

CO-INTEGRATION APPROACH OF THE RELATIONSHIP BETWEEN TRADE AND ECONOMIC GROWTH: CASE OF THE REPUBLIC OF MACEDONIA

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ABSTRACT

The focus on the debate regarding the relationship between trade and economic growth have been rapidly increasing recently, yet still not resolving the contradicted results among the scholars on this issue. In addition, economists recognize the fact that countries that are trading have higher growth rate, however the problem remains on the difficulty to attribute this growth to the level of trade and its trade openness.

In this regard, the main aim of this paper is to investigate the relationship between trade variables and economic growth for the case of the Republic of Macedonia as a small open economy for the last two decades. Moreover, this paper employs the co-integration approach regarding the long run relationship among these variables. In addition, Granger causality test was accomplished to determine also the causal relationship among trade variables and economic growth. Further the VECM results reveals long run positive nexus among trade openness and growth while no evidence for such nexus among FDI and economic growth. Further, bidirectional causality among openness and growth exist for the case of Republic of Macedonia, while unidirectional causality among FDI and growth is present, running from FDI to economic growth.

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JEL classification: F10, F21, F43

INTRODUCTION

The existing economic theory has been suggesting the establishment of the connection between trade and economic growth (Lee and Huang, 2012; Chatterji et al., 2013; Steiner et al., 2014). Yet, empirical evidence has been struggling with the association of such establishment to be proven.

The debate regarding the relationship between international trade and economic growth has been present for a long period on the agenda of many scholars and policymakers, yet according to Chen (2009) there exist little evidence to link the effects of trade with the economic growth. He claims that there exist contentions the debate whether trade play a causal role or it just act as a facilitator of other underlying factors that affect the economic growth. Moreover, according to Shan and Sun (1998), the *ceteris paribus* effect of the trade on economic growth is difficult to estimate since the correlation of these two variables won't determine the direction of the causality.

However, Gwaindepi et al., (2014) further discuss that growth might indirectly be affect by trade through specialization because of the comparative advantage, economies of scale, improved communication channels and technological spillovers, new methods of productions and organization.

The existing reforms made in Republic of Macedonia on trade and its policy with emphasizes on trade openness represents an interest for dealing with the investigation of the long-run effects of such nexus in a small open economy, contributing to the first attempt for co-integration analysis of this nexus in Republic of Macedonia in the long – run through the VECM methodology. Thus, having into consideration the difficulty of associating theoretically and empirically the connection between trade and trade policy with economic growth, this paper rather than trying to dissolve the debate it will contribute to the existing empirical

literature with the co-integration results of this long run nexus in the case of the Republic of Macedonia.

The structure of the paper is as follows: second section reveals the relevant literature review of the relationship between trade and economic growth, third section describes in particular the research methodology, in the fourth section are presented the empirical findings and discussion, while the last section deals with the main conclusions of this nexus.

LITERATURE OVERVIEW

The debate regarding the effects of trade on the country's growth has attracted the attention of many scholars, yet an appropriate consensus has not been reached in this direction. Recently there is more theoretical evidence regarding the positive effects that trade can enhance on the economic growth of developed countries, while no empirical evidence can claim the such effects on developing nations. Although trade can be promoted as a powerful tool through which globalization gains can be allocated between and within nations, according to Chaterjii et al. (2013) the relationship between trade and economic growth can not be understood for a cause and effect nexus, emphasizing the fact that when countries grow, they tend to trade more and become more open. However, it is clear that the effects of trade depend particularly on the comparative advantage, level of investment and technological knowledge (Gwaindepi et al., 2014; Marrewijk, 2012). Indeed, economic growth can be promoted from international trade through technological spin overs and external stimulation (Shan and Sun, 1998).

On the other hand, evidence so far has suggested that the relationship between trade openness and economic growth has been theoretically controversial. In addition, trade can generate economic growth by facilitating the diffusion of knowledge and technology from the direct import of high-tech goods (Barro and Sala-i-Martin, 1995; Baldwin et al., 2005, Almeida and Fernandes, 2008). By using the endogenous growth model of trade, Grossman and Helpman (1990) tried to highlight the importance of the technological progress and knowledge accumulation in the long-run nexus of trade and economic growth.

However, the effects of trade on growth can differ with respect to the level of the economic development of the countries. Thus, for some countries, higher trade

can slow growth in long run when economy specializes in sectors with dynamic comparative disadvantage in terms of potential productivity growth (Young, 1991; Lucas, 1998).

Evidence from the existing empirical findings suggest that the impact of trade on growth has been a disputable subject for a long time. Various approaches used has been led conclude that growth might be heightened by trade openness (Krueger, 1978; Dollar, 1992; Edwards, 1998). Opposite to this view, the effects and importance of trade openness for the economic growth can change because of the level of the development and time period.

In their paper, Dollar and Kray (2001) claim that obviously there exists a nexus between trade and economic growth; yet such effects are not instant. By studying the relationship between trade and growth they claim that trade openness can accelerate economic growth. However more rapid growth may represent a transitional effect rather than different steady level of growth.

Authors Greenway et al. (2005) in their paper have empirically analyzed the impact of international trade on 70 developing countries, through dynamic panel framework by using three different indicators of liberalization and international trade and found significant positive relationship between trade and economic growth.

In their paper, Andersen and Babula (2008) investigate the nexus of openness-growth through channels where international trade impact economic growth, identifying two sources of growth in GDP per capita such as capital accumulation and productivity growth. Further they argue that the main source of growth is not capital accumulation, while the effects of trade on growth mainly operate through productivity growth. In addition, Gries and Redlin (2012) through variables for trade measure, imports and exports as a ratio of GDP as trade openness measure, suggested significant relationship between trade openness and economic growth.

Kim and Lin (2009) in their study found significant threshold effects in trade-growth nexus. Further they discuss that higher trade openness has positive impacts on economic growth for high-income economies, while for low-income countries trade openness has negative impacts on growth. Although it is noted that trade liberalization is not "one size fits all", authors Chang et al. (2009) suggest that trade does improve growth, emphasizing that on average trade liberalization leads to faster growth.

Moreover, Dollar and Kraay (2004) explore the relation between trade and growth in 100 countries, addressing some of the criticisms at trade-growth studies by Rodriguez and Rodrik (2000) and found that changes in growth rates showed a strong correlation with increases in trade volume.

Although there exist an unreached consensus among scholars regarding the effects of trade and its policy on economic growth in developing countries, still positive effects of trade and trade openness on economic growth are stated on many recent research studies (Sakyi and Egyir (2017); Sunde (2017); Musila and Yiheyis (2015); Fetahi-Vehapi et al. (2015); Szkorupová (2014)). However, the debate of the positive nexus among trade and economic growth is evidenced in many studies so far (Goh et al. (2017); Hye and Lau (2015); Eris and Ulaşan (2013)).

Having into consideration this debate, our paper will be focused on investigating the relationship among trade and its variables and economic growth in the long run in Republic of Macedonia through the employment of the co-integration approach and contributing to the existing empirical findings regarding the effects of such nexus on developing economies.

RESEARCH METHODOLOGY

This section incorporates some details regarding the methods that are used for investigating the trade-growth nexus in the case of Republic of Macedonia as well as specifying the models to be tested.

For investigating the effects of trade on the economic growth in Republic of Macedonia, quarterly time series has been employed for the time period 2000q1 – 2017q4, where the basic empirical model has been determined from the following vectors:

$$Y = [\log TO; \log FDI; \log Ex; \log Imp] \quad (1)$$

Where Y refers to the real GDP growth rate; TO refers to the trade openness, FDI refers to the Foreign Direct Investments, Ex refers to the real exports and Imp refers to real imports.

In this regard, the list and abbreviation of the variables included in the model are presented in the following table 1.

Table 1. List of variables and its abbreviations

VARIABLE	ABBREVIATION
Real GDP rate	RGDP
Trade openness	TO
Foreign Direct Investments	FDI
Real exports	Ex
Real imports	Imp

Note: abbreviations for the included variables in the analysis

Secondary data used in this empirical analysis covers the time spin 2000 – 2017 through quarterly time series, available from National Bank of Republic of Macedonia. All variables have been transformed into logarithmic form.

In addition, some pre-estimation tests are accomplished in this study: first, lag selection has been selected according to the three main criteria AIC, SBIC and HQIC and second, Unit root test has been used in order to determine the stationarity of the time series based on Augmented Dickey Fuller test.

Further, in order to test the long run relationship among trade and economic growth, Johansen co-integration methodology has been accomplished in order to determine whether there exist a long – run co-integration vector in this model indicating the existence of long run nexus among trade variables and economic growth and then VECM methodology has been applied, revealing the short-run and long-run dynamic effects through the lost information from the differencing process.

Finally, in order to determine the causal nexus between trade variables and economic growth, Granger causality test has been employed to determine the way of the causality among openness, FDI and growth in Republic of Macedonia. In addition, post estimation tests are accomplished for checking the validity of this model: VECM stability test, LM test and Jarque – Berra test.

EMPIRICAL FINDINGS AND DISCUSSION

In order to continue the discussion of co-integration and VECM analysis findings, following table gives an overview of descriptive statistics of the variables in the model, regarding the values of their mean, standard deviations, minimum and maximum values.

Table 2: Descriptive statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
logRGDP	71	11.34094	.1692452	11.01653	11.61263
logTO	71	4.522255	.1989483	3.945845	4.791069
logFDI	71	3.771048	.8760208	1.145823	5.994669
logEx	71	10.339	.3667483	9.643239	11.11963
logImp	71	10.70128	.3453725	9.762604	11.30924

Source: author's calculations

Initially lag selection is been determined according to three main criteria: AIC, SBIC and HQIC. The results are displayed in the following table, determining the number of the lag included in the model to be four according to the Akaike and Hannan-Quinn Information Criteria.

Table 3: Lag selection criteria

Lag	AIC	HQIC	SBIC
0	-3.62307	-3.55796	-3.45854
1	-12.368	-5.82631	-5.22976*
2	-6.25211	-5.53596	-4.44228
3	-6.66024	-5.61857	-4.02777
4	-7.50129*	-6.1341*	-4.04618

Source: author's calculations

As was previously stated, Augmented Dickey Fuller test was employed in order to test the unit root of the time series, and the following table represents the findings of their stationarity in their level and their first difference.

Augmented Dickey Fuller test reveals that null hypothesis of unit root can be accepted, thus each variable contains unit root in their level, or is not stationary in their level. In addition, in order to check if the variables are becoming stationary in their first or second difference, we check their stationarity in their difference.

Finally, results indicate that the null hypothesis of unit root is rejected for each variable in their first difference, thus suggesting that each variable becomes stationary in their first difference.

Table 4: Augmented Dickey Fuller test results

	VARIABLE	AUGMENTED DICKEY FULLER	COMMENT
Level	logRGDP	0.145 (-2.917)	H_0
	logTO	-0.795 (-2.917)	H_0
	logFDI	-2.338 (-2.917)	H_0
	logEx	-0.334 (-2.917)	H_0
	logImp	-0.129 (-2.917)	H_0
First difference	logRGDP	-4.662 (-2.918)	H_1
	logTO	-3.483 (-2.918)	H_1
	logFDI	-4.919 (-2.918)	H_1
	logEx	-3.184 (-2.918)	H_1
	logImp	-5.009 (-2.918)	H_1

Notes: † numbers in brackets represent lag length in ADF test

Source: author's calculations

Additionally, co-integration approach has been employed in order to determine the existence of long run nexus among trade and economic growth, where in this regard Johansen co-integration technique has been used. It is clear that non-stationary data cannot be used in a regression model since they can lead to spurious findings, thus Engle and Granger (1987) have suggest when linear combination of two or more non-stationary series is stationary, then they can be co-integrated and long run nexus to be presented from their stationary linear combination.

Empirical findings regarding the Johansen test for co-integration has been illustrated in the following table:

Table 5: Johansen test for co-integration

Null hypothesis	Alternative hypothesis	λ - trace	95 % critical value
$r = 0$	$r > 0$	76.5436	68.52
$r \leq 1$	$r > 1$	43.8410*	47.21
$r \leq 2$	$r > 2$	20.7619	29.68

Source: author's calculations

Trace test in the Johansen test for co-integration findings reveal that there exist one co-integrating vector in the model among the variables at $I(1)$, thus rejecting the null hypothesis of no co-integration vector and accepting the alternative hypothesis, thus there exist long run relationship among trade variables and economic growth in the Republic of Macedonia for the time spin 2000 - 2017.

Last but not the least, in order to determine the dynamic effects of trade on the economic growth of Republic of Macedonia in the long run and short run, Vector Error Correction Model - VECM technique has been applied after the existence of one co-integrating vector from the Johansen co-integration model and the results are shown in the following table.

Table 5: Vector Error Correction findings

Variables (co-integration vector 1)	β	α
logRGDP	1.000	0
logTO	0.0509 (0.049)	0.9068 (0.000)
logFDI	-0.0044 (-0.375)	-10.282 (0.000)
logEx	-0.0522 (-0.397)	0.4088 (0.024)
logImp	0.0703 (0.265)	1.527 (0.000)
Notes: β - cointegrating vector and α - adjustment parameter vector; 1.000 - co-integrating vector normalized with respect to RGDP. Brackets - p values for probabilities for β and α		

Source: author's calculations

As it can be seen, the co-integration model is normalized with respect to real GDP growth rate. β - coefficient indicate the existence of positive and significant effect of trade openness on the economic growth of Republic of Macedonia for the time period 2000 to 2016 in the long run. In addition, FDI has insignificant impact on the real GDP growth rate on the long run; as well as insignificant effect of real exports and real imports on real GDP growth rate in the long run in Republic of Macedonia.

Further, causal relationship between trade openness, FDI and economic growth has been determined by employing the Granger Causality test while its findings have been presented in the following table.

Table 6: Granger Causality test results

		Dependent variables (equation)		
		logRGDP	logTO	logFDI
Independent variables (lags)	logRGDP		23.87 (0.000)	4.613 (0.329)
	logTO	17.837 (0.001)		0.61763 (0.961)
	logFDI	14.509 (0.006)	15.605 (0.004)	

Source: author's calculations

Findings from the Granger Causality test reveal the existence of bi-directional causality between real GDP growth rate and trade openness, thus null hypothesis has been rejected for both of the cases, indicating the acceptance of alternative hypothesis. Moreover, unidirectional causality is revealed among real GDP growth rate and FDI, indicating the direction to run from FDI to the real GDP growth rate. In this case the null hypothesis of FDI does not Granger cause real GDP growth rate can be rejected while the alternative hypothesis has been accepted. In addition, the null hypothesis of RGDP does not Granger cause FDI has been accepted, suggesting that a change in FDI, will not be followed by a change in RGDP.

Finally, the validity and stability of the fitness of this model has been demonstrated by employing several post-estimation tests such as VECM stability test and Lagrange-multiplier test. (Appendix A).

CONCLUSIONS

The main objective of this study was to determine the co-integration approach of the long-run relationship among trade variables and economic growth for the case of Republic of Macedonia, as a small open economy. In addition, this paper tried to analyze the long run and short run dynamic effects of the trade openness and FDI on the economic growth of the Republic of Macedonia covering the time spin 2000 – 2017, through the incorporation of Johansen co-integration method and the Vector Error Correction method technique. Additionally, in order to determine the causal relationship between trade variables and economic growth, Granger Causality test has been accomplished.

Regarding the findings from the VECM, it reveals the existence of positive long run effects of trade openness on the economic growth in the Republic of Macedonia that are in line with the theory and many empirical findings so far. Contrary, the results indicate also that FDI does not have significant effect on Macedonian economy, and the same results correspond as well as with the nexus of real exports and real imports with the real GDP growth rate.

Findings from the Granger Causality test indicate the existence of bi-directional causal nexus between trade openness and economic growth, while unidirectional causal relationship is present between FDI and economic growth, indicating that a change in FDI will not be followed by a change in real GDP growth rate.

Having into consideration the indicative results from the co-integration relationship and VECM analysis, indicting the important role of trade openness and insignificant effect of FDI on the long run on the Macedonian economy, several recommendations are proposed to be consider for the trade policy in the near future:

- Exports to be concentrated on more products, based on the global markets;
- Export promotion to be part of trade liberalization policy;
- Trade policies to be implemented with complementary macroeconomic policies;
- Geographical diversification to be made attracting FDI;
- Industrial diversification of FDI targeting especially IT sector, agriculture and tourism;

- Business climate improvement;
- Better credit policy;
- More stable regulatory framework.

REFERENCES:

- Andersen. L., and Babula, 2008. The Link Between Openness and Long-Run, Economic Growth, *Journal commerce and economics*.
- Barro, R. J., & Sala-i-Martin, X. (1995). Capital mobility in neoclassical models of growth. *American Economic Review*, 85,103-115.
- Chatterji, M., Mohan, S., & Dastidar, S.G. (2013). Relationship between trade openness and economic growth of India: A time series analysis. SIRE Discussion Papers, Scottish Institute for Research in Economics (SIRE).
- Chen, H. (2009). A Literature Review on the Relationship between Foreign Trade and Economic Growth. *International Journal of Economics and Finance*, Vol 1, Number 1. 127-131
- Dollar, David and Kraay, Aart, Trade, Growth, and Poverty (June 2001). World Bank Policy Research Working Paper No. 2615. Available at SSRN: <https://ssrn.com/abstract=632684>
- Edwards, 1998. Openness, productivity and growth: what do we really know? *Econ. J.*, 108 (447) (1998), pp. 383-398
- Eris M. N. and Ulasan B, (2013), "Trade openness and economic growth: Bayesian model averaging estimate of cross-country growth regressions", *Economic Modelling* 33, 867-883.
- Fetahi-Vehapi M. Sadiku L. and Petkovski M. (2015), "Empirical analysis of the effects of trade openness on economic growth. An evidence for South East European countries", *Procedia Economics and Finance* 19, 17-26.
- Goh S.K. Sam C.Y. and McNown R, (2017), "Re-examining foreign direct investment, exports and economic growth in Asian economies using a bootstrap ARDL test for co integration", *Journal of Asian Economics* 51, 12-22.
- Granger, C.W.J., and P, Newbold. (1974). Spurious regressions in econometrics. *Journal of Econometrics*, 2, 111-120.
- Grossman, G.M., & Helpman, E. (1990). Trade, Innovation, and Growth. *American Economic Review* Volume 80 (2), 86-91
- Gwaindepi, Mazanai and Netabi (2014). Relationship between International Trade and Economic Growth: A Cointegration Analysis for Zimbabwe. *Mediterranean Journal of Social Sciences*, 10.5901/mjss.2014.v5n20p621
- Hye Q. M. A. and Lau W, (2015), "Trade openness and economic growth: empirical evidence from India", *Journal of Business Economics and Management* 16 (1), 188-205.
- Kim, D-H., & Lin, S. C. (2009). Trade and growth at different stages of economic development. *Journal of Development Studies*, 45(8), 1211-1224. <https://doi.org/10.1080/00220380902862937>

- Kremer et al., 2009. Nautzlnation and Growth: New Evidence from a Dynamic Panel Threshold Analysis, SFB 649 Discussion Paper 2009–036 (2009)
- Lee, C., & Huang, D. (2012). Human Capital Distribution, Growth and Trade. *Bulletin of Economic Research* and John Wiley & Sons Ltd
- Levine, R., & Renelt, D. (1992). A Sensitivity Analysis of Cross-Country Growth Regressions. *The American Economic Review*, Vol. 82, No. 4. p. 942-963.
- Levine, R., & Zervos, S.J. (1993). What We Have Learned About Policy and Growth from Cross-Country Regressions. AEA Papers and Proceedings 83: 426-430.
- Marrewijk, C. (2012). *International Economics: Theory, Application and Policy*. Oxford University Press, Oxford.
- Musila J. W. and Yiheyis Z, (2015), "The impact of trade openness on growth: the case of Kenya", *Journal of Policy Modeling* 37, 342-354.
- R. Almeida, and A. Fernandes (2008). Openness and technological innovations in developing countries: evidence from firm-level surveys. *J. Dev. Stud.*, 44 (5) (2008), pp. 701-727
- R.E. Baldwin, H. Braconier, R. Forslid (2005). Multinationals, endogenous growth, and technological spillovers: theory and evidence. *Rev. Int. Econ.*, 13 (5) (2005), pp. 945-963
- R.E. Lucas (1988). On the mechanic of economic development, *Journal of Monetary Economics*, 46 (1) (1988), pp. 167-182
- Rodriguez, F., & Rodrik, D. (1999). Trade Policy and Economic Growth: A Skeptic's Guide to Cross-National Evidence. NBER Working Paper No. 7081.
- Sakyl D. & Egyir, J. 2017. Effects of trade and FDI on economic growth in Africa: an empirical investigation. *Transnational Corporations Review*. 9(2): 66-87.
- Shan, J., & Sun, F. (1998). On The Export-led Growth Hypothesis: The Econometric Evidence From China. *International Journal of Economics and Finance* Vol. 1, No. 1. 341-351.
- Sunde T, (2017), "Foreign direct investment, exports and economic growth: adrl and causality analysis for South Africa", *Research in International Business and Finance* 41, 434-444.
- Szkorpová Z, (2014), "A causal relationship between foreign direct investment, economic growth and export for Slovakia", *Procedia Economics and Finance* 15, 123-128.
- T. Gries, M. Redlin (2008), *Trade Openness and Economic Growth: A Panel Causality Analysis*, University of Paderborn, Germany
- Young, 1991. Learning by doing and the dynamic effects of international trade, *Q. Journal of Economics*, 106 (2) (1991), pp. 369-405

Appendix A

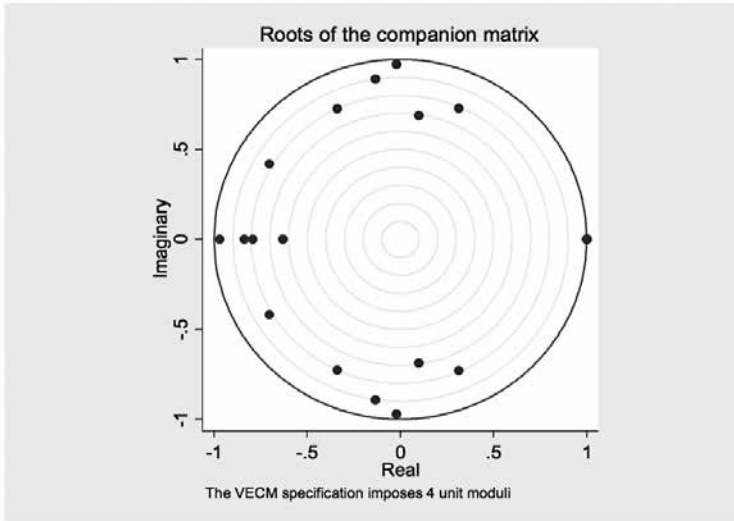


Table 1: Lagrange-multiplier test

lag	chi2	Prob > chi2
1	28.3879	0.29031
2	23.1231	0.57037

H0: no autocorrelation at lag order

Source: author's calculations