

An Empirical Analysis On The Relationship Between Trade Openness And Economic Growth In Niger

Fatih Mangir¹ Hakan Acet² And Mahamane Moutari Abdou Baoua³

Abstract

The purpose of this study is to analyze the relationship between trade openness and economic growth of Niger for the period of 1970-2015. Having found evidence of long-run relationship between variables by using Johansen co-integration approach, Vector Error Correction (VEC) technique has been employed to analyze the direction of causality.

The empirical results show that there exists bi-directional causality among variables in Niger economy. This study concludes that like many developing countries, the main aim of economic policies in Niger is to develop business environment and opportunities for supporting trade openness.

Keywords: Trade openness, Economic Growth, Niger

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1Corresponding Author, Selçuk University, Faculty of Economics and Administrative, Department of Economics, Konya,Turkey e-mail: fmangir@selcuk.edu.tr

2 Selçuk University, Faculty of Economics and Administrative, Department of Economics, Konya,Turkey, hakanacet@selcuk.edu.tr

3 Social Sciences Institute, Selçuk University, Konya, Turkey, mukhtar.abdu@hotmail.com

INTRODUCTION

According to standard international trade theories, adopting reforms for liberalizing trade, launching multi-trade agreements and participating free trade by lowering trade barriers are the main trade policies to improve efficiency and increase economic growth. Innovation and adaptation of technology are two basic channels through trade may affect growth. They also boost the economy's rate of total factor productivity growth (Proudman et al., 1998). Economies of scale and differentiated goods may lead to lower prices and create gain for consumers according to new trade theory developed by Krugman (1979, 80).

However, recently, the protectionist economists have criticized mentioned arguments of standard trade theories. Rodrik (2001) argues that the excessive emphasis on trade liberalization can backfire if it diverts scarce energies and political resources of government leaders from growth fundamentals (Zafar, 2005:3). According to the protectionist views, restrictions on trade may help countries in dealing with trade deficit. Increased export may lead to better growth. And also opponents of free trade claim that removing restrictions on trade may cause the decline of domestic production and also domestic employment. Free trade also may lead to decrease government revenue by reducing tariffs.

In this world of globalization, each country tries to increase its share on the international market through trade. For this reason, these countries rapidly open their economies to world trade by negotiating trade agreements and lowering trade barriers. Since 1970s economist are investigating whether trade openness is a good thing for an economy. This is due to the growth differences between Latin America and East Asian countries. While East Asian countries have been accepted miracle due to the high economic performance based on trade-led growth, Latin America could not attain high growth with the Import substitution growth.

There is also no consensus about the role of trade on economic growth among economic growth theories and empirical studies. Solow growth theories state that trade liberalization might affect growth in short time without technological progress. On the other hand, trade foster growth in the long run according to the endogenous growth theories (Romer 1986, 1990, Grossman and Helpman, 1990, 1994, Lucas 1988).

While some empirical studies suggest that there is positive relationship between trade openness and economic growth, other studies showed that sometime the situation can be the opposite of all this. For this reason, the main purpose of this study is to investigate the relationship between trade openness and economic growth in Niger.

Niger has been a member of the WTO since 1996 and as such is committed to trade liberalization and opening its markets to foreign investments. Before 1996 the average economic growth was about 2.3% and after 1996, the growth became 4.8%. The average export growth also increased from -6.5% before 1996, to 8.6% after 1996 [CITATION UNC17 \l 1055]. Because of the fact that Niger is a landlocked country, trade openness could hit the economy in long run. Another point is that, despite its natural resources, Niger is one of the poorest country in the world in term of development. And that's why we chose Niger for this study. We will examine the link between trade openness and economic growth in Niger by using time series data of 1970-2015 periods.

This study examines the cointegration and causality relationship between the variables by employing the Johansen co-integration and VEC Granger causality tests.

In this context, our work will be structured as follow. In the second section, we will review the empirical studies about trade openness and economic growth relationship. The third section provides the data, model specification and method. And we concluded in fourth section.

II. Literature Review

Nowadays we can reach a lot of studies related to trade and economic growth in the literature. Most of them give importance to the trade openness for a certain development of a given country. As the main purpose of this study is to investigate the relationship between trade openness and economic growth for Niger, firstly we will look at some studies that did the same investigation using these variables. In this context, we will start with the studies that found a positive relationship between the variables.

Constant (2010) investigated the long-run impact of FDI and trade openness on economic growth in Ivory Coast by using the bounds testing co-integration approach and the VAR Granger causality/Block Exogeneity Wald tests. He found a long run relationship between the foreign direct investment, trade openness and growth; and according to the VAR Granger causality/Block Exogeneity Wald tests, there is unidirectional causal relationship running from FDI, trade openness to economic growth and from output, FDI to trade openness.

Ramzan & Kiani (2012) applied an econometric technique of Error Correction Methods (ECM) in order to find the link between economic growth indicator, FDI, and trade openness by using the annual data set ranging from 1975 to 2011. The results suggested that FDI and trade promote growth of real sector of economy of Pakistan. However, the impulse response

analysis reveals that this relationship is not stable rather volatile over time. Kakar & Khiji (2011) found also a positive relationship between trade openness and economic growth for Pakistan and Malaysia over the period 1980-2010.

Aboubacar et al. (2014) investigated the trade-led growth theory for Niger economy covering the period from 1980 to 2013 and found that the trade openness has been efficient to spur the economic growth in Niger over the period of study.

Sakyi, Commodore, & Opoku (2015), investigated the long-run impact of FDI and trade openness on economic growth in Ghana (1970–2011) and found that the interaction of FDI and exports has been crucial in fostering growth

Bibi (2014) investigated the role of trade openness in enhancing economic growth in Pakistan by using analysis based on time series data for the period 1980 to 2011. According to his results, negative impact of trade openness could be surmounted by producing import substitutes and creating conditions for trade surplus.

The summary of literature review is given in the following table.

Table 1. Openness and Growth: Literature Survey

Studies	Sample and Periods	Methodology	Findings
Ali & Abdullah (2015)	(Export+Import)/GDP Pakistan, 1980-2010	The Johansen Cointegration test & VECM	Short-run positive relationship and long-run negative relationship between openness and growth.
Kalu, Nwude, & Nnenna (2016)	net export (NEXP) Nigeria, 1991-2013	Classical Linear Regression Model (CLRM) & ordinary Least Square Regression method Nigeria	Positive relationship between trade openness and economic growth.
Nduka (2013)	(Export+Import)/GDP Nigeria, 1970 – 2008	The ordinary Least Squares (OLS) technique	Positive long-run relationship between openness and growth.
Olufemi (2004)	(Export+Import)/GDP Nigeria, 1970-2000	Johansen Cointegration, VECM	Positive Long-run relationship and Unidirectional causality between the variables.
Aboubacar, Xu, &	(Export+Import)/GDP	The Johansen	Positive Long-run

Ousseini, 2014	Niger, 1980-2013	Cointegration test & VECM	relationship and unidirectional causality between openness and growth
Nduka, Chukwu, Ugbor, & Nwakaire, 2013	(Export+Import)/GDP Nigeria, 1970Q1-1985Q4 and 1986-2011	Regression model Granger Cointegraion & Causality test	Positive Long-run relationship and unidirectional causality between openness and growth
Mohsen, 2015	(Export+Import)/GDP Syria, 1970-2010	Johansen Cointegraion VECM Granger Causality	Positive Long-run relationship and bidirectional causality between openness and growth
Ramzan & Kiani, 2012	(Export+Import)/GDP Pakistan, 1975-2011	Johansen Cointegraion & VECM	Positive Long-run relationship between openness and growth
Adhikary, 2015	(Export+Import)/GDP Bangladesh, 1986-2008	Panel Johansen Cointegraion & VECM	Positive long-run relationship and unidirectional Short-run causal relationship between openness and growth.
Kakar & Khilji, 2011)	(Export+Import)/GDP Pakistan and Malaysia for the period 1980-2010	Johansen Cointegraion and Granger Causality for Malaysia & Pakistan	Positive Long-run relationship for Pakistan & Malaysia. Short-run causal link between Openness and growth.
Constant, 2010	(Export+Import)/GDP Cote d'Ivoire , 1980-2007	The bounds testing cointegration approach (Pesaran et al, 2001) and the VAR Granger causality/Block Exogeneity Wald test	Positive Long-run relationship and unidirectional causality from openness to growth.
Umba, 2013	(Export+Import)/GDP Democratic Republic of Congo, 2015-2029	Dynamic computable general equilibrium model based on the social accounting matrix	Negative effect of trade openness on economic growth.
Adhikary, 2011	(Export+Import)/GDP Nepal, 1985-2012	Johansen Cointegraion & VECM	Negative long-run relationship and unidirectional causal link between Trade openness and GDP.
Olasode, Raji, Adedoyin, & Ademola, 2015	(Export+Import)/GDP Nigeria, 1981-2012	Vector Error Correction Model (VECM)	Negative Short -long-run relationship between openness and growth.
Musila & Yiheyis, 2015	(Export+Import)/GDP Kenya, 1980-2012	Granger Causality test, Kenya	Negative long-run relationship & causality link between openness and

			growth.
Bibi, 2014	(Export+Import)/GDP	DOLS (Dynamic Ordinary Least Square)	Negative long run relationship between trade openness and economic growth
Eric, 2015	(Export+Import)/GDP Nigeria, 1980-2011	Johansen co-integration approach, Fully Modified Ordinary Least Square (FMOLS) approach	Negative and significant long run relationship between trade openness and economic growth
Yusoff & Nuh, 2015	(Export+Import)/GDP Thailand	Granger causality test Thailand	Bidirectional causality link between openness and growth.

III. Data, Methodology and Empirical Results

III.I. Data and Methodology

In this study, we investigate the effect of foreign trade on the economic growth of Niger using quarterly time-series data from 2000 to 2012. Trade openness (TO) is defined as $\text{Export} + \text{Import} / \text{GDP}$. Economic growth is expressed as logarithmic form of Gross Domestic Product (LGDP) per capita (constant 2010 US\$). All data were obtained from World Economic Outlook database of World Bank in constant (base year:2010).

First, we will conduct unit root test to check the stationarity properties of the series. In this study we will use conventional ADF unit root tests (Dickey and Fuller, 1981). The null hypothesis of ADF test suggests that the series include unit root. So, rejection of the null hypothesis means that the series are stationary.

Secondly, we will use the co-integration test to detect the long-term relationship between our variables. Co-integration is a statistical property of time series introduced in economic analysis, to detect the long-term relationship between two or more time series. Formally, if the available time series are integrated in first order, and in addition a linear combination of these series is integrated of order zero (stationary), we will then say that the varieties are co-integrated of order $I(1)$. The econometric literature distinguishes different techniques for testing co-integration, among which we can cite: the Granger-Engel algorithm (1987); the approaches of Johansen (1988, 1991); The Stock-Watson test (1988); The Phillips-Ouliaris test (1990). In this study, we will use Johansen approach of co-integration. The co-integration test of Johansen helps us on the number of co-integration relation and its functional form by

following the criterion of trace and minimum eigen value and also the information criteria of Akaike and Schwarz. The test hypothesis is formulated as follows:

H_0 : There is a co-integration relation;

H_1 : There is no co-integration relationship.

If the value of the trace and Max-eigen value is greater than its tabulated critical value, the hypothesis H_0 is rejected, indicating that there is co-integration between the variables. On the other hand, a value of the trace and Max-eigenvalue lower than its critical value implies that there is no co-integration relation between the variables (Tari, 2011:416-429).

After determining cointegration relation, we want also to investigate the causality link between the variables. In order to understand causality relation among variables, vector error correction (VEC) mode will be performed.

VEC model (VECM) is a restricted VAR designed for use with nonstationary series that are known to be cointegrated (Bagzibagli, et all, 2016). The cointegrating equation is

$$y_{2,t} = \beta y_{1,t}$$

The corresponding VECM is:

$$\Delta y_{1,t} = \alpha_1 (y_{2,t-1} - \beta y_{1,t-1}) + \varepsilon_{1,t}$$

$$\Delta y_{2,t} = \alpha_2 (y_{2,t-1} - \beta y_{1,t-1}) + \varepsilon_{2,t}$$

The VEC has cointegration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics (Goshu, 2014: 29). The cointegration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments (Cobham and Dibeh, 2011: 99).

III. 2. Empirical Results

III. 2.1. Unit Root Tests

The stationary properties of two variables are investigated by ADF (1979) test. The results of the first differenced variables show that the ADF test statistics for two variables are greater than critical values at 1%, 5%, 10% levels and the two variables are stationary after differenced, suggesting that two variables are integrated of order I(1).

Table 2 Results of the ADF and unit roots tests

	<i>Augmented Dicky-Fuller Test (ADF test)</i>	
	<i>Level Form</i>	<i>First Difference</i>
<i>LGDP</i>	-2.34	-6.38
<i>TO</i>	-2.14	-6.45
<i>Significant Level</i>	<i>Critical Values</i>	
<i>%1</i>	-3,58	-3,58
<i>%5</i>	-2,92	-2,92
<i>%10</i>	-2,60	-2,60

Determining both variables are non-stationary and integrated of first order then we can proceed the test for cointegration.

III. 2.2. Cointegration Test

Johansen co-integration results are showed in Table-5.

Table 3: Johansen-Juselius Cointegration Tests

Hypothesized No. of CE(s)	Trace	Max-Eigen	Critical Values (5%)	
	Statistic	Statistic	Trace	Max-Eigen
$r = 0$	17.54**	15.15**	15.49	14.26
$r \leq 1$	2.38	2.38	3.84	3.84

*Note: ** denotes significant at 5% significance levels.*

Since calculated trace and max-eigenvalue statistics are bigger than critical value of 17.54 and 15.15 respectively at the 5% significance level, the null hypothesis of $r=0$ is rejected which means that there is one cointegrating relationship among the variables.

III. 2.3. VEC Model and Granger Causality

Having conclude the cointegration relationship, we can estimate VEC model. The error-correction term measures the deviations of the series from the long run equilibrium relation

(Anoruo and Ramchander, 2000:10). The VEC approach to granger causality was performed to test the direction of short-run causality existing among the variables.

In this model, we can write error correction term which is the normalized cointegrating equation based on the VEC as follows:

$$\Delta \text{GDP} = 5.03 + 0.019 \Delta \text{TP}$$

According to normalized equation, trade openness contributes to economic growth in the long-run. In an effort to determine the short run causality among the two variables Granger causality/Block Exogeneity Wald tests based upon VEC model is performed. According to the test results in Table 4, we found the existence of a bidirectional causal relationship between trade openness and growth in the short-run.

Table 4. VEC Granger Causality/Block Exogeneity Wald Tests

Dependent variable: ΔGDP			
Excluded	Chi-sq	df	Prob.
ΔTP	3.50	1	0.06***
All	3.50	1	0.06***
Dependent variable: ΔTP			
Excluded	Chi-sq	df	Prob.
ΔGDP	4.68	1	0.03**
All	4.68	1	0.03**

* significant at 1% level, ** significant at 5% level, *** significant at 10% level

Our analysis supports the trade-growth hypothesis which claims that trade openness leads to economic growth.

Conclusion

This study examines the causal relationship between trade openness and economic growth of Niger for the period of 1970-2015. After reviewing recent empirical research regarding the link between openness and growth, we use time series methods to discover the causal relationship between these variables. In a first step we check for stationarity using ADF unit root test. Secondly, we tested the co-integration and causality relation. The co-integration test indicates that there is co-integration in our model. According to these results, we can conclude that trade openness in Niger has a long-run equilibrium link with economic growth. The Granger causality test shows that there is short-run bi-directional causal relationship between trade openness and economic growth. When we compare our results with the study on Niger mentioned in literature review, we have obtained similar result with Aboubacar et al. (2014). Our model suggests that international openness may play a role in the economic process of

Niger so it should continue to increase the infrastructure in order to reduce the trade costs and to attract and facilitate the foreign investment in the country. The evidence indicates the importance of Niger's dependence on foreign trade to increase growth, thereby increasing openness in turn.

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