



THE EFFECT OF TRADE OPENNESS ON ECONOMIC GROWTH IN NIGERIA

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ABSTRACT

The aim of this study is to analyse the relationship between trade openness and economic growth in Nigeria from 1981-2014; the model was augmented by adding financial development. The methodology used in this paper are unit root, cointegration and granger causality test. The stationarity and integration of the data was done using the Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) test; the test conducted shows that the variables are not stationary. The Johansen test was used to test for cointegration and the result shows that cointegration exists. Finally, the granger causality test was carried out, and the result shows that there is a bilateral relationship between all variables; except the relationship between import and economic growth, import and domestic credit, import and export which have a unilateral relationship.

Keywords: Economic Growth, Financial Development, Trade, Nigeria

JEL Index Classifications: F63, G21, O11, C12, C01

1. INTRODUCTION

There has been a lot of controversies on the relationship between trade openness on economic growth; these controversies also take place in both empirical and theoretical levels. The neoclassical model on exogenous growth states that trade policy changes affects only product specialization pattern but does not affect the long term economic growth rate. In contrast, the new growth theory stated that trade policy affects the long run economic growth rate. However, trade openness level of impact on growth in the long run has varying patterns when trading partner vary structurally in terms of innovation capabilities is ambiguous (Musila & Yihevis, 2015). A model was created by Grossman & Helpman, (1991) that shows that trade between a less developed and a developed nation can improve long term growth rate of less developed countries. While Stokey and Young (1991) developed models that shows trade between a developed and a less developed country (LDC) reduces the level of long run growth for the LDC.

There has been a lot of arguments on the importance of trade openness and financial development among the variables used in economic literature and analysis; these variables also have a strong correlation with growth (Sachs & Andrew, 1995). Poor countries face financial constraints which prevents them from taking full advantage of the technology transfer which is one of the reasons why some countries deviate from the world

production frontier growth rate (Aghion, Burgeess, Redding, & Zilibotti, 2005). Poor countries get trapped in the vicious circle of poverty due to their under developed financial systems. When there is poor financial system development, a country is likely to face poor economic performance and vice versa (Fung, 2009). However, countries with well-developed financial system have the tendency of faster growth, hence, finance does not just promote growth but it also promotes the poor economies which helps the poor countries to gradually meet up with the rest of the economy (Baltagi, Panicos, & Siong, 2009).

2. LITERATURE REVIEW

Financial markets play a great role which has influence on economic growth (Levine, 1997); this helps in the reduction of idiosyncratic and liquidity risks, improve allocation of resources to some more productive usages, increase savings, increase corporate control and monitoring and improve specialization. Real sectors need financial supply of these services for a deeper financial system. The issues regarding financial development and how it can influence economic growth has received a lot of attention and theoretical foundation which recognize two different, but complementary channels, also, it is debated that allocative and cumulative channels can influence economic growth. Many channels stress the positive effects of finance on human and capital accumulation on economic growth (e.g; Gregorio & SE-JIK, 2000). Distribution channel concentrates on the increasing efficiency on allocation of resources which is due to financial extension which consequently boosts growth (e.g. King & Ross, 1993). Others, such as, Harrison (1996) and Vamvakidis (2002), have also shown that trade liberalization has a positive effect on economic growth. Specialization can also be increased through trade liberalization which in turn will increase productivity growth and realize economies of trade. A lot of empirical studies have been done since the 1990's which stated that open economies face a lot of competition which leads to an increase in productivity. In summary, most of the studies done shows that financial development has a positive impact on economic growth, even though there need to be more research done to give more details on the heterogeneity across countries.

Another research done shows that Africa has the capabilities of rapid economic growth like other developing countries around the world. Regression results show that the lagging growth of the African economy is due to natural factors such as, climate, limitation on access to sea, abundance of natural resources. From the results, it also shows that policies like government saving, trade liberalization, and "market-supporting institutions" have great impact on the level of economic growth (Sachs & Warner, 1997). It was also observed that variations in demographic factors and life expectancies have some effect on the sluggish growth rate of African countries compared to other developing countries. From the research conducted, it was found that there are certain variables that do not have effect on economic growth, such as, neighborhood. It was also found out that the Sub-Saharan Africa does not have any unmeasured growth constraint or that the residuals of the regression analysis are considerably higher in Africa compared to other countries.

The kind of relationship that exists between trade openness and growth has been a subject of debate among economists for a long period of time. The debate takes place at the empirical and theoretical levels. Looking at the exogenous growth model, any change in trade policy will only have effect on the path of product specialization, but it does not affect the long term ratio of economic growth. On the contrary, the new theory of growth shows that trade policy changes can stimulate rates of economic growth in the long-run. However, difference in trade partners innovation capabilities can affect the level of impact of trade openness on long-term rate of economic growth. A model was created by Helpman and Grossman (1991) which shows that trade between a less developed country and a

developed country can increase the level of growth in the long run, under certain conditions. While Stoke and Young (1991) came up with models that show trade between a less developed and a developed country can decrease long run growth in less developed country. On the contrary, another model was created that shows that trade between a less developed and a developed country will lead to a decrease economic growth of the developed country in the long run.

There are a lot of mixed results on effect of trade openness on economic growth. Some regressions find a positive effect (Dollar & AART, 2003), (Frankel & David, 1999), while some find negative effects (Irwin, 2002); Clemens & Jeffrey, (2001). However, thorough research on individual country is a better way of understanding the impact of trade openness on economic growth in the long run.

3. MATERIALS AND METHOD

This study analysis the impact of trade openness, financial development on economic growth in Nigeria using annual data from 1960-2013. Financial development is used to augment the model. The framework used is the granger causality test in vector Auto regression (VAR) to test the relationship among financial development, trade openness and economic growth in Nigeria. Firstly, data used will be described, followed by technique for analyzing stationarity of underlying time series is described. Then, a description of Johansen co-integration test, followed by Granger-causality methodology in vector auto regression (VAR) and the concluding section will be notes on consistency of the estimated vector auto regression.

3.1 Overview of the variables

Over the years, there has been a couple of research done to show that there is a relationship between financial development and economic growth; there is a two-way effect or economic growth leads to financial development. Some research show that there is independent causation between economic growth and financial development. Proving the relationship between financial development and growth consists of two problems.

- It is required to take up a measure for financial development.
- A lot of econometrics articles regarding this issue don't use a theoretical model.

Three variable were used to proxy the financial development; these variables are:

- Private credit (PC): this is a percentage of the GDP
- DOMESTIC CREDIT (DC): this is also as a percentage of the GDP
- Broad money (BM): as a percentage of GDP

Trade openness (TO) will be measured using import and export (% of GDP) and the rate of economic growth (EG) will be measured using the sum of import and export.

3.2 Model Specification

The main model that shows the relationship among trade openness, financial development and economic growth in Nigeria can be identified as:

$$EG = F(FD, TO) \text{-----(1)}$$

which can also be presented as:

$$EG_t = \alpha_0 + \alpha_1 FD_t + \alpha_2 EG_t + \varepsilon_t \text{-----(2)}$$

Where:

FD stands is the financial development represented by Money Supply (M2), Private Credit (PC) and, Direct Credit (DC); GR which stands for Growth rate of GDP; TO stands for Trade Openness; α_0 is the constant term; 't' is the time trend; an 'ε' is the random error term.

Financial development is proxied by three variables the three variables are separated from growth rate and trade openness when determining the Granger causality to create three models:

$$DC_t = \alpha_0 + \alpha_1 EG_t + \alpha_2 TO_t + \varepsilon_{t1} \text{----- (3.1)}$$

$$PC_t = \beta_0 + \beta_1 EG_t + \beta_2 TO_t + \varepsilon_{t2} \text{----- (3.2)}$$

$$M_t = \delta_0 + \delta_1 EG_t + \delta_2 TO_t + \varepsilon_{t3} \text{-----(3.3)}$$

α_0, β_0 and δ_0 are constant terms.

3.3 Estimation Technique

(a) Unit Root Test

The first step comprises of testing integration of individual series considered. A lot of researchers created a couple of procedures to test the order of integration. Some of the popular tests are Augmented Dickey-Fuller (ADF) by Dickey and Fuller (1979, 1981), and the Phillip-Perron (PP) by Phillips and Perron (1988). The general formula for Augmented Dickey-Fuller (ADF) test is estimated by the following regression:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum_{i=1}^n \alpha_i \Delta y_{t-i} + \varepsilon_t \text{-----(4)}$$

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum_{i=1}^n \alpha_i \Delta y_{t-i} + \delta t + \varepsilon_t \text{-----(5)}$$

- Y is time series.
- t is linear time trend.
- Δ is the first difference operator.
- α0 is a constant.
- n is the optimum number of lags in the dependent variable 9
- e is the random error term

equation one (1) includes just drift while equation two (2) includes both drift and

linear time trend pp.

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \varepsilon_t \text{-----(6)}$$

3.4 Co-integration test

Another test was conducted to test the presence or absence of cointegration between series of same order of integration through creation of cointegration equation. The basic idea behind cointegration is that if, in the long-run, two or more series move closely together, even though the series themselves are trended, the difference between them is constant. It is possible to regard these series as defining a long-run equilibrium relationship, as the difference between them is stationary (Hall and Henry, 1989). A lack of cointegration suggests that such variables have no long-run relationship: in principal they can wander arbitrarily far away from each other (Dickey et. al., 1991). We employ the maximum-likelihood test procedure established by Johansen and Juselius (1990) and Johansen (1991). Specifically, if Y_t is a vector of n stochastic variables, then there exists a p -lag vector auto regression with Gaussian errors of the following form: Johansen's methodology takes its starting point in the Vector Auto regression (VAR) of order P given by

$$Y_t = \mu + \Delta_1 y_{t-1} + \dots + \Delta_p y_{t-p} + \varepsilon_t \quad (7)$$

To find the quantity of co-integration vectors, Juselius (1990) recommended two statistic test, firstly, the trace test (λ trace) is conducted. It examines the null hypothesis which states that the number of distinct cointegrating vector is less than or equal to q contrary to a general unrestricted alternatives $q = r$. the test is as follows:

$$\lambda \text{ trace } (r) = -T \sum_{i=r+1}^n \ln(1 - \lambda_i) \quad (8)$$

- T is the quantity of usable observations,
- λ_i s are the projected eigenvalue in the matrix

3.5 Granger-causality Test

The next test conducted after the cointegration test, is the test for the causality among trade openness, financial development and economic growth. If the test shows that the variables are cointegrated, error correction term (ECT) should be included because it is vital (Granger, 1988). But if it shows that the variables are not cointegrated a multivariate equation will be used.

MODEL 1

$$DC_t = \sum \alpha_{11t} DC_{t-1} + \sum \alpha_{12t} TO_{t-1} + \sum \alpha_{13t} GR_{T-1} + \varepsilon_{11t} \quad (9.1)$$

$$TO_t = \sum \alpha_{21t} DC_{t-1} + \sum \alpha_{22t} TO_{t-1} + \sum \alpha_{23t} GR_{T-1} + \varepsilon_{21t} \quad (9.2)$$

$$GR_t = \sum \alpha_{31t} DC_{t-1} + \sum \alpha_{32t} TO_{t-1} + \sum \alpha_{33t} GR_{T-1} + \varepsilon_{31t} \quad (9.3)$$

MODEL 2

$$PC_t = \sum \beta_{11t} PC_{t-1} + \sum \beta_{12t} TO_{t-1} + \sum \beta_{13t} GR_{T-1} + \varepsilon_{11t} \quad (10.1)$$

$$TO_t = \sum \beta_{21t} PC_{t-1} + \sum \beta_{22t} TO_{t-1} + \sum \beta_{23t} GR_{T-1} + \varepsilon_{21t} \quad (10.2)$$

$$GR_t = \sum \beta_{31t} PC_{t-1} + \sum \beta_{32t} TO_{t-1} + \sum \beta_{33t} GR_{T-1} + \varepsilon_{31t} \quad (10.3)$$

MODEL 3

$$M_t = \sum \delta_{11t} M_{t-1} + \sum \delta_{12t} TO_{t-1} + \sum \delta_{13t} GR_{T-1} + \varepsilon_{11t} \quad (11.1)$$

$$TO_t = \sum \delta_{21t} M_{t-1} + \sum \delta_{22t} TO_{t-1} + \sum \delta_{23t} GR_{T-1} + \varepsilon_{21t} \quad (11.2)$$

$$GR_t = \sum \delta_{31t} M_{t-1} + \sum \delta_{32t} TO_{t-1} + \sum \delta_{33t} GR_{T-1} + \varepsilon_{31t} \quad (11.3)$$

Note: DC_t stands for Direct Credit as a proxy financial development; PC_t stands for Private Credit as a proxy for financial development; M_t stands for broad Money Supply also used as a proxy for financial development; TO_t stands for Trade Openness; GR_t stands for Growth Rate of GDP; Rejecting the null hypothesis ($\alpha_{11} = \alpha_{22} = \alpha_{33}$) show that direct credit do granger cause economic growth and trade openness and vice versa.

It can be concluded that the null hypothesis ($\beta_{11} = \beta_{22} = \beta_{33}$) in equation (10.1, 10.2, 10.3) show that private credit does granger cause economic growth and trade openness and vice versa hence, rejected. Also, by rejecting the null hypothesis ($\delta_{31} = \delta_{32} = \delta_{33}$) show that money supply does cause economic growth and trade openness and vice versa. The tests conducted help us to prove the relationship of no causality, unidirectional causality or feedback causality among the variables used to conduct the test.

4. EMPIRICAL RESULTS

4.1 ADF Verifications

We first conducted a test is conducted to know if the variables used are stationary and to also know their order of integration. Two tests (Augmented Dickey Fuller and Phillips-Perron) were used to determine if unit root exists in the time series data. The result of the test is available in table 1.

Table 1: ADF and PP results

variables	ADF	PP
EG	-2.197048 (-3.646342)	-2.019646 (-3.646342)
PC	-2.646561 (-3.646342)	-2.402949 (-3.646342)
DC	-2.101623 (-3.646342)	-1.882698 (-3.646342)
BM	-3.240686 (-3.653730)	-2.284509 (-3.646342)
EX	-2.688537 (-3.646342)	-2.569210 (-3.646342)
IM	-2.776623 (-3.646342)	-2.837644 (-3.646342)

Note: Test based on 1% level of significance; Figures within parenthesis indicates the critical values. Mackinnon (1991) critical value for rejection of hypothesis of unit root applied.

The result of the augmented dickey fuller (ADF) and the Phillips-Perron (PP) test indicates that all the variables are not stationary. The result can be seen by comparing the values that has been observed from the ADF and PP test and the critical values of the ADF and PP test at all the significance levels (1%, 5% and 10%). From the results, showing evidence of non-stationarity; the null hypothesis should be accepted. Therefore, unit root exists. Result from table 1 provides strong evidence of non-stationarity. Therefore, there is presence of unit root on all the variables.

4.2 Cointegration Results

When the stationarity of the variables has been confirmed, the cointegration test is been conducted among the variables. If the result show that there is cointegration, it means that economic growth, financial development and trade openness share a common trend and equilibrium in the long-run (suggested theoretically). The Johansen and Juselius test was used to conduct the cointegration test. From the results shown in table 2 and 3 both trace statistic and Eigenvalue statistic indicate that there is one (1) cointegrating equation at the 5% level of significance. Which means that there is a relationship among economic growth, financial development and trade openness.

TABLE 2: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.719159	107.8442	95.75366	0.0057
At most 1	0.552646	67.20533	69.81889	0.0794
At most 2	0.490730	41.46436	47.85613	0.1743
At most 3	0.303927	19.87147	29.79707	0.4316
At most 4	0.181955	8.277852	15.49471	0.4362
At most 5	0.056204	1.851042	3.841466	0.1737

Trace test indicates 1 cointegratingeqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 3: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.719159	40.63890	40.07757	0.0432
At most 1	0.552646	25.74096	33.87687	0.3368
At most 2	0.490730	21.59289	27.58434	0.2420
At most 3	0.303927	11.59362	21.13162	0.5881
At most 4	0.181955	6.426810	14.26460	0.5591
At most 5	0.056204	1.851042	3.841466	0.1737

Max-eigenvalue test indicates 1 cointegratingeqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

4.3 Granger Causality Test

After the cointegration test which shows that there is cointegration among the variables, economic growth, trade openness and financial development, a granger causality test was carried out. The results are made available in table 4. From the results of the granger causality test, it can be seen that the null hypothesis of all the relationships of the variables have been rejected while the alternate hypothesis has been accepted (there is a causal relationship between variables) and have a bidirectional relationship except two relationships. IM granger cause EG but EG does not granger cause IM which makes the variables have a unilateral relationship. IM granger cause DC but DC does not granger cause IM which makes the variables have a unilateral relationship also. IM granger cause EX but EX does not granger cause IM which also makes the variables have a unilateral relationship. All other relationships for the granger causality test have a bidirectional relationship.

Table 4: Pairwise Granger Causality Tests

Date: 01/25/16 Time: 19:33
 Sample: 1981 2014
 Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
PC does not Granger Cause EG	32	1.04814	0.3644
EG does not Granger Cause PC		0.17386	0.8414
DC does not Granger Cause EG	32	2.67079	0.0874
EG does not Granger Cause DC		0.86059	0.4342
BM does not Granger Cause EG	32	1.99771	0.1552
EG does not Granger Cause BM		0.41062	0.6673
EX does not Granger Cause EG	32	2.81417	0.0776
EG does not Granger Cause EX		0.82935	0.4471
IM does not Granger Cause EG	32	2.88990	0.0729
EG does not Granger Cause IM		8.38476	0.0015
DC does not Granger Cause PC	32	1.55753	0.2290
PC does not Granger Cause DC		0.26876	0.7663
BM does not Granger Cause PC	32	0.96059	0.3954
PC does not Granger Cause BM		0.06260	0.9395
EX does not Granger Cause PC	32	0.97046	0.3917
PC does not Granger Cause EX		0.65977	0.5251
IM does not Granger Cause PC	32	0.19161	0.8267
PC does not Granger Cause IM		0.80357	0.4581
BM does not Granger Cause DC	32	0.23680	0.7908
DC does not Granger Cause BM		0.30491	0.7397
EX does not Granger Cause DC	32	1.70886	0.2001
DC does not Granger Cause EX		1.16915	0.3259
IM does not Granger Cause DC	32	0.66444	0.5228
DC does not Granger Cause IM		4.60352	0.0190
EX does not Granger Cause BM	32	1.41255	0.2609
BM does not Granger Cause EX		1.42695	0.2576
IM does not Granger Cause BM	32	0.63960	0.5353
BM does not Granger Cause IM		2.01006	0.1535
IM does not Granger Cause EX	32	0.81595	0.4528
EX does not Granger Cause IM		8.13083	0.0017

5. CONCLUSION

This study was conducted to examine the causal relationship among economic growth, trade openness and financial development using data collected from World Bank, World Development Indicators and EconStats TM from 1981-2014. The methodology used to get the information are unit root, cointegration, and granger causality test. Stationarity was tested using Augmented Dickey-Fuller(ADF) and Phillip-Perron (PP) test. The result shows that the variables were non-stationary. Then we used the Johansen multivariate model to check for cointegration: and the result shows that there is cointegration which means there is long-run relationship among variables. Finally, the granger causality test was conducted. The granger causality test show that financial development and trade openness have a causal impact on economic growth.

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