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Bakari, Sayef and MABROUKI, Mohamed

Department of Economics Science, LIEI, Faculty of Economic
Sciences and Management of Tunis (FSEGT), University El Of
Tunis Manar, Tunisia., Higher Institute of Companies
Administration University of Gafsa, Tunisia

20 December 2016

Online at <https://mpra.ub.uni-muenchen.de/76044/>
MPRA Paper No. 76044, posted 07 Jan 2017 10:34 UTC

The Relationship among Exports, Imports and Economic Growth in Turkey

Sayef Bakari

PhD Student, Department of Economics Science, LIEI, Faculty of Economic Sciences and Management of Tunis (FSEGT), University Of Tunis El Manar, Tunisia. Email: bakari.sayef@yahoo.fr

Mohamed MABROUKI

Associate Professor of Economic, Higher Institute of Companies Administration University of Gafsa, Tunisia, Email: mabroukimed@gmail.com

Abstract

This paper studies the nexus between exports, imports, and economic growth in Turkey. Annual data for the periods between 1960 and 2015 was tested by practicing Johansen co-integration analysis of Vector Auto Regression Model and the Granger-Causality tests. According to the result of the analysis, there is no relationship between exports, imports and economic growth in Turkey. On the other hand, we found that there is a strong evidence of bidirectional causality from imports to economic growth and from exports to economic growth.

KEYWORDS: *Export, Import, Economic Growth, Turkey, Cointegration, VAR and Causality.*

I. Introduction

The important role of exports and imports in the economy cannot be overemphasized. Exports and imports play an integral role in determining the trade balance of a country. It is known that exports are seen as an engine of economic and social development because of their ability to influence economic growth and poverty reduction. They are the subject of growth strategies adopted by developing countries, seduced by the successes of those in South-East Asia and Latin America. Recent endogenous growth models have emphasized the importance of imports as an important channel for foreign technology and knowledge to flow into the

domestic economy. Because new technologies could be embodied in imports of intermediate goods such as machines and equipments and labor productivity could increase over time that workers acquire the knowledge of the new embodied technology. The choice of Turkey as a case study is justified on several reasons. Turkey is the leading economic power in the Middle East ahead of Iran and Saudi Arabia, the 7th largest economic power in Europe and the 15th largest economy in the world. Otherwise, the Turkish economy is a relatively open economy. External trade accounts for 48% of GDP compared with 22% in Brazil and 88% in Germany. The European Union is the country's largest trading partner. In 2010, the country's foreign trade is largely in deficit. The aim of this work is to investigate the relationship between exports, imports and economic growth of Turkey, through employing yearly data for the period 1960-2015. In particular, this work tries to empirically find an answer for the question of whether exports lead economic growth or imports lead economic growth or economic growth leads exports and imports to achieve this objective the paper is structured as follows. In section 2, we present the review literature concerning the nexus between trade and economic growth. Secondly, we discuss the Methodology Model Specification and data used in this study in Section 3. Thirdly, Section 4 presents the empirical results as well as the analysis of the findings. Finally, Section 5 is dedicated to our conclusion.

II. Literature Review

Different studies and researches were done by academics and policy makers for exports, imports and economic growth. A variety of studies shows different results about the relationship of these three variables. Recently, most of studies have attended to focus on VAR and VEC models and cointegration approach.

Bédia F. Aka (2006) examined the relationships between openness, globalization on economic growth in Côte d'Ivoire for the period 1960-2005. The empirical results show by using VAR model that increasing openness has a positive impact on Côte d'Ivoire's economic growth in the short but not in long-run.

Mehdi Taghavi, Masoumeh Goudarzi, Elham Masoudi and Hadi Parhizi Gashti (2012) study the impact of exports and imports on economic growth in Iran over the period 1962-2011. Johansson's cointegration test, error correction model, Impulse, response function and Variance Decomposition were employed in the empirical analysis. The results show that there

is a long run relationship between exports, imports and economic growth. Based on results, export had direct and positive relationship with economic growth in long run. However, import had a negative relationship with economic growth in long-term.

Khairul Hashim and Mansur Masih (2014) examine the relationship between trade and economic growth in Malaysia by using Granger causality test and impulse response functions to examine whether growth in trade stimulates economic growth. The results confirm the bidirectional long run relationships between the economic growth and exports, economic growth and imports and exports and imports.

Abugamea (2015) examined the link between exports, imports and economic growth in Palestine through employing yearly data for the period 1968-2012. The results, based on Vector Error Correction model show the existence of the long run relationship between imports and economic growth given exports stationary. Moreover, both exports and imports are considered main determinants of economic growth in Palestine. Granger causality test shows no causality among exports and imports and economic growth. Mainly, causality tests confirm VECM results that import cause changes on economic growth in the long run but not in the short run.

Sachin N. Mehta (2015) tested the relationship between exports, imports and economic growth in India by using annual data for the period 1976-2014. Engle Granger Cointegration analysis, VECM and Granger causality tests were employed in the empirical analysis. The results show that there is a long run co-integrating relationship between Gross Domestic Products (GDP), Export, and Import in India. In long term the results of Granger causality tests show that GDP leads to Exports but Exports does not lead to GDP, also GDP does not lead to Import and Import do not lead to GDP. Finally Export lead to Imports but Imports do not lead to Exports.

Sani Hassan Hussaini, Bashir Ado Abdullahi, Musa Abba Mahmud (2015) examined the relationship between exports, imports and economic growth in India. They found that exports, imports and economic growth are cointegrated and there exist bidirectional relationship between GDP and Export.

Bader S.S. HAMDAN (2016) analyzed the effect of exports and imports on economic growth in the Arab countries during the period 1995 to 2013. The study used panel data approach in 17 countries: (Jordan, United Arab Emirates, Bahrain, Tunisia, Algeria, Saudi Arabia, Sudan, Oman, Qatar, Kuwait, Lebanon, Egypt, Djibouti, Mauritania, Morocco, Yemen and

Palestine). The outcome indicates that exports and imports have positive effect of economic growth.

Masoud Albiman Md and Suleiman NN (2016) investigated the nexus between exports, imports and economic growth in Malaysia, using annual data for the period 1967- 2010. Cointegration analysis, VAR and Granger causality tests were employed in the empirical analysis. The results show that there is a causal relationship from exports to economic growth and from exports to imports.

Nikolaos and Stamatiou (2016) examined the relationship between trade openness and growth for 30 newest European Union Members using annual data from 1995 to 2013. Findings derived from the panel data analysis show that the impact of economic growth and trade openness is found to be positive. Finally, the panel Granger causality analysis reveals a unidirectional causal relationship running from trade openness to economic growth, both in the short and in the long-run.

III. Data, methodology and model specification:

1. The Data:

The analysis used in this study cover annual time series of 1960 to 2015 (or 55 observations) in Turkey. The data set consists of observation for GDP, exports of goods and services (current US\$), and imports of goods and services (current US\$). All data set are taken from World Development Indicators 2016.

2. Methodology

We will use the most appropriate method which consists firstly of determining the degree of integration of each variable. If the variables are all integrated in level, we apply an estimate based on a linear regression. On the other hand, if the variables are all integrated into the first difference, our estimates are based on an estimate of the VAR model. When the variables are integrated in the first difference we will examine and determine the cointegration between the variables, if the cointegration test indicates the absence of cointegration relation, we will use the model VAR. If the cointegration test indicates the presence of a cointegration relation between the different variables studied, the model VECM will be used.

3. Model specification:

Early empirical formulations tried to capture the causal link between exports and GDP growth by incorporating exports into the aggregate production function (Balassa, 1978; Afaf Abdull J. Saaed, 2015).

The augmented production function including both exports and imports is expressed as:

$$GDP_t = f(exports, imports) \quad (1)$$

The function can also be represented in a log-linear econometric format thus:

$$\log(GDP)_t = \beta_0 + \beta_1 \log(exports)_t + \beta_2 \log(imports)_t + \varepsilon_t \quad (2)$$

Where:

- β_0 : The constant term.
- β_1 : coefficient of variable (exports)
- β_2 : coefficient of variables (imports)
- t : The time trend.
- ε : The random error term assumed to be normally, identically and independently distributed.

IV. Empirical Analysis

Table 1: Unit root test results (constant)

Variable	ADF		PP	
	Levels	First Differences	Levels	First Differences
Log(GDP)	2.916566	8.340193	2.196566	8.331772
Log(Exports)	2.916566	7.062045	2.196566	7.061907
Log(Imports)	3.557472	7.354982	3.557472	7.354859

According to the table 1, we saw that all variables become stationary on first differences in both ADF and PP tests.

Table 2: VAR Lag Order Selection Criteria for Log GDP, Log Exports, Log Imports

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-77.66007	NA	0.004746	3.163140	3.276777	3.206564
1	93.22531	314.9652*	8.31e-06*	-3.185306*	-2.730759*	-3.011610*
2	98.36848	8.874502	9.71e-06	-3.034058	-2.238601	-2.730090
3	102.8186	7.155131	1.17e-05	-2.855632	-1.719264	-2.421393
4	110.5622	11.53937	1.26e-05	-2.806359	-1.329080	-2.241847
5	115.4664	6.731300	1.52e-05	-2.645741	-0.827552	-1.950957

It is clear from Table 3 that LR, FPE, AIC, SC, HQ and HQ statistics are chosen lag 1 for each endogenous variable in their autoregressive and distributed lag structures in the estimable VAR model. Therefore, lag of 1 is used for estimation purpose.

Table 3: Result Of the Co-integration Test based on Johnson Juselius method

Johansen Test for Co-integration (Trace Test)				
Hypothesized	Trace Statistic	0.05 Critical	Probability	Conclusion
No. of CE(s)		Value		
None	27.65747	29.79707	0.0866	no cointegration relationship
At most 1	8.752360	15.49471	0.3888	
At most 2	0.820284	3.841466	0.3651	

Johansen Test for Co-integration (Maximum Eigen value Test)				
Hypothesized	Trace Statistic	0.05 Critical	Probability	Conclusion
No. of CE(s)		Value		
None	18.90511	21.13162	0.0996	no cointegration relationship
At most 1	7.932076	14.26460	0.3856	
At most 2	0.820284	3.841466	0.3651	

The table 3 shows that there is no relationship of cointegration between exports, imports and Growth in Turkey. That is mean that we have to use the Vector Auto-Regression estimation.

Table 4: Vector Auto regression Model

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.599350	0.123098	4.868871	0.0000
C(2)	0.057123	0.101065	0.565205	0.5744
C(3)	0.221305	0.135851	1.629025	0.1095
C(4)	3.755741	1.151130	3.262655	0.0020

To check if exports and imports have effect on economic growth, C (1) must be significant, and the coefficient of C (1) should be negative for the VAR model to be significant. In our case C (1) is significant because the value of her probability is (0.0000), which is less than 5%, but the coefficient of C (1) is not negative. So, we can say that exports and imports have not any effect on economic in Turkey.

Table 5: Residual Diagnostics Tests

R-squared	0.987326
Adjusted R-squared	0.986580
Durbin-Watson stat	1.611465
F-statistic	1324.298
Prob(F-statistic)	0.000000
Heteroskedasticity Test: Breusch-Pagan-Godfrey	
Prob. Chi-Square(3)	0.7201
Prob. Chi-Square(3)	0.6100
Breusch-Godfrey Serial Correlation LM Test:	
Prob. F(1,50)	0.3903
Prob. Chi-Square(1)	0.3670

Diagnostic tests indicate that the overall specification adopted is satisfactory.

Table 6: Pair-wise Granger Causality Tests

Null Hypothesis:	F-Statistic	Prob.
LOG(EXPORTS) does not Granger Cause LOG(GDP)	8.01235	0.0066
LOG(GDP) does not Granger Cause LOG(EXPORTS)	0.74507	0.3920
LOG(IMPORTS) does not Granger Cause LOG(GDP)	10.7420	0.0019
LOG(GDP) does not Granger Cause LOG(IMPORTS)	0.15106	0.6991
LOG(IMPORTS) does not Granger Cause LOG(EXPORTS)	3.71616	0.0594
LOG(EXPORTS) does not Granger Cause LOG(IMPORTS)	3.12467	0.0830

The results of the Granger causality test (Table 6) show that imports led to economic growth, and exports led to economic growth. Also we can remark that there is weak uni-direction causality between exports and imports.

V. Conclusion:

The principal objective of this work was to clarify and to show the link between exports, imports and economic growth of Turkey over the period 1960-2015. The cointegration, VAR model and Granger's causality tests are exercised to investigate the relationship between these three variables. The result shows that there is no relationship between the three variables in Turkey. On the other hand, we found that there is a strong evidence of bidirectional causality from imports to economic growth and from exports to economic growth. These results provide evidence that exports and imports, thus, are seen as the source of economic growth in Turkey.

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