THE J-CURVE EFFECT FOR BILATERAL TRADE BETWEEN THE REPUBLIC OF NORTH MACEDONIA AND ITS LARGEST TRADING PARTNERS

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Abstract

This paper aims to analyse the presents of the J-curve effect for bilateral trade between The Republic of North Macedonia and its largest trading partners, namely: Germany, Greece, Bulgaria, Belgium, Serbia, Great Britain, Italy, Turkey, USA and Poland. According to the theory, the devaluation of the domestic currency is expected to initially worsen the trade balance and then improve it and so forming a curve in the form of the letter J. The empirical analysis using quarterly data from q1-1997 to q4-2021 will be performed by the ARDL model as a more appropriate econometric model to analyse the impact of the exchange rate on bilateral trade between the Republic of North Macedonia and its trading partners for the short and long-run relationship. The results suggest that only in three of ten trading partners exchange rate seems to have a long-run effect and only with two have a short-run effect. Based on the results, the existence of the J-curve was found only in bilateral trade with North Macedonia and Belgium.

Keywords: North Macedonia, J-curve, Trade balance, Exchange rate.

1. Introduction

Throughout the globalization and cooperation of countries with one and other in the framework of the international economy, more and more importance has been given to the trade balance of a country. For this reason, a lot of empirical studies have been done to find out which factors affect the trade balance of a country. Where a significant portion of these studies have been focused on the impact that exchange rate has on the trade balance.

The exchange rate has a quite significant impact on trade balance because of the devaluation of domestic currency which can make the exports less important - nonsignificant and imports more expensive, lead on the improvement of the trade balance.

The J-curve has been widely used to explain the effects that the devaluation of the domestic currency may have upon the trade balance. The J-curve predicts that as a result of the devaluation of domestic currency, the trade balance will first worsen and then after a certain time it will start to improve. This means that in the beginning the increased value of imports would dominate over the increased volume of exports which later the volume of exports would outweigh the increased value of imports and causing so an improvement in the trade balance of a country.

2. Literature review

Over the years numerous studies have been done towards the existence of the J-curve. The J-curve as a concept was initially elaborated by Magee (1973) and then later empirically tested by Bahmani-Oskooee (1985), who analysed four developing countries (Greece, India, Korea and Thailand) and found the presents of the J-curve for the upper mentioned economies. All the studies that followed the Magee analyses (1973) up to the study of Rose and Yellen (1989), considered aggregated data to investigate the relationship between the trade of a country with the rest of the world (for example Felmingham 1988; Guptar-Kapoor and Ramakrishnan 1999), the work of Rose and Yellen (1989) is considered to be the first empirical study to consider disaggregated date to investigating the relationship between a reporting country and its major trading partner or partners. After the work of Rose and Yellen (1989), many of the following studies started to also use disaggregated or bilateral date to test the existence of the J-curve (for example Marwah and Klein 1996, Wilson and Tat 2001, Bahmani-Oskooee and Kovyryalova 2008 and many others).

The findings of different researchers from their empirical studies are mixed. Some of them found the presence of the J-curve, like Moffett (1989) in the US trade, Petrovic and Gligoric (2010) in Serbia trade. While others found that there is no J-curve, like Bahmani-Oskooee and Ratha (2004b) in the US trade, Rose and Yellen (1989) found that the J-curve does not hold for the G-7[1] countries and neither for some of the developing countries.

From all the numerous empirical studies that have been done about the J-curve by different authors for different countries, some of these studies have also been done for the South-Eastern European countries (North Macedonia included too) by authors like Bahmani-Oskooee and Kutan (2009), Petrović and Gligorić (2010), Pllaha (2013), Simakova (2013), Simakova (2013), Özsahin (2017), Kurtovic, Halili and Maxhuni (2017) and many others.

Bahmani-Oskooee and Kutan (2009) used monthly data for the period from 1990 to 2005 and applied the ARDL cointegration approach and corresponding error correction model to analyse the presence of the J-curve on some of the European countries (Bulgaria, Croatia, Cyprus, Czech Republic, Hungary, Poland, Romania, Russia, Slovakia, Turkey and Ukraine) and found empirical support for the J-curve only in case of Bulgaria, Croatia and Russia.

Petrović and Gligorić (2010) also used the ARDL model to analyse the impact of the real exchange rate on the trade balance of Serbia and concluded that the real exchange rate has a positive impact on the trade balance in the long-run, while in the short-run initially has a worsening of the trade balance and then its improvement, thus creating a J-curve.

Pllaha (2013) has analyzed the impact of the exchange rate on bilateral trade between Albania, Italy, Greece, Germany, Kosovo and Turkey and the Eurozone, for the period 1998-2012. Based on the results, the existence of the J-curve was found only in bilateral trade with Italy and Turkey.

Simakova (2013) investigated the existence of the J-curve on bilateral trade between Hungary and its main trading partners (Germany, Austria, Italy, France, the Netherlands, the United Kingdom, Poland and the Czech Republic), for the period 1997-2012. Based on the results, the J-curve was detected in trade with United Kingdom. In trade with Austria and Italy there was a partial J-curve, while in trade with Czech Republic there was an opposite J-curve.

Özsahin (2017) analysed the relationship between bilateral trade and the real exchange rate of Turkey and its 20 main trading partners for the period 1995-2015 and found that the real exchange rate has a statistically significant negative effect on bilateral trade with 10 out of 20 trading partners

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[1] G7 or the Group of Seven is an inter-governmental political forum consisting of Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.

taken into analysis.

Kurtovic, Halili and Maxhuni (2017) analysed the relationship of the exchange rate on the export and import demand function of Serbia and its nine main trading partners, for the period 2004-2015. The results have shown that there is a presence of a J-curve in the case of Germany, Austria and Croatia.

Over the years, North Macedonia leads the fixed exchange rate regime, target it to the main EU trade partners as an optimal choice.

3. Methodology

3.1. The Model: To study the bilateral J-curve is usually used the model of Rose and Yellen (1989). A remarkable number of the empirical studies reviewed above such as Bahmani-Oskooee and Kutan (2009), Pllaha (2013), have also adopted the same model introduced in the work of Rose and Yellen (1989) where the trade balance is modelled as a function three main variables such as exchange rate, foreign income and domestic incomes. The equation of the model is as follows:

$$ln\,TB_{i,t} = \alpha_1 + \beta_1 lnY_i + \beta_2 lnY_j + \beta_3 lnER + \varepsilon_t \qquad (1)$$

TB –measure the trade balance and it can be defined as the ratio of North Macedonia's s imports over exports with the selected countries.

Yi, t- presents the North Macedonia's real income or the Real GDP of North Macedonia.

Yj, t- presents the real income of the trading partner j or the Real GDP of the trading partner j.

ER- presents the exchange rate of denar per euro.

According to the J-curve, it is expected that $\beta3 < 0$, since an increase in the exchange rate initially reduces the demand for the home country's export but increases its demand for imports. As a result, the balance of trade initially worsens and then after a while it begins to improve as export and import volumes adjust to price changes. As for the signs of $\beta1$ and $\beta2$, there are no priori expectations, however, one asserts tentatively that $\beta2$ is negative and $\beta1$ is positive (Halicioglu, 2008).

The equation (1) defined above represents the long run relationships between the trade balance and its determinants. But when testing the J-curve in the short run, according to (Hsing, 2009) we must apply the modified error correction model, which can be definite as follows:

$$\Delta ln\,TB_t = \alpha + \sum_{i=1}^{n} \omega_i \Delta lnTB_{t-i} + \sum_{i=1}^{n} \beta_i \Delta lnY_{i,t-i} + \sum_{i=1}^{n} \gamma_i \Delta lnY_{j,t-i} + \sum_{i=1}^{n} \lambda_i \Delta lnER_{\,t-i}$$

$$(2)$$

3.2. Data: The authors have been considering data for the period from first quartal 1997 to forth quarterly 2021. The data consist of the GDP of North Macedonia, exchange rate and trade balance between North Macedonia and its trading partners are collected from The National Bank of the Republic of North Macedonia (NBRNM), while the data on the real GDPs of the trading partners are collected from Federal Reserve Bank of St. Louise (FRED).

4. Empirical Results

This section begins with the checking of the unit root, for which it is used the Augmented Dickey-Fuller (ADF) criteria. According to the results of Augmented Dickey-Fuller (ADF) test presented in Table 1, all the variables, except of the natural logarithm of trade balance with the Turkey (LnTB_TR) and the natural logarithm of the real income of Italy (LnYITA) are non-stationary at levels but stationary in the first difference since the t-statistics are greater than the critical value of

t-statistic at 5%. While the natural logarithm of trade balance with Turkey (LnTB_TR) and the natural logarithm of the real income of Italy (LnYITA) are stationary at levels. Based on the results, it can be concluded that there is a mixture of I (0) and I (1) data and none of the variables are integrated of order two. Therefore, the ARDL model will be used as a more suitable model.

Table 1. Augment Dickey-Fuller Unit Root Test results

Variables	AIC Lag selection	At Level		At First Difference		Conclusion
		t-statistic	t-statistic at 5%	t-statistic	t-statistic at 5%	Order of integration
LnTB_GR	4	-0.266	-2.895	-4.921	-2.895	I (1)
LnTB_GRE	4	-1.085	-2.894	-4.528	-2.895	I (1)
LnTB_SR	4	-1.022	-2.894	-4.439	-2.895	I (1)
LnTB_BLL	3	-1.186	-2.893	-5.344	-2.894	I (1)
LnTB_BEL	3	-2.554	-2.893	-5.320	-2.894	I (1)
LnTB_ITA	4	-1.774	-2.894	-5.222	-2.895	I (1)
LnTB_USA	4	-1.832	-2.894	-4.811	-2.895	I (1)
LnTB_TR	2	-3.289	-2.892	-7.125	-2.893	I (0)
LnTB_PO	4	-1.412	-2.894	-5.860	-2.895	I (1)
LnTB_GB	4	-0.884	-2.894	-4.539	-2.895	I (1)
LnYNM	4	-1.163	-2.897	-5.221	-2.898	I (1)
LnYGR	2	-1.417	-2.892	-7.596	-2.893	I (1)
LnYGRE	3	-1.177	-2.893	-4.391	-2.894	I (1)
LnYSR	2	-0.847	-2.892	-8.121	-2.893	I (1)
LnYBLL	3	-0.898	-2.893	-6.788	-2.894	I (1)
LnYBEL	2	-1.805	-2.892	-8.354	-2.893	I (1)
LnYITA	2	-3.640	-2.892	-7.484	-2.893	I (0)
LnYUSA	2	-1.148	-2.892	-5.612	-2.893	I (1)
LnYTR	2	-1.401	-2.896	-4.500	-2.896	I (1)
LnYPO	2	-1.074	-2.892	-5.447	-2.893	I (1)
LnYGB	1	-2.249	-2.896	-4.710	-2.897	I (1)
LnER	2	-1.321	-2.892	-9.142	-2.893	I (1)

Source: Authors calculation

As we assured that none of the variables are integrated of order two, we will further on proceed with estimating the long-run and the short-run coefficients of our variables. In the long run, along with the results of the coefficients of exchange rate we have also included the results of the coefficients of the other variables like the real GDP of our country and the real GDPs of the partner countries. While in the short run we have only been focused on the results of the coefficients of exchange rate.

The results from the Table 2 showed that only in three out of ten trading partners taken into analyses the devaluation of the domestic currency seems to have a long-run effect, respectively the devaluation of the domestic currency seems to have an effect over bilateral trade with Belgium, United Kingdom and Turkey. The exchange rate coefficients of Belgium and United Kingdom have a positive sign in the long-run, while the exchange rate coefficient of Turkey has a negative sign in the long-run.

Table 2. Long-run estimations of ARDL based on the AIC lag suggestion criterion

	Germany	Greece	Bulgaria	Belgium	Serbia	Great Britain	Italy	Turkey	USA	Poland
LnYi	24.4243 (0.33)	1.0209** (2.05)	4.4023 (1.67)	-1.4728 (-0.58)	3.2304 (0.46)	-0.3355 (-0.15)	5.6445** (2.48)	7.803*** (3.21)	15.36*** (4.78)	-25.345** (-3.37)
LnYj	-75.3849 (-0.36)	-2.73*** (-6.76)	-8.469** (-2.97)	-3.3367 (-0.68)	0.7088 (0.08)	-4.326** (-2.26)	-2.033 (-0.90)	0.2059 (0.60)	-3.29*** (-3.31)	3.4712** (2.11)
LnER	638.347 (0.33)	-20.187 (-1.04)	75.776 (1.42)	86.592* (1.76)	139.402 (0.80)	219.31** (2.33)	-79.701 (-0.96)	-248.87** (-2.42)	-144.03 (-1.22)	69.3737 (0.64)
C	14.5570 (1.55)	22.0265 (1.51)	-21.595 (-1.09)	-60.979 (-1.53)	-38.271 (-0.76)	-44.282** (-2.20)	38.361 (1.18)	132.42** (2.19)	105.59 (1.15)	-20.649 (-0.27)

*t-statistics are in (). *Indicates statistical significances at 10 %,*
*** indicates statistical significances at 5 %,*
**** indicates statistical significances at 1%.*
Source: Authors calculation

In terms of the short-run results shown in the Table 3, negative exchange rate coefficients are followed by positive ones in case of Serbia and Belgium. Negative exchange rate coefficients are followed by positive exchange rate coefficients also in case of Turkey, but the negative exchange rate coefficients are insignificant. While the opposite occurs in case of Poland and Bulgaria, where positive exchange rate coefficients are followed by negative ones. But, in the case of Bulgaria occurs the same as in the case of Turkey where the first exchange rate coefficient (positive one) is insignificant.

In case of the United States of America we have only one significant positive exchange rate coefficient, while for the other countries the results from Table 3 show insignificant exchange rate coefficients or there isn't any coefficient, which means that for these countries exchange rates doesn't have any impact on bilateral trade with them.

Table 3. Short- run estimations of ARDL based on the AIC lag suggestion criterion

	Germany	Greece	Bulgaria	Belgium	Serbia	Great Britain	Italy	Turkey	USA	Poland
D(lnER)	-	28.8850 (1.64)	8.7499 (0.51)	45.9481 (1.09)	-31.719 (-0.77)	-	62.977* (1.71)	-71.505 (-1.18)	250.48** (2.29)	-61.671 (-0.73)
lnERt-1	-	-	22.9768 (1.29)	-100.59** (-2.25)	-89.89** (-2.21)	-	-11.272 (-0.29)	-13.242 (-0.23)	-	188.353**

									(2.15)
lnERt-2	-	-	-5.415** (-2.02)	10.980* (1.82)	15.57*** (2.88)	-	-8.5907 (-1.65)	123.225** (2.22)	-	-27.595** (-2.32)
lnERt-3	-	-	-3.952** (-2.10)	-	-	-	-	-	-	-19.865** (-2.55)

*t-statistics are in (). *Indicates statistical significances at 10 %,*
*** indicates statistical significances at 5 %,*
**** indicates statistical significances at 1%.*
Source: Authors calculation

5. Conclusions

As for the main objective that we sat for this paper which was to analyse the presents of the J-curve for bilateral trade between The Republic of North Macedonia and its largest trading partners (Germany, Greece, Bulgaria, Belgium, Serbia, Great Britain, Italy, Turkey, USA and Poland), we can easily pronounce that this aim met our expectations.

The results suggest that the J-curve stands only in the case of bilateral trade between North Macedonia and Belgium. On the other hand, in the case of Turkey it happens the opposite, where in the short-run the results show a positive exchange rate impact on trade with Turkey, while in the long-run a negative impact on trade with Turkey. As for the other countries, we have a positive impact of exchange rate on trade with United Kingdom in the long-run and a positive impact of exchange rate on trade with United Stated of America in the short-run. Further on, we have a worsening than an improvement of trade balance caused by exchange rate in case of Serbia and Turkey. And the opposite, first an improvement than a worsening of the trade balance caused by exchange rate happens in case of Poland and Bulgaria. While in case of Germany and Greece exchange rate doesn't have any impact on trade balance neither in the long-run nor in the short-run.

This paper enriches the existing empirical literature, especially that of transition economies and the results of this paper can be used as an orientation information for the country's trade policy makers.

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