7. EXPORT-LED GROWTH: EVIDENCE FROM POST-COMMUNIST SERBIA

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Abstract

This study examines the export-led growth hypothesis on a small open economy such as Serbia. The main motivation for this research comes from the fact that Serbia has been striving to achieve sustainable growth by focusing on export. This is the first study which has examined the relations between economic growth and export in the Republic of Serbia with the methodology that we have applied here. The trivariate model (export, economic growth, exchange rate) with quarterly data sets has revealed that variables were cointegrated during the time period from 2004 to 2015. The empirical results indicate that there is a unidirectional causality from export to economic growth in both short and long run. The results obtained confirm the export-led growth hypothesis. Serbia may enhance economic growth by enhancing exports. In order to do so, it is necessary to improve the environment for exporters and to harmonize the structure of exports with the EU imports. The empirical results obtained in this study have certain practical implications for economic policy makers. The Government should support export activities and processes in order to enhance growth performances.

Keywords: exports, economic growth, national economy, ARDL, Bayer-Hanck co-integration, VECM, time series analysis
JEL classification: C32, F11, F43, 024

1. Introduction

The export-led growth (ELG) hypothesis relies on the assumption that exports contribute to economic growth. This study has used time series data for Serbian economy to investigate the relationship between exports and growth by using causality tests. The ELG hypothesis is verified when the Granger-causality runs from exports to economic growth. However, there has been a constant debate in the literature about the effects that exports expansion has on GDP growth. Presumably, the debate has been focusing on the role of exports policy in improving economic growth. Many studies have explained the effects of exports expansion on economic growth. According to Krueger (1978), exports contribute to economic growth by increasing the growth of total factor productivity. The countries with a large share of exports in output have faster economic growth. This is partly attributed to a more efficient

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allocation of resources, technological changes and other externalities that improve the economy (Krueger, 1980). Exports expansion affects productivity growth through larger economies of scale (Helpman and Krugman, 1985). In addition, direct effects of exports are visible in providing foreign currency for the imports of capital equipment, particularly from the technologically developed countries. This transfer might increase the level of knowledge and technology and thereby growth (Chuang, 1998). Xu (1996) believes that export-promotion strategies are preferred by policy makers in order to enhance economic growth and development.

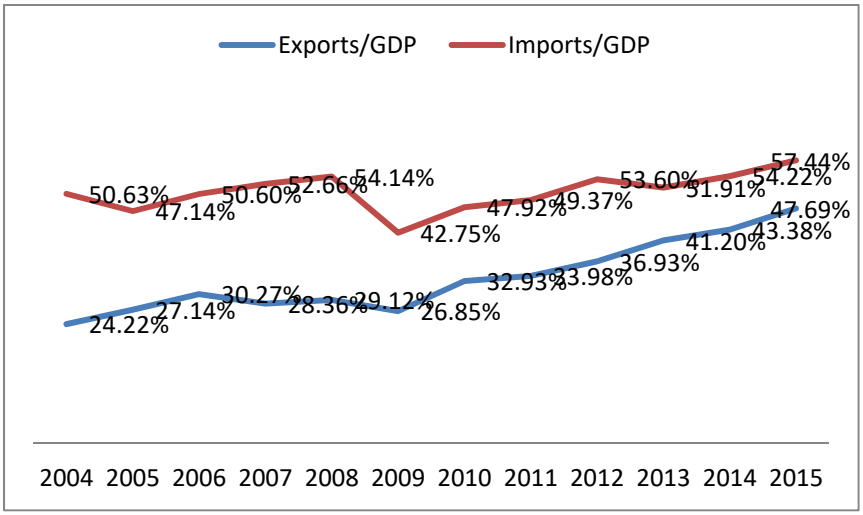
From the aggregate demand-side perspective, export is an important activity in generating economic growth, especially in small domestic markets. Exports as component of aggregate demand can be limitless and without restrictions for growth (Agosin, 1999). Many developing economies have been applying exports strategy to accelerate economic growth. There has been a strong evidence of productivity-enhancing effects of manufactured exports (Herzer *et al.*, 2006). For policy makers, a stable causal association between economic growth and export is a very important precondition for formulating long-term effective economic policy. Despite the fact that the investigation of the export-led growth hypothesis is not a new area of research in the theoretical and empirical literature, it has remained a vehemently debatable issue in the economic circles. In addition, the relations between exports and economic growth in the Serbian economy have still not been examined with cointegration techniques and Granger causality tests, so this paper will introduce the results through a unique methodological approach.

The considerable losses have been recorded in Serbia during the last decade of the twentieth century due to disintegration and war processes in the Western Balkans. This has isolated Serbia from the international economic flows, and implied low trade openness. After 2000, the October Revolution and the fall of the dictatorial regime, Serbia has been focusing on the European integration and joining the European Union. Taking into consideration the Serbian weakened economy, the initial trade openness growth was predominately focused on increasing imports. This resulted in a high foreign trade deficit, still present today (Figure 1). Consequently, the main preoccupation of the Serbian economy during the process of integration has been to increase exports potential. The utmost importance is thus to determine Serbia's key points for promotion of those comparative advantage sectors so that the country may facilitate the promotion of a flexible export-oriented economy.

This study aims at investigating whether there is a short-run or a long-run causality between exports and economic growth in Serbia. Furthermore, the paper examines if, and to what extent, exports boost economic activity. In other words, the article tests the validity of the export-led growth hypothesis in case of the Serbian economy. The contribution of this study is threefold. Firstly, the issue is very important for further economic development of Serbia since its small, open economy is burdened with structural changes and external shocks. Secondly, besides Ng-Perron, this study employs Zivot-Andrews unit root test with one structural break to determine the order of integration of the time series. Thirdly, the analysis simultaneously uses ARDL and newly developed Bayer- Hanck cointegration analysis to confirm test results. The findings of this study may, also, serve as a guide to other small open economies with similar macroeconomic challenges.

Figure 1

Exports and imports of goods and services (% of GDP) in Serbia



Source: 2016 World Bank Report.

The remainder of this article is organized into five sections: apart from the introductory remarks, Section 2 provides the overview of the current literature on the links between exports and economic growth. Section 3 is the methodology section, which introduces the data, the model specification and the model estimation procedure, while Section 4 introduces the results and discussion. Finally, Section 5 presents the conclusions and potential implications for policy makers.

2. Literature Overview

Exports growth is typically considered as one of the main determinants of the economic growth, especially in the less developed countries (World Bank, 1987). However, this is a very debatable issue. According to Chen (2007), there are four possible outcomes in terms of the relationship between economic growth and export. If there is a long-run relationship between economic growth and exports, export promotion is still one of the best strategies in order to ensure growth (Tang *et al*., 2015). The theoretical and empirical literature that examines the relationship between exports and economic growth is rich, with numerous studies that have been exploring this issue for the last 40 years. Taking that into consideration, as well as the comprehensiveness of the literature review in the previous studies (*i.e*., Chang *et al*., 2000; Konya, 2000; Konya, 2006; Tang, 2006; Ozturk and Acaravci, 2010), this paper focuses, solely, on recent studies that have examined this relation. Some recent papers have confirmed the export-led growth hypothesis in post-Communist European countries (Bilas *et al*., 2015; Trost and Bojnec, 2016). Bilas *et al*. (2015) have pointed out that the strengthening of Croatian performance growth requires a policy directed toward the export sector, while Trost and Bojnec (2016) have stressed the importance of improving the business environment and market expansion in increasing the economic growth rates in Slovenia and Estonia. These findings are in contrast with Beko's (2003) results obtained for the Slovenian economy.

On the sample of 45 developing countries, Dreger and Herzer (2013) applied panel cointegration techniques and confirmed that exports positively affect GDP. With similar methods Yee Ee (2016) confirmed validity of the export-led growth hypothesis in the selected Sub-Saharan African countries. Ojide *et al*. (2014) employed time series analysis, cointegration and causality tests for Nigeria, Gokmenoglu *et al*. (2015) for Costa Rica, Al-Asaf and Al-Abdulrazag (2015) for Jordan, Ali and Li (2017) for China and Pakistan, and Faisal *et al.* (2017) for Saudi Arabia, and all the studies showed that exports could enhance economic growth. On the other hand, Tang *et al*. (2015) have revealed that export-led growth is not stable in case of Asia's Four Little Dragons. The similar results have been obtained by Tang (2013) for Malaysia. Tiwari and Ludwig (2014) have used rolling causality techniques and found that exports caused long-run economic growth in India.

The second possible outcome is to confirm the growth-driven export hypothesis. This hypothesis postulates that an increase in economic growth leads to exports increase. Empirically, it refers to unidirectional causality from gross domestic product to exports. The growth-led export hypothesis has been confirmed in the following studies: Abbas (2012), Shihab *et al*. (2014), Hassan and Murtala (2016) and Khemka *et al*. (2018). As aforementioned, bidirectional relationship between economic growth and exports is the third possible outcome. Some papers have confirmed this kind of relationship – Alimi (2013) and Kumari and Malhotra (2014). Finally, a neutral hypothesis assumes that there is no relationship between economic growth and exports. Such outcome has been confirmed: by Debnath *et al*. (2014) and Tahir *et al*. (2015).

It is obvious that there is no convergence between the theoretical points of view and the empirical findings. The theoretical background, based on the international trade and development theory suggests that exports are of the utmost importance for economic growth. On the other hand, the empirical findings do not provide the conclusive evidence. Thereby, the causality evidence remains controversial and the contradictions might be present due to the application of different methods, variable selections, time frames, and frequencies (Kónya, 2006). Inconsistent causality may, also, be attributed to: the omission of relevant variables, the use of different causality methods and the arbitrary choice of lags structure (Giles and Williams, 1999; Tang, 2013). The economy of the Republic of Serbia has been striving to achieve remarkable economic growth driven by exports. This process is not easy and it implies changes from domestic-generated to export-oriented sustainable growth (Inotai, 2013). In spite of the slower exports growth rate at the global level (WTO, 2016), the latest data show that Serbia registered growth of goods exports by 9.5% in the first six months of 2016 (Statistical Office of the Republic of Serbia, 2016). Consequently, the main objective of this article is to carefully investigate both short-run and long-run relationships between exports and growth.

3. Data and Methodological Framework

The study applied quarterly time series data from 2004 to 2015. The variables used in this study are real GDP, real exports and real effective exchange rate. The trivariate model is specified as follows:

$$lnY_t = \alpha_1 + \alpha_2 lnEX_t + \alpha_3 lnRER_t + \mu_t \quad (1)$$

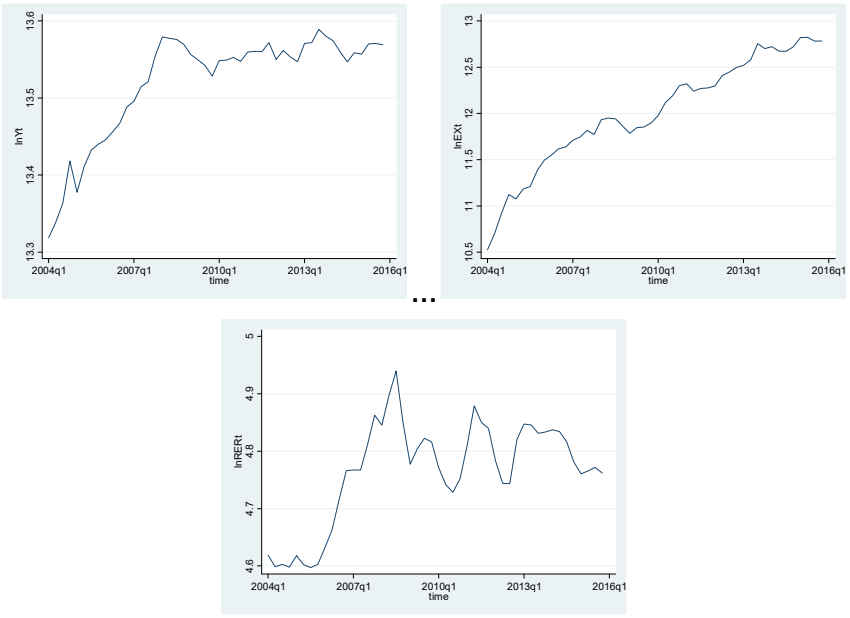
The data sets for real GDP (Y_t) and real export (EX_t) were obtained from the Statistical Office of the Republic of Serbia, and the data sets for real effective exchange rate (RER_t) from the official website of the National Bank of Serbia. The residual (μ_t) is assumed to be normally distributed and white noise. Real GDP and real exports are expressed in millions of local

currency unit (RSD). Real effective exchange rate is expressed in index numbers (2005=100). The trivariate model for examining the export-led growth hypothesis was chosen in order to avoid mixed and inconclusive results that could be assigned to the bivariate context between exports and economic growth (Al-Yousuf, 1999). All the variables were converted into logarithm (*ln*). Prior to that, time series of real GDP and real exports had been seasonally adjusted. Figure 2 shows the trend of the selected variables in Serbia.

The stationarity of the time series variables was first tested by the traditional unit root test. The Ng-Perron test with intercept and trend was used here. In order to confirm and verify the obtained results in connection with the order of integration of the series the Zivot-Andrews unit root test was applied, since it is appropriate when series have one structural break (Zivot and Andrews, 1992). The implementation of the unit root test in the ARDL modelling is necessary to ensure that none of the time series are integrated at I(2) or beyond order of integration. To test the connection between economic growth and exports in the presence of the third variable (real exchange rate), ARDL bounds testing approach was further applied. One of the advantages of this approach is that there is no need for precise identification of the order of the observed series (Hsiao, 1997).

Figure 2

Trends of variables in Serbia (lnY_t, $lnEX_t$, $lnRER_t$, respectively)



Source: Authors' calculations.

The other cointegration tests are based on the fact that the tested variables must be of the order of integration I(1). In ARDL bounds testing approach the relation between the variables is tested regardless of whether the variables are I(1), I(0) or of mixed order of integration. This approach, in particular, corresponds to a given sample, since the sample is small. The only precondition is that none of the variables are of the order of integration I(2). The Unrestricted Error Correction Model (UECM) of the ARDL model is formatting long and short-term through the following steps:

$$\Delta lnY_t = \alpha_0 + T\alpha_t + \alpha_{lnY} lnY_{t-1} + \alpha_{lnEX} lnEX_{t-1} + \alpha_{lnRER} lnRER_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta lnY_{t-i} + \sum_{j=0}^{q} \alpha_j \Delta lnEX_{t-j} + \sum_{l=0}^{m} \alpha_l \Delta lnRER_{t-l} + DUM\alpha_{dum} + \mu_t \quad (2)$$

$$\Delta lnEX_t = \alpha_0 + T\alpha_t + \alpha_{lnEX} lnEX_{t-1} + \alpha_{lnY} lnY_{t-1} + \alpha_{lnRER} lnRER_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta lnEX_{t-i} + \sum_{j=0}^{q} \alpha_j \Delta lnY_{t-j} + \sum_{l=0}^{m} \alpha_l \Delta lnRER_{t-l} + DUM\alpha_{dum} + \mu_t \quad (3)$$

where: Δ represents the first-difference operator, α drift aspects, DUM dummy variable that signifies a structural break in time series, and *p, q and m* are the lag lengths. In the initial step the F-test statistics was calculated and compared, with critical bounds collected by Narayan (2005) in order to determine whether there is a long-run association or not. The obtained value was compared to the upper and lower critical bounds. The null hypothesis can be presented as: Ho: $\alpha_{lnY}=\alpha_{lnEX}=\alpha_{lnRER}=0$. This indicates that there is no long-run relation between the variables. The cointegration hypothesis implies the opposite situation, *i.e.* inequality to zero: H_a: $\alpha_{lnY}\neq\alpha_{lnEX}\neq\alpha_{lnRER}\neq 0$. If the value of the F-test statistics exceeds the upper critical bound, then there is a cointegration. If there is an evidence of cointegration between the variables in a logical sequence of events, long-run and short-run parameters should be estimated. A long- run relationship between variables exists if the coefficient of the lagged error correction term is negative and statistically significant. This kind of relationship is a necessary, but not sufficient condition to reject non-causality hypothesis (Morley, 2006). The hypothesis of no cointegration implies that the calculated F statistics drops below the lower bound. In case that the value of the F statistics falls inside lower and upper critical bounds, then clear conclusions about cointegration cannot be drawn. The error correction mechanism can be used for establishing cointegration in this case (Kremers *et al*., 1992). Finally, it is necessary to investigate the stability of the long and short-run estimates by applying the tests of stability (the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMsq).

The robustness of the long-run relationship is investigated by applying Bayer and Hanck (2013) test. Bayer and Hanck (2013) proposed new cointegration approach called combined cointegration. This test provides the enhanced power of cointegration test, with the unique aspect of generating a joint-test statistics, based on Engle-Granger, Johansen, Peter Boswijk, and Banerjee tests. By using this approach, we can combine various individual cointegration test results to ensure more conclusive findings. This approach was also applied to examine the presence of cointegration relationship among economic growth, exports and effective exchange rate in Serbia. Following Bayer and Hanck (2013), the following equations can be presented as:

$$EG - JOG = -2[ln(p_{EG}) + (p_{JOH})] \quad (4)$$

$$EG - JOH - BO - BDM = -2[ln(p_{EG}) + (p_{JOH}) + (p_{BO}) + (p_{BDM})] \quad (5)$$

where: p_{EG}, p_{JOH}, p_{BO}, p_{BDM} represent *p-values* of various individual cointegration tests. If the Fischer statistics for EG-JOH and EG-JOH-BO-BDM are more than 5 percent of critical values, the null hypothesis of no cointegration can be rejected. If variables are co-integrated, then the VECM model can be used, since in the long run variables move together. VECM model provides information about the direction of causality between the variables. When VECM model is applied, variables convert into first differences. The following equation can be presented as:

$$\begin{bmatrix} \Delta lnY_t \\ \Delta lnEX_t \\ \Delta lnRER_t \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \end{bmatrix} + \begin{bmatrix} B_{11,1}B_{12,1}B_{13,1}B_{14,1}B_{15,1} \\ B_{21,1}B_{22,1}B_{23,1}B_{24,1}B_{25,1} \\ B_{31,1}B_{32,1}B_{33,1}B_{34,1}B_{35,1} \end{bmatrix} x \begin{bmatrix} \Delta lnY_{t-1} \\ \Delta lnEX_{t-1} \\ \Delta lnRER_{t-1} \end{bmatrix} + \cdots +$$
$$\begin{bmatrix} B_{11,m}B_{12,m}B_{13,m}B_{14,m}B_{15,m} \\ B_{21,m}B_{22,m}B_{23,m}B_{24,m}B_{25,m} \\ B_{31,m}B_{32,m}B_{33,m}B_{34,m}B_{35,m} \end{bmatrix} x \begin{bmatrix} \Delta lnY_{t-1} \\ \Delta lnEX_{t-1} \\ \Delta lnRER_{t-1} \end{bmatrix} + \begin{bmatrix} \xi_1 \\ \xi_2 \\ \xi_3 \end{bmatrix} x(ECM_{t-1}) + \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \end{bmatrix} \qquad (6)$$

where: Δ represents difference operator, and ECM_{t-1} is long-run adjustment parameter (error correction term). By using the value of the t-statistics for the coefficient of ECM_{t-1}, it is possible to examine the long-run causality. The direction of the short-run causality can be examined by using the value of the F statistics for the first-difference lagged independent variables.

4. Results and Discussion

This study begins with the unit root testing in order to make our results more robust. The unit root testing of variables is an extremely important precondition for applying any cointegration test. The results of Ng-Perron test are presented in Table 1. According to these results, the variables of economic growth, exports and exchange rate are not stationary at level. After the conversion into the first difference, the exchange rate becomes stationary at 1 % level of significance, and exchange rate and economic growth become stationary at 5 % level of significance. This shows that the order of integration for all variables is *I(1)*.

In order to test the robustness of stationarity properties, the Zivot-Andrews unit root test was applied. This test takes into account a single unknown structural break within time series.

Table 1

The Ng-Perron unit root test

Variables	MZa	MZt	MSB	MPT
lnY_t	-1.93131 (0)	-0.84119	0.43556	38.3685
$lnEX_t$	-2.79053 (0)	-1.00691	0.36083	27.6097
$lnRER_t$	-12.2674 (1)	-2.4071	0.19622	7.80299
ΔlnY_t	-21.9589 (0)**	-3.31199	0.15083	4.1591
$\Delta lnEX_t$	-21.9308 (0)**	-3.3104	0.15095	4.16118
$\Delta lnRER_t$	-42.5639 (1)*	-4.61176	0.10835	2.1486

*Notes: ( ) indicates lag length. *Shows significant at 1% level. **Shows significant at 5% level.*
Source: Authors' calculation.

Table 2

The Zivot-Andrews structural break trended unit root test

Variable	At level		At 1st difference	
	T-statistic	Time break	T-statistic	Time break
lnY_t	-5.1807 (0)	2008q4	-9.42498 (0)*	2008q2
$lnEX_t$	-4.021 (2)	2008q3	-6.905579 (0)*	2009q2
$lnRER_t$	-4.2689 (2)	2008q4	-6.536749 (1)*	2008q4

*Notes:*Represents significance at 1% levels respectively. Lag length of variables is shown in small parentheses.*
Source: Authors' calculation.

The findings from Table 2 show that all variables are not stationary at level in the presence of structural breaks. At the first difference, the variables are found to be stationary at 1 percent level of significance. In general, the combined results of the traditional and structural breaks tests suggest that all variables have the order of integration of 1.

In investigating the existence of cointegration among economic growth, exports and exchange rate in the presence of structural breaks, this study applied the ARDL bounds testing approach to cointegration. The value of F-statistics is sensitive to the chosen number of lags (Bahmani-Oskooee and Nasir, 2004). We used the Akaike information criteria to choose suitable lag structure to select the optimal model (Pesaran *et al*., 2001). The empirical results of the ARDL cointegration test are shown in Table 3. Our computed F statistics is greater than the upper critical bound at 5% and 10% levels of significance, when economic growth is the dependent variable. The third case, when a dependent variable is the real effective exchange rate, is not further examined, since the model specification has determined serial correlation of the residuals. The critical bounds are developed by Narayan (2005). Economic growth, exports and exchange rate were cointegrated for the long-run relationship over the period of 2004-2015 in Serbia.

Table 3

The results of ARDL cointegration test

Bounds testing to co-integration				Diagnostic tests			
Estimated models	Optimal lag length	Structural break	F-statistics	X^2_{NORMAL}	X^2_{ARCH}	X^2_{RAMSEY}	X^2_{SERIAL}
$F(lnY_t/ lnEX_t, lnRER_t)$	2,1,1	2008q4	5.965**	0.1021	1.3587	1.1245	2.8586
$F(lnEX_t/ lnY_t, lnRER_t)$	1,4,0	2008q3	2.8578	0.6187	0.2937	7.6354	2.8489
$F(lnRER_t,/ lnY_t, lnEX_t)$	3,0,1	2008q4	9.341*	2.7161	0.0894	0.0067	7.4358
Significant level	Critical values (T=48)						
	Lower bounds I(0)	Upper bounds I(1)					
1% level	7.017	7.727					
5% level	5.043	5.607					
10% level	4.230	4.740					

*Notes: *Denotes the significant at 1% levels. **Denotes the significant at 5% levels.*
Source: Authors' calculation.

Table 4 highlights the combined cointegration test which includes EG-JOH and EG-JOH-BO-BDM tests. The results reveal that Fisher statistics for EG-JOH and EG-JOH-BO-BDM, in case when lnY_t is a dependent variable, are greater than 5 percent critical values, which implies that both tests statistically reject the null hypothesis of no cointegration between variables. The next step is to examine the long-run and short-run impact of exports on economic growth after having cointegration between the series. The long-run results are reported in Table 5. Based on the results, it may be noted that 1% increase in exports is linked with an increase in GDP by 0.1433%, considering the long-run elasticity and keeping all other things constant. The coefficient of the error correction term, ECM_{t-1} is lagged residual term and it shows the speed of equilibrium adjustment from short to long run. This is a

confirmation of the integrity of the long-run cointegration empirical equations (Bannerjee *et al*., 1998). It is statistically significant and negative. The value of ECM_{t-1} is equal to 0.43 and its significance implies that the economic growth is corrected from the short to the long-run equilibrium by 43.46%. The results of the short-run analysis are also presented in Table 5 and they indicate that exports have positive and significant impact on economic growth. As a result, 1% increase in exports increases economic growth by 0.1121% in the short-run. The sensitivity analysis shows satisfactory results which are shown in the lower segment of Table 5. The Jarque-Bera normality test reveals that the estimated residuals are normally distributed. The ARCH LM test reports that there is no heteroskedasticity problem. According to the Breusch-Godfrey LM test, residuals are not serially correlated. The Ramsey RESET test confirms that the functional form of the model is well specified.

Table 4

The results of Bayer and Hanck cointegration analysis

Estimated models	EG-JOH	EG-JOH-BO-BDM	Cointegration
$lnY_t=f(lnEX_t,l\ nRER_t)$	15.9868	24.3173	Yes
$lnEX_t=f(lnY_t,l\ nRER_t)$	9.7658	11.1317	No
$lnRER_t=f(lnY_t,l\ nEX_t)$	6.6901	14.6792	No

Notes: Critical values at 5% level are 10.895 (EG-JOH) and 21.106 (EG-JOH-BO-BDM).
Source: Authors' calculation.

Table 5

Long and short runs results

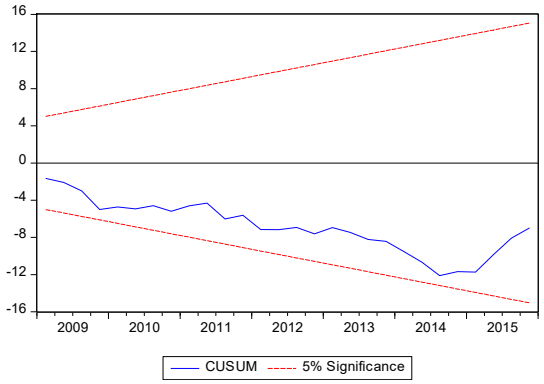
Dependent variable= lnY_t		
Long run analysis		
Variables	Coefficient	T-statistic
Constant	4.3698	4.2545
$lnEX_t$	0.1433*	2.746
$lnRER_t$	0.3602*	4.5515
Short run analysis		
Variables		
Constant	4.4321	5.1559
$\Delta lnEX_t$	0.1121*	4.755
$\Delta lnRER_t$	0.0413	0.85
ECM_{t-1}	-0.4346*	-5.1557
R^2	0.58	
F-statistic	10.95*	
D.W	2.16	
Short Run Diagnostic Tests		
Test	F-statistic	Prob. Value
X^2_{NORMAL}	0.0798	0.9609
X^2_{SERIAL}	1.1346	0.3322
X^2_{ARCH}	1.3640	0.2493
X^2_{RAMSEY}	1.1245	0.2960

Note: *shows significant at 1% level of significance.
Source: Authors' calculation.

The stability of the model is investigated by CUSUM and CUSUM sq tests proposed by Brown *et al*. (1975). The plots of the CUSUM in Figure 3 and CUSUM sq in Figure 4 are found to be within the limits and significant at 5%. According to the test results for the given regression, we conclude that the model parameters are stable and efficient.

Figure 3

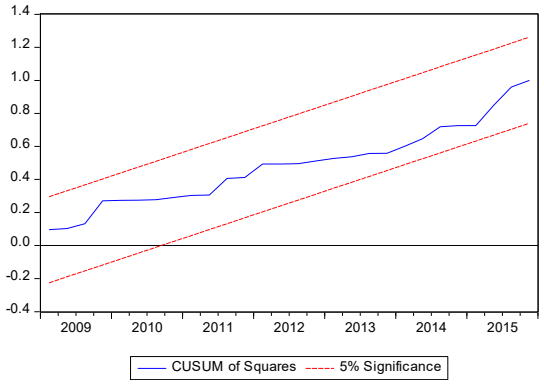
(Export-led growth model) Plot of cumulative sum of recursive residuals



Source: Authors' calculation.

Figure 4

(Export-led growth model) Plot of cumulative sum of squares of recursive residuals



Source: Authors' calculation.

The presence of cointegration between the variables raises the question of direction of causality between economic growth and exports. The VECM Granger causality test which divides causality results into long-run and short-run was applied for this purpose. This is very important in order to design the adequate trade policy for sustainable economic growth. The findings show the existence of both long-run and short-run causal relationship (Table 6). Furthermore, the findings reveal unidirectional causality from exports to economic growth.

Table 6

VECM Granger causality analysis

Dependent variable	Type of causality			
	Short Run			Long Run
	ΔlnY_t	$\Delta lnEX_t$	$\Delta lnRER_t$	ECT_{t-1}
ΔlnY_t	-	6.1267** [0.0133]	0.3981 [0.5281]	-0.3421* [-3.2642]
$\Delta lnEX_t$	0.0146 [0.9037]	-	1.7634 [0.1842]	-
$\Delta lnRER_t$	0.5567 [0.4556]	7.0841 [0.0078]*	-	-

*Notes: *Shows significant at 1% level. ** Shows significant at 5% level.*
Source: Authors' calculation.

5. Conclusion and Policy Implications

The investigation of the ELG hypothesis reveals that exports expansion is an important factor in achieving a long-run economic growth in Serbia. Our empirical analysis confirms the export-led growth hypothesis. In terms of aggregate demand, it may be concluded that the Serbian market is very small, which means that the effects of monetary and fiscal policy referring to the expansion of domestic aggregate demand are rather limited. When it comes to exports, the dominant market is the EU, which, as it is, is crucial for the development of the Serbian economy. The EU directed exports, as a component of the aggregate demand, have an immediate impact on economic growth. The EU market is vital for the Serbian economy as it is the target of the largest share of the exports. The possibilities for further collaboration are enormous, since the Serbian exports share is only a fraction of the EU total imports. The structure of Serbian exports is being, to a degree, adjusted to the structure of the EU imports demand. On the other hand, the structure of Serbian exports is dominated by labor-intensive rather than capital-intensive goods. Foreign trade deficit is, also one of the key issues of Serbian economy. The increase in exports is inevitable not only for the purpose of deficit reduction, but also for the export income increase as well, in order to avoid the crisis of foreign exchange liquidity. However, the continuation of the exports trend can easily become an issue, since the advances have been made by a small number of companies. Another unfavorable condition for Serbia is the fact that the exports are concentrated on a small number of countries and a small range of goods. These circumstances enhance the possibility of disruption of relationships due to external shocks.

The study makes a contribution to economic science by filling the gap in the current empirical literature which lacks the studies and analyses about the links between export and economic growth in the Republic of Serbia. The additional contribution to the current literature is the application of the specific methodology not used before on this sample. The article has not included other factors which may have an influence on economic growth. This is the main limitation of the study. However, in the future studies it would be interesting to include FDI flows and examine the validity of FDI-led growth hypothesis bearing in mind that FDI dynamics has a constantly increasing significant role in the process of trade liberalization.

The empirical results obtained in this study and the aforementioned situation in Serbia have certain practical implications for economic policy makers. Firstly, it is necessary to diversify exports by expanding the markets in order to increase their intensity. It is also important to

put additional efforts in enhancing bilateral arrangements with other attractive export destinations, such as, for example, Turkey. For the Serbian economy, with a relatively small market, it is important to redefine the strategies since growth-oriented policies are directly focused on the exports to the EU countries. Secondly, a better integration into the EU market requires the adjustment of the exports structure to the EU imports demand. In trade relations with the EU, Serbia is in deficit, so it is necessary to increase the share of capital-intensive products. The import of modern equipment and technology plays an important role in this process, as well as the larger share of capital investments. This requires the focus to be on the value added exports. Also, a more favorable regulatory climate must not be disregarded as a prerequisite for the exports sector. Serbia has to undertake further reforms in order to integrate into the EU faster, since it is a crucial strategy for faster growth enhancement. The most important implication of the study is that government must focus the attention on the permanent support of export-oriented policies in order to improve growth performances. For example, the country should increase investments and resources from the budget which would be oriented towards the development and export of ICT technologies, since this could contribute to the growth of economic activity significantly.

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References

Abbas, S., 2012. Causality between exports and economic growth: Investigating suitable trade policy for Pakistan. *Eurasian Journal of Business and Economics*, 5(10), pp. 91-98.

Agosin, M., 1999. Trade and growth in Chile. *Cepal Review*, 68, pp. 79–100.

Al-Assaf, G. and Al-Abdulrazag, B., 2015. The validity of export-led growth hypothesis for Jordan: A bounds testing approach. *International Journal of Economics and Financial Issues*, 5(1), pp. 199-211.

Ali, G. and Li, Z. 2017. Export-led growth or growth- led exports in the case of China and Pakistan: An empirical investigation from the ARDL and Granger causality approach. *The International Trade Journal*. Available at: <https://www.tandfonline.com/doi/full/10.1080/08853908.2017.1379449?scroll=top&needAccess=true>.

Al-Yousif, Y.K., 1999. On the role of exports in the economic growth of Malaysia: a multivariate analysis. *International Economic Journal*, 13(3), pp. 67–75.

Alimi, S., 2013. Export-led growth or growth-driven exports? Evidence from Nigeria. *British Journal of Economics, Management & Trade*, 3(2), pp. 89-100.

Bahmani-Oskooee, M. and Nasir, A.B.M., 2004. ARDL approach to test the productivity bias hypothesis. *Review of Development Economics*, 8(3), pp. 483-488.

Banerjee, A. Dolado, J. and Mestre, R., 1998. Error-correction mechanism tests for cointegration in a single-equation framework. *Journal of Time Series Analysis*, 19(3), pp. 267-283.

Bayer, C. and Hanck, C., 2013. Combining non-cointegration tests. *Journal of Time Series Analysis*, 34(1), pp. 83-95.

Beko, J., 2003. Causality between exports and economic growth: empirical estimates for Slovenia. *Prague Economic Papers*. Available at: <https://www.vse.cz/pep/213>.

Bilas, V. Bošnjak, M. and Franc, S., 2015. Examining the export-led growth hypothesis: The case of Croatia. Naše gospodarstvo/Our economy, 61(3), pp. 22-31.

Brown, R. L. Durbin, J. and Evans, J. M., 1975. Techniques for Testing the Constancy of Regression Relations Over Time. *Journal of the Royal Statistical Society Series B,* 37, pp. 149-163.

Chang, T. Fang, W. Liu, W. and Thompson, H., 2000. Exports, imports and income in Taiwan: An examination of the export led growth hypothesis. *International Economic Journal*, 14(2), pp. 151-160.

Chen, S-W., 2007. Exactly what is the link between export and growth in Taiwan? New evidence from the Granger causality test. Economics Bulletin, 6(7), pp. 1–10.

Chuang, Y.-C., 1998. Learning by Doing, the Technology Gap, and Growth. *International Economic Review*, 39(3), pp. 697–721.

Debnath, A. Laskar, A. B. Bhattacharjee, N. and Mazmuder, N., 2014. Is India's GDP really led by export? A further examination. *Journal of Transnational Management*, pp. 19(4), 247-260.

Dreger, C. and Herzer, D., 2013. A further examination of the export-led growth hypothesis. *Empirical Economics*, 45(1), pp. 39-60.

Faisal, F. Tursoy, T. and Resatoglu, N. G. 2017. Is export-led growth hypothesis exist in Saudi Arabia? Evidence from an ARDL bounds testing approach. *Asian Journal of Economic Modelling*, 5(1), pp. 110-117

Gokmenoglu, K. K. Sehnaz, Z. and Taspinar, N., 2015. The export-led growth: A case study of Costa Rica. *Procedia Economics and Finance*, 25, pp. 471-477.

Giles, A. J. and Williams, L. C., 1999. *Export-led Growth: A survey of the empirical literature and some noncausality results*. Economics Working Paper No. 9901.

Hassan, S. and Murtala, M. 2016. Market size and export-led growth hypotheses: New evidence from Malaysia. *International Journal of Economics and Financial Issues*, 6(3), pp. 971-977.

Helpman, E. and Krugman, P., 1985. *Market Structure and Foreign Trade- Increasing Returns*, Imperfect Competition, and the International Economy. MIT Press: Cambridge.

Herzer, D. Nowak-Lehmann, D. F. and Siliverstovs, B., 2006. Export-Led Growth in Chile: Assessing the role of export composition in productivity growth. *The Developing Economies*, 44, pp. 306–328.

Hsiao, C., 1997. Cointegration and dynamic simultaneous equations model. *Econometrica*, 65(3), pp. 647-670.

Inotai, A., 2013. *Sustainable growth based on export-oriented economic strategy-The Bulgarian case in an international comparison*. Economic Policy Institute: Friedrich Ebert Stiftung.

Khemka, A. Kifle, T. and Morgan, B. 2018. Export-led growth in India: A bounds testing approach. *The Journal of Developing Areas*, 52(1), pp. 1-14.

Konya, L., 2000. *Export-led growth or growth- driven export? New evidence from Granger causality analysis on OECD Countries*. Central European University Working Paper No. 15/2000.

Konya, L., 2006. Exports and growth: Granger causality analysis on OECD countries with a panel data approach. *Economic Modelling*, 23(6), pp. 978-992.

Kremers, J. Ericsson, N. and Dolado, J., 1992. The Power of Cointegration Tests. *Oxford Bulletin of Economics and Statistics,* 54(3), pp. 325–348.

Krueger, A., 1978. *Liberalization Attempts and Consequences*. Cambridge, MA. NBER Working Paper

Krueger, A., 1980. *Trade policy as an input to development*. Cambridge, MA. NBER Working Paper No. 466.

Kumari, D. and Malhotra, N., 2014. Trade-led growth in India and China: A comparative analysis. *Journal of International and Global Economic Studies,* 7(2), pp. 68-88.

Morley, B., 2006. Causality between Economic Growth and Immigration: An ARDL Bounds Testing Approach. *Economics Letters*, 90(1), pp. 72-76.

Narayan, P.K., 2005. The saving and investment nexus for China: evidence from cointegration tests. *Applied Economics*, 37(17), pp. 1979-1990.

National Bank of Serbia. 2016. [online] Available at: <www.nbs.rs>. [Accessed in August 2016]

Ojide, M.G. Ojide, K.C. and Ogbodo, J.C., 2014. Export-led growth hypothesis in Nigeria: Applications of ARDL model and co-integration analysis. *Global Journal of Emerging Market Economies*, 6(1), pp. 5-13.

Ozturk, I. and Acaravci, A., 2010. Testing the export-led growth hypothesis: empirical evidence from Turkey. *The Journal of Developing Areas*, 44(1), pp. 245-254.

Pesaran, M. H. Shin, Y. and Smith, R.J., 2001. Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics,* 16(3), pp. 289-326.

Shihab, R. A. Soufan, T. and Abdul-Khaliq, S., 2014. The Causal Relationship between exports and economic growth in Jordan. *International Journal of Business and Social Science*, 5(3), pp. 302-308.

Statistical Office of the Republic of Serbia. 2016. [online] Available at: <http://webrzs.stat.gov.rs/WebSite/>. [Accessed in August 2016]

Tahir, M. Khan, I. and Shah, A.M.. 2015. Foreign remittances, foreign direct investment, foreign imports and economic growth in Pakistan: A time series analysis. *Arab Economic and Business Journal*, 10(2), pp. 82-89.

Tang, C.F. Lai, W.Y. and Ozturk, I., 2015. How stable is the export- led growth hypothesis? Evidence from Asia's four little dragons. *Economic Modelling*, 44, pp. 229-235.

Tang, C.F., 2013. A revisitation of the export-led growth hypothesis in Malaysia using leveraged bootstrap simulation and rolling causality techniques. *Journal of Applied Statistics*, 40(11), pp. 2332-2340.

Tang, C.F., 2006. New evidence on export expansion, economic growth and causality in China. Applied Economics Letters, 13(12), pp. 801-803.

Tiwari, A.K. and Ludwig, A., 2014. The export-led growth hypothesis for India: examining causality by a new approach in the time-frequency domain. *Applied Economics Letters*, 21(18), pp. 1297-1301.

Trošt, M. and Bojnec, S., 2016. Export-led growth: The case of the Slovenian and Estonian economies. *Post-Communist Economies*, 28(3), pp. 373-383.

World Trade Organization., 2016. Trade in 2016 to grow at slowest pace since the financial crisis. [online] Available at: <https://www.wto.org/english/news_e/pres16_e/pr779_e.htm>. [Accessed in October 2016]

World Bank., 2016. *World Bank Report*. Washington: World Bank.

World Bank., 1987. *World Development Report 1987: Barriers to adjustment and growth in the world economy; industrialization and foreign trade; world development indicators*. Oxford University Press: NY.

Xu, Z., 1996. On the causality between export growth and GDP growth: An empirical reinvestigation. *Review of International Economics*, 4(2), pp. 172–184.

Yee Ee, C., 2016. Export-led growth hypothesis: Empirical evidence from selected Sub-saharan African countries. *Procedia Economics and Finance*, 35, pp. 232-240.

Zivot, E. and Andrews, D., 1992. Further evidence on the Great crash, the oil-price shock, and the unit root hypothesis. *Journal of Business & Economic Statistics*, 10(3), pp. 251-270.