have crucial role in trade. Also there are few trade agreements between BiH and its trade partners. These agreements still need time to be in function.

Conclusion

The objectives of this research are to provide a theoretical justification by using the gravity model in the analysis of lending flows and apply the gravity model to analyze lending to Bosnia and Herzegovina. This paper contributes to both theoretical and the empirical literature about gravity models of Bosnia and Herzegovina. The aim of study was to show that there is positive relationship between lending and bilateral trade flows and how gravity model of trade can be applied to lending model. This study should provide incentives for further research and to apply gravity model to explain determinants of lending to Bosnia and Herzegovina. It is found that the usage of the gravity model in applied research of international flows is theoretically justified for B&H case.

In this study, the generalized gravity model of lending for Bosnia and Herzegovina was estimated. The analysis of a data set of observation for 11 countries in period from 2005-2012 show how capital flow (lending to Bosnia and Herzegovina) is influenced by many factors such as: gross domestic product of lending country, gross domestic product of Bosnia and Herzegovina, distance between two countries, amount of bilateral trade flows, exchange rate, bank ownership, being part of European Union and Euro Zone, signing Free Trade Agreement and area of country. Selected variables are chosen on the previous research, availability of data and analysis is done through several methods and some diagnostics tests are performed in order to determine the most appropriate model that explains determinants of borrowings of Bosnia and Herzegovina. Results indicate based on data that gross domestic products GDP of selected country, distance, exchange rate, area of country and bilateral trade flows have significant effect on borrowings. On the

other hand variables EURO, EU, FTA, GDP of B&H and bank ownership do not appear to have significant effect on lending to Bosnia and Herzegovina. FTA agreements do not have expected influence due to the fact that agreements are relatively new and their impact on flows needs some time to work well. Variables GDPcntr, distance, EU and bankownership have negative effect on lending, while variables EURO, exchange rate, FTA, GDPbih, areacntr and bilateral trade flows are positively related with borrowing of Bosnia and Herzegovina.

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