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Bosnia and Herzegovina vs. Her Trading Partner from Southeast Europe

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Abstract. It is well known that there is a strong relationship between real depreciation of the real exchange rate and the trade balance. Therefore, in this paper we investigated the presence of the J-curve between Bosnia and Herzegovina and seven leading trading partners in Southeast Europe. In the study we have used time series of disaggregated data from 1999 to 2015 and econometric techniques such as co-integration analysis, vector error correction, Johansen's co-integration test, diagnostic tests and tests of stability. The results have shown that there is a co-integration and the presence of the phenomenon of J-curve in the case of Romania and Bulgaria, while this effect is absent in other countries.
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JEL. F14, F31, F32.

1. Introduction

There is a strong argument among international trade economists that depreciation causes a decrease in deficit of the trade balance (Bahmani-Oskooee, 1985). Therefore, the interaction between real depreciation of the currency and the international trade is often considered the primary focus of research and dispute between many academic researchers and policy makers. In long term, depreciation balances the trade balance, while this rarely happens in the short term (Šimáková, 2013; Šimáková & Stavarek, 2015). Trade balance represents a relationship between the volume of exports and imports. In the case of imports being higher than exports, we have a deficit, and vice versa, we have a surplus (Krueger, 1983). Trade balance of a particular country can be improved in two ways. The first is an internal approach and is based on the supply-side policies that improve productivity, reduce inflation and taxes and lead to a more efficient labor market. In the end, it all leads to the growth of GDP and exports. Another way is the currency depreciation which leads to changes in relative prices of imports and exports (Krueger, 1983; Stučka, 2004).

There are two dominant approaches regarding currency depreciation in economics literature. The absorption approach assumes that depreciation leads to deflection of consumption from foreign products to domestic products, which leads to an improved trade balance. On the other hand, the monetary approach allows

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depreciation to devaluate currency values and prices of non-traded and traded goods, leading to an improved trade balance (Aftab & Khan, 2008). In the short term, depreciation causes an imbalance in the trade balance due to the unchanged quantity of import, that is more expensive due to a lower exchange rate. In the long run, export grows significantly, and import declines affecting the improvement of the trade, but not enough to achieve a surplus. The effect of depreciation leads to a fall in the prices of exports relative to imports. The growth of exports and decrease of imports improves the current account. In the long run, depreciation leads to a reduction in the current account deficit. The trade balance improves when demand adjusts the price change (Khieu Van, 2001; Nagpal, in press; Sahlan *et al.*, 2008).

After depreciation, there is the time delay effect (a time lag), i.e. an equilibrium is not so quickly created in the trade balance. Time lag occurs for several reasons. First, the depreciation of certain currencies requires more time to identify specific changes that it causes in terms of the competitiveness of products and services. Businessmen need some time before they can respond to changing conditions after a change in relative prices. Recognition takes longer in international trade than in the domestic market due to language differences and distances of the markets. Second, decision-making requires a certain time lag, because it takes some time to establish new business ties and sign new business contracts. Third, delay of delivery (a delivery lag) refers to the necessary time to create an order form and deliver products. Supply of raw materials can be delayed in order to spend existing stock of the product. Fourth, the production lag or delay is due to the fact that manufacturers have to ascertain whether the current situation in the market will be profitable or not, in view of the continuing process of production (Junz *et al.,* 1973; Krugman & Baldwin, 1987; Bahmani-Oskooee, 1985).

The economic concept of the J-curve was first introduced by Magee (1973) who points out that the trade balance in a given country gets worse in the short term as a result of currency depreciation, i.e. due to time delay. In the beginning or in the short term, trade balance deteriorates, in order to improve in the long-term. Using the example of the trade balance of the United States, the deterioration after the devaluation of the dollar in 1971 is observed. Such a condition causes the trade balance to have a movement in the form of a curved J-curve (Magee, 1973; Bahmani-Oskooee & Kantipong, 2001; Bahmani-Oskooee & Goswami, 2003; Sorensen *et al.,* 2010; Harvey, 2013). The J-curve phenomenon is based on the assumption that exports are denominated in the local currency, while imports are denominated in the foreign currency. Therefore, it often happens that the J-curve does not occur in small countries after real depreciation, i.e. when exports are expressed in a foreign currency. In addition, the J-curve is to explain a condition in the trade balance based on exchange rate, domestic and foreign GDP (Kamoto, 2006; Akbostancı, 2002).

B&H is a small and relatively open economy. Its economic growth relies heavily on the realization of revenue derived from exports. The domestic market is relatively small and does not provide the ability to produce economies of scale. In addition, in large part it is import dependent to meet the needs of domestic consumption. Within the former Yugoslavia, B&H recorded a positive trade balance until 1992. However, B&H economy was devastated during the war from 1992 to 1995, causing a significant imbalance in the trade balance, i.e. it had significantly more imported than exported products. As a result, for a little more than two decades B&H has been facing the problem of foreign trade imbalance that has arisen as a result of the growth of the current account deficit. The cause of the current account deficit is a high trade deficit. The trade balance of B&H recorded a permanent deficit from 1995 to 2015. The total exports of B&H in 2015 amounted to 5,019 billion dollars, while total imports amounted to 8,857 billion. dollars. The trade deficit in 2015 amounted to EUR -3,748 billion dollars. The export-import ratio in 2015 was 56.1%. For comparison, in 1998 the export-import ratio was only 20.4% (Centralna Banka B&H, 2015).

The main objectives of this paper are: 1) to investigate potential presence of co-integration variables; 2) to investigate whether there is a phenomenon of the J-curve; 3) to investigate the stability of the coefficient based on the application of diagnostic statistics and stability tests.

The paper consists of the sections as follows: The most significant papers are provided in Section 2; Section 3 contains databases used in the research and economic; Section 4 presents the research results, while Section 5 gives conclusion.

2. Literature Review

It is well known that numerous studies are trying to confirm the presence of the J-curve, based on the traditional approach. The leading research include Magee (1973), Goldstein & Khan (1976, 1978), Spitaller (1980), Haynes & Stone (1983), Gylfason & Risager (1984), Bahmani-Oskooee (1985, 2001, 2003), Krugman & Baldwin (1987), Marwah & Klein (1996), Hacker & Hatemi-j (2003), Bahmani-Oskooee & Kutan (2006).

There are several studies that estimate the presence of the J-curve in the case of developed countries and developing countries. Bahmani-Oskooee & Kantipong (2001) tested the presence of the J-curve between Taiwan and its five leading trading partners. They applied the Autoregressive Distributed Lag and the time series of quarterly data from 1973 to 1997. They investigated the presence of the J-curve only between Taiwan and the US, and Taiwan and Japan. Akbostanci (2002) investigated the presence of J-curve for Turkey in the period from 1987 to 2000. He applied the co-integration analysis and determined that J-curve does not exist in the case of Turkey. Bahmani-Oskooee & Goswami (2003) investigated the presence of the J-curve between Japan and its leading trading partners. The applied the econometric technique Autoregressive Distributed Lag and used the time series of quarterly data from 1973 to 1998. In the case of applying data aggregation the presence of J-curve was not observed, while in the case of applying bilateral data, the J-curve effect between Japan and Germany and Japan and Italy was investigated. Hacker and Hatem-j (2003) investigated the presence of the J-curve in the example of north-European economies. They used econometric techniques Johansen and Juselius maximum likelihood approach and vector error correction methods. They investigated the presence of J-curve for analyzed countries. Onafowora (2003) investigated the presence of the J-curve in ASEAN trade with the United States and Japan. The study applied co-integration analysis and used the quarterly data from 1980 to 2001. The study showed that Indonesia and Malaysia recorded the presence of the J-curve for the United States and Japan, while in the case of Thailand it is only recorded in trade with the United States.

Bahmani-Oskooee & Ratha (2007) investigated the presence of the J-curve between Sweden and its seventeen trading partners. They applied the Autoregressive Distributed Lag and the time series of quarterly data from 1980 to 2005. The study showed that there is a presence of J-curve in only five of the seventeen countries, i.e. in the case of Sweden, Austria, Denmark, Italy, the Netherlands and Britain. Sahlan *et al.,* (2008) investigated the presence of the J-curve between Malaysia and its leading trading partners in the period from 1970 to 2003. They applied the co-integration analysis. The study found the presence of the J-curve for the United States and Japan. Hsing (2008) investigated the presence of the J-curve in the U.S. bilateral trade with its seven leading trading partners from South America. The presence of the J-curve was observed for Chile, Ecuador and Uruguay. Bahmani-Oskooee & Harvey (2009) investigated the presence of the J-curve za Indonesia and its thirteen trading partners. The study applied the ARDL model and used the quarterly data from 1974 to 2008. The study showed the presence of J-curve for the United Kingdom, Singapore, Canada, Japan and Malaysia.

Harvey (2013) investigated the presence of the J-curve in the case of bilateral trade between the Philippines and its fifteen leading trading partners. The study showed the presence of J-curve for Australia, Thailand and Saudi Arabia.

Šimáková (2013) investigated the presence of the J-curve between Hungary and its leading trading partners. The study applied the Johansen co-integration test and used the quarterly data from 1997 to 2012. The study showed the presence of J-curve only for the United Kingdom. Pllaha (2013) investigated the presence of the J-curve in bilateral trade between Albania and its leading trading partners. The study applied the ARDL approach and used the quarterly data from 1998 to 2012. The study showed the presence of J-curve only for Italy and Turkey, and real depreciation had caused a decrease in Albania's trade deficit.

3. Data and Methodology

This research relates to the assessment the presence of the J-curve between B&H and its seven trading partners in Southeast Europe. Available data relate to the annual level, i.e. from 1999 to 2015. Data used in the research were taken from the databases, as follows: World Bank (World Development Indicators), International Financial Statistics (IFS), Eurostat, the Statistics Agency of Bosnia and Herzegovina, National Bank of Macedonia, the Central Bank of Bosnia and Herzegovina, the National Bank of Serbia and <http://wits.worldbank.org/>.

In formulating the model of the trade balance on a bilateral level we very strongly referenced the work of Onafowora (2003), Halicioglu (2007) and Sahllan *et al.,* (2008). Therefore, we started from the next model

$$ln\,TB_{i,t} = \beta_0 + \beta_1\, lnY_{j,t} + \beta_2 lnY_{i,t} + \beta_3 lnEXR_{i,t} + e_t \quad (1)$$

where $TB_{i,t}$ – measures the trade balance between B&H and its trade partners i. It is defined as the difference between B&H exports and imports with the country i. $Y_{j,t}$ - represents the B&H income (GDP) in the period t; $Y_{i,t}$- income of the trading partner i in the period t; $EXR_{i,t}$ - bilateral exchange rate between the Bosnian BAM and the trading partner in time t; ln – represents the natural logarithm; β_0, β_{1}, β_2 i β_3 are parameters; e_t - the error term.

In equation (1) we expect β_1 will have a positive sign, i.e. that the growth of the B&H income or GDP will affect the growth of imports of products from trading partners. However, if GDP grows as the result of production growth of the import substitutive products, then B&H will import less as its economy grows, causing a negative assessment. In the case of β_2 a positive or negative sign can be expected. In case of β_3 real depreciation will lead to increased exports and decreased imports. Finally, based on the J-curve we can expect that in the short term the real depreciation will worsen the trade balance.

Equation (1) represents the trade balance model. Testing the short-term effects, i.e. the existence of J-curve due to currency depreciation, implies the inclusion of short-term effects of a dynamic nature in the equation (1). The dynamic nature can be achieved by including Vector Error Correction Model in the equation (1). Based on the methods used by Pesaran & Shin (1995), i.e. by modifying the equation (1) we get the Autoregressive Distributed Lag (ARDL) model in the following format (Bahmani-Oskooee & Goswami, 2003; Sahllan *et al.,* 2008).

$$\begin{aligned}\Delta ln\,TB_{i,t} =\ & \beta_0 + \textstyle\sum_{i=1}^{m} \beta_{1,i} \Delta ln\,TB_{j,t-1} + \sum_{i=0}^{m} \beta_{2,i}\, \Delta lnY_{j,t-i} + \sum_{i=0}^{m} \beta_{3,i}\, \Delta lnY_{i,t-i} + \\ & \textstyle\sum_{i=0}^{m} \beta_{4,i}\, \Delta lnEXR_{i,t-1} + \alpha_1 ln\,TB_{i,t-1} + \alpha_2 ln\,Y_{j,t-1} + \\ & \alpha_3 ln\,Y_{i,t-1} + \alpha_4 ln\,EXR_{i,t-1} + e_t \quad (2)\end{aligned}$$

where Δ represents the first-difference operator; m represents the length of lags. We expect in the short term that the effect of real depreciation β_4 will have a significant value. Also, we expect that in the long term the effect of real depreciation α_4 will have a significant value. For the first few years or the t-period the estimate for β_4 is that it will have a negative value and that it will subsequently be followed by a positive value by which the existence of the J-curve phenomenon will be confirmed.

Testing the null hypothesis, i.e. whether time series have a unit root is widely represented in the research papers in the last few decades (MacKinnon, 1992). Accordingly, Augmented Dickley Fuller test (Dickey, 1979) and Phillips & Perron (1988) test were used in the equation (2). The Augmented Dickey-Fuller test is to determine the presence of stationary or non-stationary time series. If a time series is not stationary then, by introduction of the first difference series it becomes stationary, i.e. they are integrated on the same level (1). The ADF test allows the inclusion of the dependent variable with a delay or lag (lagged) in order to eliminate the residuals of the serial correlation and to show that all variables are integrated on the same level I(1). The regression model of the ADF test will be presented as (Greene *et al.,* 2008).

$$\Delta y_t = u + \gamma^* y_{t-1} + \sum_{j=1}^{\rho-1} \emptyset_j \, \Delta y_{t-j+1} + \varepsilon_t \tag{3}$$

where Δ is the first difference operator, t – time trend, u, γ and $\emptyset_j$ are estimated parameters, ε_t is the error term and $\rho - 1$ is the number of extended lags. The null hypothesis of the Augmented Dickey-Fuller t-test is $H_0\!:\gamma = 0$ and alternative hypothesis is $H_0\!:\gamma < 0$.The null hypothesis shows unsteadiness of data and the series has no unit root, while in the case of the alternative hypothesis the data is stationary and the series has a unit root test (Ho *et al.,* 2004; Hill *et al.,* 2011).

The ADF test is not reliable in identifying serial correlation and heteroscedasticity and Phillips & Perron (1988) test is therefore used to correct error term ε_t, with a direct modification of the test statistics $t_\pi = 0$ and $T\hat{\pi}$, i.e. it uses nonparametric techniques. PP test is represented as

$$Y_t = \beta_0 + \delta_t + \gamma_1 \Upsilon_{t-1} + \sum_{j=1}^{l} \gamma_j \, \Delta\Upsilon_{t-j} + \varepsilon_t \tag{4}$$

After that, we will apply the Johansen test of the co-integration to investigate the long-term relationship between the variables in the equation (2). This test provides an opportunity for an effective treatment of several variables or co-integration relations, while the Engle-Granger test can process only one co-integration relationship. The Co-integration test (1988, 1991, 1995) is used to investigate the co-integration between the variables.

$$\Delta x_t = \Pi x_{t-1} + \sum_{i=1}^{l-1} \Gamma_i \, \Delta x_{t-1} + \mathrm{B} y_t + \varepsilon_t \tag{5}$$

where

$$\Pi = \sum_{i=1}^{l} \mathrm{A}_i - \mathrm{I} \qquad\qquad \Gamma_i = -\sum_{j=i+1}^{l} A_j$$

The model enables the identification of short-term and long-term adjustments, i.e. it represents changes in X_t – estimated variable matrix. The adjustment is shown via Π matrix which shows a linear independence between variables. Matrix Π can be represented as the vector adjustment of parameters α and the co-integration vector β, as $\Pi = \alpha\beta'$. When $\Pi = 0$ the variables are not in co-integration and the relation boils down to a vector autoregression in the first differences (Dwyer, 2015).

$$\Delta X_t = \sum_{i=1}^{l-1} \Pi_i \Delta X_{t-1} + e_t \tag{6}$$

The variable can be I(1) non-stationary and I(0) stationary. It is highly important to identify the classes non-stationary processes I(1) and make them stationary after the introduction of differencing. On the other hand, stationary processes I(0) become non-stationary when you add up and thereby limit the relationship between a random walk and its increase (Johansen, 2000). If there is co-integration between the variables than rank $(\Pi) \neq 0$ and in fact rank $(\Pi) =$ the number of co-integrating vectors. The number of co-integrating vectors is less than or equals to the number of variables n and strictly less than n if the variables have unit roots (Dwyer, 2015). In that case we can present Π as $\Pi = \alpha\beta'$, where α and β represent the $n\ x\ r$ matrix. Keep in mind that α and β are only recognizable as non-singular change $\Pi = \alpha\beta_0 = aF^{-1}(\beta F')'$ for any non-singular F. The inability to identify the results from the multivariate co-integration analysis often creates a problem in the interpretation and finding the appropriate ways to normalize β and thereby α (Johansen, 1991; Johansen, 1995; Sorensen, 1997).

The Johansen test proposes two different tests of the probability coefficient of correlation reducing the level of the Π matrix. These are the trace test and the maximum eigenvalue test (Verbeek, 2004; Hjalmarsson & Österholm, 2007).

$$\lambda_{trace} = -T \sum_{i=r+1}^{n} \log(1 - \lambda_i) \quad (7)$$

$$\lambda_{trace} = -T \log(1 - \lambda_i) \quad (8)$$

where r refers to ranking for co-integration vector, T refers to the number of independent observations or sample size, λ_i refer to the largest canonical correlation. The hypotheses on whether cointegration vector exists or not are shown as below (Sahllan *et al.*, 2008; Sharma & Panagiotidis, 2005).

$$H_0 = r = 0,\ r =< 1 \ldots\ldots r =< k \quad (9)$$
$$H_1 = r = 0,\ r => 1 \ldots\ldots r => k$$

Finally, diagnostic and stability tests are used to assess the reliability of ARDL models. The assessment of the diagnostic tests includes Lagrange Multiplier test, the Ramsey Reset test, the Jarque-Berra test and the KB test (Siddiqui et al., 2008; Bhatta, 2011; Kurtovic et al., 2016). Stability test of variables are carried out by applying cumulative sum of squared recursive residuals and cumulative addition of recursive residuals and. These statistical tests are presented through diagrams. If these statistics are moving within a defined level of significance, stability is considered to exist.

4. Empirical Results

Table 1 represents the results of tests for the ADF (1979) test and PP (1988) test. Results of the unit root test show the presence of the long-term relationship between the trade balance, GDP of Bosnia and Herzegovina, exchange rates and GDP of Croatia, Serbia, FYR Macedonia, Romania, Bulgaria, Albania and Turkey. These tests show the presence of the smallest unit root at level for each time series or form and stationarity of first difference at level of 5% of significance. Data in the time series is not stationary at level, but with the introduction of the first difference it becomes stationary at the level of 1% and 5% of significance, which means the presence of the long-term relationship between the variables.

Table 1. *Unit Root Tests*

Variable	ADF Level	ADF 1st difference	Phillips-Perron Level	Phillips-Perron 1st difference
B&H				
lnGDPit	1.079.343	-2.426940**	0.939891	-2.341278**
Croatia				
lnGDPjt	0.534937	-2.233516**	0.400239	-2.165668**
lnRER	0.176731	-4.581269***	0.197474	-4.538738***
lnTrade Balance	-0.625601	-4.144144***	-528712	-4.126283***
Serbia				
lnGDPjt	0.205231	-3.957354***	0.20599	-3.941829***
lnRER	1.144.277	-3.247414***	144.277	-3.244619***
lnTrade Balance	0.16618	-2.737869***	0.288552	-2.515047**
FRY Macedonia				
lnGDPjt	0.464622	-0.745446*	0.456298	-2.337270**
lnRER	2.417.726	-2.625521**	2.256.408	-2.565876**
lnTrade Balance	-0.858681	-3.902284***	-0.768868	-4.310898***
Turkey				
lnGDPjt	1.062.980	-2.912247***	1.007.180	-2.904358***
lnRER	2.531.564	-2.572986**	2.524.039	-2.575148**
lnTrade Balance	-1.065.925	-3.861435***	-0.982259	-4.473261***
Romania				
lnGDPjt	0.862667	-2.738488***	0.862657	-2.690106**
lnRER	-4.541.888	-51.19596***	-3.881.546	-43.02610***
lnTrade Balance	-1.193.196	-4.546491***	-1.174.141	-5.716482***
Bulgaria				
lnGDPjt	1.057.609	-2.245539**	0.899664	-2.152647**
lnRER	-1.000.536	-17.78353***	-6.433.392	-24.45720***
lnTrade Balance	-1.984.676	-6.099489***	-1.984.676	-11.10835***
Albania				
lnGDPjt	1.228.235	-2.157532**	1.063.897	-2.183207**
lnRER	-0.615478	-2.652603**	-0.615478	-2.690215**
lnTrade Balance	-0.740532	-3.340907***	-0.749023	-3.277207***

Notes: **, and *** denote rejection of the null hypothesis of unit root at the 5%, and 1% significance level respectively. Critical value refers to MacKinnon (1996).

U Table 2 presents the result of the co-integration test, which measures the co-integration between the four time series, i.e. trade balance, GDP of B&H, the GDP of trading partners and the exchange rate Bosnian BAM and the currencies of trading partners. The null hypothesis of the lack of co-integration vector $H_0\!:r=0$ is rejected in most cases and alternative hypotheses $H_0\!:r \leq n$, are accepted, in the case of trace statistics and maximum eigenvalue statistics at 1% and 5% of significance. However, the null hypothesis of the existence of at least one co-integration vector cannot be rejected, with regards to the alternative hypotheses, in the case of 6 co-integration vectors, in both tests. Finally, we assert the presence of a significant relationship between time series and a common trend in the long run.

Table 2. *Cointegration Test Statistic*

Cointegration		λ trace	Critical value	λ trace	Critical value
Croatia					
lnTrade Balance	$H_0\!:r=0$ $H_A\!:r\geq 1$	80.01975***	4.785.613	32.34032**	2.758.434
ln GDPit	$H_0\!:r\leq 1$ $H_A\!:r\geq 2$	47.67943***	2.979.707	27.40509***	2.113.162
lnGDPjt	$H_0\!:r\leq 2$ $H_A\!:r\geq 3$	20.27434***	1.549.471	14.40768**	1.426.460
lnRER	$H_0\!:r\leq 3$ $H_A\!:r\geq 4$	5.866656**	3.841.466	5.866656**	3.841.466
Serbia					
lnTrade Balance	$H_0\!:r=0$ $H_A\!:r\geq 1$	119.1373***	4.785.613	65.24986***	2.758.434
ln GDPit	$H_0\!:r\leq 1$ $H_A\!:r\geq 2$	53.88734***	2.979.707	30.31672***	2.113.162
	$H_0\!:r\leq 2$				

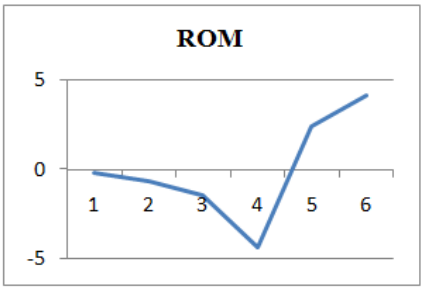
lnGDPjt	$H_A{:}r \geq 3$	23.57071***	1.549.471	19.18931***	1.426.460
lnRER	$H_0{:}r \leq 3$ $H_A{:}r \geq 4$	4.381398**	3.841.466	4.381398**	3.841.466
			Turkey		
lnTrade Balance	$H_0{:}r = 0$ $H_A{:}r \geq 1$	87.45107***	4.785.613	50.46213***	2.758.434
ln GDPit	$H_0{:}r \leq 1$ $H_A{:}r \geq 2$	36.98894***	2.979.707	1.711.684	2.113.162
lnGDPjt	$H_0{:}r \leq 2$ $H_A{:}r \geq 3$	19.87210**	1.549.471	14.41448**	1.426.460
lnRER	$H_0{:}r \leq 3$ $H_A{:}r \geq 4$	5.457611**	3.841.466	5.457611**	3.841.466
			Romania		
lnTrade Balance	$H_0{:}r = 0$ $H_A{:}r \geq 1$	77.77639***	4.785.613	47.25517***	2.758.434
ln GDPit	$H_0{:}r \leq 1$ $H_A{:}r \geq 2$	30.52122**	2.979.707	2.026.143	2.113.162
lnGDPjt	$H_0{:}r \leq 2$ $H_A{:}r \geq 3$	1.025.980	1.549.471	9.973.702	1.426.460
lnRER	$H_0{:}r \leq 3$ $H_A{:}r \geq 4$	0.286094**	3.841.466	0.286094**	3.841.466
			Bulgaria		
lnTrade Balance	$H_0{:}r = 0$ $H_A{:}r \geq 1$	88.08038***	4.785.613	51.18590***	2.758.434
ln GDPit	$H_0{:}r \leq 1$ $H_A{:}r \geq 2$	36.89448***	2.979.707	24.73828***	2.113.162
lnGDPjt	$H_0{:}r \leq 2$ $H_A{:}r \geq 3$	1.215.620	1.549.471	7.742.219	1.426.460
lnRER	$H_0{:}r \leq 3$ $H_A{:}r \geq 4$	4.413982**	3.841.466	4.413982**	3.841.466
			Albania		
lnTrade Balance	$H_0{:}r = 0$ $H_A{:}r \geq 1$	93.44657***	4.785.613	49.67437***	2.758.434
ln GDPit	$H_0{:}r \leq 1$ $H_A{:}r \geq 2$	43.77220***	2.979.707	22.82383**	2.113.162
lnGDPjt	$H_0{:}r \leq 2$ $H_A{:}r \geq 3$	20.94837***	1549471	14.81244**	1426460
lnRER	$H_0{:}r \leq 3$ $H_A{:}r \geq 4$	6.135930**	3.841.466	6.135930**	3.841.466

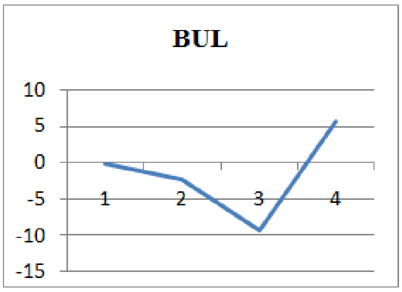
Notes: **, and *** denote rejection of the null hypothesis of unit root at the 5%, and 1% significance level. Critical value refers to MacKinnon-Haug-Michelis (1999).

Table 3 presents the results confirming the presence of the J-curve. The J-curve implies that the coefficients of the exchange rate are negatively significant in shorter time lags, while in the longer time lags they are positively significant. In Equation 2, the J-curve exists if the β_4 coefficient first has a negative value for several time lags followed by a positive value. In Table 3 and Graph 1 we can see that we have succeeded finding the presence of the J-curve phenomenon between B&H and Romania and B&H and Bulgaria. In the first four years of the lag, in the case of Romania, and three years of lag, in the case of Bulgaria, we have a negative value of coefficients, and in the fifth year of lag for Romania and fourth year of lag for Bulgaria we have a significant value of the coefficients. Real depreciation of the Bosnian BAM had a positive effect on the improvement of the trade balance of B&H with Romania and Bulgaria. On the other hand, we have not observed the presence of the J-curve phenomenon for Croatia, Serbia, FYR Macedonia and Turkey. Therefore, the depreciation of the Bosnian BAM according to the currency exchange rates of Croatia, Serbia, FYR Macedonia and Turkey hadn't a positive effect on the improvement of the trade balance of B&H.

Also, in Table 3 presents the diagnostic statistics. AdjR^2 has an optimum value in all tested cases. The LM test shows that in most cases there is no autocorrelation in the disturbance of the error term, except in the case of Serbia and Bulgaria. The RESET test tells us that the models are correctly specified except in the case of

Croatia and Turkey. In addition, we examined whether our models can meet the stability tests: CUSUM and CUSUMSQ. In the case of both tests stability was confirmed. Finally, we can say that our models comply with all tested diagnostic tests.





Graph 1. *The Reaction of Trade Balance to the Change of the Currency Exchange Rate*

Table 3. *Vector Error Correction Model Estimation for Exchange Rate Coefficient Between B&H and Trading Partners*

Country	Croatia	Serbia	FRY Macedonia	Turkey	Romania	Bulgaria	Albania
$\Delta lnREX_{t-2}$	20.613.361	-10.335.066	11.230.113	-74.417.709	-0.1303954	-0.2389896	-78.138.507
	-1.564.431	(-5.459448)***	-0.202327	(-0.339663)	(-0.982219)	(-2.263955)*	(-0.90289)
$\Delta lnREX_{t-2}$	27.577.134	-99.091.820	14.233.552	-46.087.816	-0.6590532	-24.985.219	-97.537.206
	(2.265989)**	(-4.902193)**	-0.392785	(-0.283685)	(-0.658294)	(-1.748149)	(-1.792576)
$\Delta lnREX_{t-3}$	26.345.858	-89.782.385	24.408.320	-36.038.732	-14.341.921	-92.018.044	-74.395.309
	-2.264.400	(-2.889095)*	-0.661691	(-0.183044)	(-0.666592)	(-1.347624)	(-1.134793)
$\Delta lnREX_{t-4}$	25.889.631	-87.133.006	56.610.742	71.058.594	-43.575.648	56.335.257	30.161.848
	-2.039.898	(-4.191803)*	-1.322.057	-0.372008	(-0.139438)	-0.810602	-0.496803
$\Delta lnREX_{t-5}$	227.734.767	-816.968.653	71.992.585	19.744.416	25.488.653		-32.840.333
	-0.745207	(-3.333399)	(2.2733462)*	-0.67624	-1.389.915		(-0.354667)
$\Delta lnREX_{t-6}$	70.631.558	-77.642.983	55.637.830	58.620.985	42.786.261		-10.952.429
	-0.79045	(-1.640343)	(10.158686)*	-1.415.017	(14.271881)**		(-0.613664)
ECt-1	-1312863	-1.214.322	278.511	0.845999	2.046.316	-3.029.647	1.564.131
	-0.2077	-0.2422	(0.0132)**	-0.41	(0.0500)**	(0.0080)***	-0.1373
AdjR2	0.76	0.89	0.86	0.67	0.88	0.54	0.77
LM	8.58	5.09	11.66	9.08	9.52	2.85	6.68
	(0.013)**	(0.078)	(0.002)***	(0.01)**	(0.008)***	(0.23)	(0.035)**
Reset	0.99 (0.004)	0.64 (0.53)**	0.90 (0.40)**	6.95(0.02)	0.93 (0.45)**	2.76 (0.06)**	1.58 (0.21)**
CUSUM	stable	stable	stable	stable	stable	stable	stable
CUSUMSQ	stable	stable	stable	stable	stable	stable	stable

Notes: **, and *** denote rejection of the null hypothesis of unit root at the 5%, and 1% significance level.

5. Conclusion

The main objective of this study was to determine the presence of the J-curve phenomenon between B&H and its trading partners of Southeast Europe (Croatia, Serbia, FYR Macedonia, Albania, Romania, Bulgaria and Turkey). We used the co-integration vector error-correction model and time series data on an annual basis from 1999 to 2015. Our study was limited by the number of observations due to the unavailability of quarterly data, which, to some extent, limits the number of lags used to only six. The co-integration analysis showed the presence of the long-term relationship between the variables. Furthermore, we investigated the presence of the phenomenon of J-curve for Romania and Bulgaria, i.e. real depreciation of Bosnian BAM had a positive effect on the improvement of the trade balance of B&H with Romania and Bulgaria. However, we did not observe the presence of the phenomenon of J-curve for Croatia, Serbia, FYR Macedonia, Albania and Turkey. Finally, our future research will relate to effects of depreciation on imports and exports as per sectors, i.e. trade balance of B&H.

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