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CONTENTS

DYNAMIC EFFECTS OF TRADE OPENNESS AND FINANCIAL DEVELOPMENT ON ECONOMIC GROWTH IN NIGERIA: A RECONSIDERATION BASED ON BOOTSTRAP CAUSALITY TEST

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Abstract

The dynamic effects of trade openness and financial development on economic growth are re-examined in Nigeria between 1986 and 2016 using the Autoregressive Distributed Lag (ARDL) and bootstrap causality test with endogenous lag order, developed by Hacker and Hatemi-J (2012). We explore a comprehensive financial development index that covers financial institutions and financial markets based on deepness, accessibility, and efficiency of the markets. The empirical results provide that trade openness dampens economic growth while financial development, oil rent, and gross capital formation stimulate economic growth. The results based on a bootstrap causality test support the growth-led financial development hypothesis and growth-led gross capital formation hypothesis. The results further suggest that causality runs from trade openness to oil rent while gross capital formation Granger-cause trade openness. These results, therefore, have numerous policy implications for Nigeria as a net oil exporter.

Keywords: Trade openness; Financial development; Economic growth; Nigeria.

JEL classification: C22, F41, F43, O16.

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1. INTRODUCTION

The potential contributions of trade and financial development as an engine of growth have been the subject of theoretical and empirical investigations in recent times. In the literature, it is clear that empirical research mostly focuses on the role of export on economic growth, leaving the potential benefit of inward-oriented trade policy on economic growth. Theoretically, there are three main possible debates. The first one argues that in favor of export, which is known as the export-led growth hypothesis. The second debate is that economic growth stimulates exports. This argument leads to what is termed as growth-led exports in the literature. The third argument suggests that economic growth is achieved by the growth in imports. This is called import-led growth. However, some researchers maintain that trade openness could be detrimental to economic growth by increasing the rate of inflation and reducing the value of the domestic currency. It could also introduce unfair competition between advanced and developed nations with a high level of technologies and developing nations with less advanced technologies (Musila and Yiheyis, 2015; Polat *et al*., 2015; Ulasan, 2015).

On the other hand, tracing back to the seminal work of Schumpeter (1911), the financial system plays an important role in allocating savings, encouraging innovation, and funding productive investments. This argument has been echoed in Goldsmith (1969), McKinnon (1973) and Shaw (1973) who found that financial development does contribute positively to economic growth. Similarly, Levine (1997) emphatically outlines five basic functions of the financial system in ameliorating information asymmetry and thus enhancing long-run growth. These functions, as stated in Hassan *et al.* (2011) include: "facilitating risk amelioration, acquiring information about investments and allocating resources, monitoring managers and exerting corporate control, mobilizing savings, and facilitating exchange. These functions facilitate investment and, hence, higher economic growth".

Basically, the role of trade openness and financial development has been analyzed by different scholars such as Rajan and Zingales (2003); Awokuse (2008); Hassan *et al.* (2011); Kar *et al.* (2011); Senay and Balcilar (2012); Omri *et al.* (2015); Durusu-Ciftci *et al.* (2017) among others. They have found openness and financial development to be a great stimulus to economic growth and as a positive way of speeding up the development process. Wacziarg and Welch (2008) argue that countries which open up their economies for external trade always experience greater levels of economic growth than countries that are still having trade restrictions.

Nigeria is a lower-middle-income country with a mixed economic system. That is to say, she has an economic system that features characteristics of both the market economy and centrally-controlled economy. Nigeria has gone through different kinds of trade and financial reforms to accelerate economic growth and development. In the 1970s the import substitution policy was the earliest form of trade liberalization before the introduction of structural adjustment programs (SAP)

in 1986 which encourage liberalization of the financial system. As a result of an unproductive macroeconomic environment, these policies could not achieve many successes. The introduction of SAP in 1986, however, led to greater trade and financial liberalization, in terms of elimination of price control and complete removal of foreign exchange control. The reason behind the implementation of the SAP was to make a conducive environment to boost capital inflows, an increase in the transfer of the latest technologies as well as an increase in the government's tax revenues. These policies, of course, will help to minimize the total dependence of Nigeria on the revenue emanating from the sales of crude oil and increase the development of a country by improving its standard of living, reducing the unemployment rate and increasing tax revenues, which can be used for future public investments.

In its present approaches, Nigeria recognizes further exchange mix as a way to cultivate financial development and mitigate over-dependence on the oil sector. Export duties are being reduced, trade and exchange directions are under survey and control, and driven development programs for the domestic administrations and port framework have been controlled. As shown by the recent statistic of the Central Bank of Nigeria (CBN), the balance of trade has been positive over the years. It reaches its peak in 2012 with about USD 63.7 billion. Given this background, the investigative question remains whether trade openness and financial development policies exert positive or negative pressure on the economic growth of Nigeria. To this extent, the main objective of this paper is to re-investigate the dynamic effects of trade liberalization policy vis-à-vis trade openness and financial development in Nigeria during the post-SAP period spanning from 1986 to 2016.

The contributions of this study to the literature are in several folds: First, we re-examine whether trade openness and financial development exert positive or negative pressure on economic growth in Nigeria during the post-SAP era. Second, financial development index constructed by IMF is used. This index is broader compared to the previous index of financial development constructed by researchers themselves. The financial index used encompasses the combination of financial institutions and financial markets in three broad areas, which include depth, access, and efficiency. Depth captures the size and liquidity of markets, access deals with the ability of individuals and companies to access financial services, and efficiency is the ability of institutions to provide financial services at possible low cost and with sustainable revenues as well as the degree of activity of capital markets. Third, trade openness is measured as imports and exports as a percentage of GDP. In this case, the potential benefits of imports and exports are captured in the model. Fourth, the Autoregressive Distributed Lag (ARDL) bounds testing technique is applied to ascertain the cointegration of the variables and their long-run and short-run dynamic effects. Fifth, we apply a bootstrap causality test following the endogenous lag order proposed by Hacker and Hatemi-J (2012). This test is robust to ARCH effects, which are apparently associated with economic and financial data. The test is also superior to existing causality tests regarding the size and power properties (See Hatemi-J, 2007; Hacker and Hatemi-J, 2012).

The remaining paper has been structured into the following sections: Section 2, which follows the introductory section, is a brief literature review. Section 3 presents the data and methodology of the study. Section 4 is concerned with the analysis of the empirical results, while section 5 summarizes and concludes the paper.

2. LITERATURE REVIEW

The link between growth and trade liberalization has remained an issue in the theoretical and empirical literature for a very long time. Although there is an extensive body of literature that focuses on the relationship between trade openness and economic growth. There is, however, no consensus on the nature of the relationship. While most development and international trade economists argue that trade openness is a key driver of both domestic and global economic growth, some other economists argue that protectionism does stimulate the economic performance of countries better. Supporters of trade openness claim that trade liberalization leads to specialization, increase resource productivity, increase output and as well employment generation (such as Dollar and Kraay, 2004; Frank and Romer, 1999; Awokuse, 2008). On the other hand, opponents of trade openness such as Musila and Yiheyis (2015); Polat *et al*. (2015); Ulasan (2015) all claim that liberalization could(i) be detrimental to economic growth by increasing inflation and lowering exchange rates, (ii) introduce unfair competition between advanced technologies of developed nations and less advanced technologies of developing nations.

Josheski *et al.* (2012) examine whether international trade influences economic growth or not. The authors apply time-series data from 208 regions and countries using Ordinary Least Squares (OLS) regression analysis. The variables used include trade openness, real investment to GDP as a proxy for physical capital and secondary school enrollment rate as a proxy for human capital. Their empirical results show that the proportion of trade volume to GDP as a proxy of trade openness has a positive effect on economic growth.More so, black market premium as a proxy for the imbalance in macroeconomic policies hurts economic growth. Lastly, in the presence of macroeconomic policies, trade has a statistically and economically significant positive effect on growth. This result is, however, disagrees with Burhan (2009) who earlier investigates the causal link between trade and economic growth in Tanzania for the period of 1950-2008. His estimation results show a short-run positive relationship and along-run negative relationship between trade openness and economic growth. The results further suggest that a bi-directional causality runs between openness and growth in Tanzania. Furthermore, Awokuse (2008) revisits the pivotal role of trade in the growth process of three major countries in Latin America – Argentina, Columbia, and Peru. The finding discloses that exports and imports played a crucial role in the growth process but the case of import is stronger. Based on causality, the finding reveals that causality runs from GDP to imports and exports.

In the case of Nigeria, Olaifa *et al.* (2003) apply OLS technique to GDP, trade openness, foreign direct investment (FDI), exports and imports in Nigeria in order to analyze the importance of trade openness for economic growth in Nigeria from 1970 to 2012. They find a positive impact of trade on the economic growth of Nigeria. Also, Olabisi *et al.* (2015) estimate a fully modified OLS (FMOLS) using GDP, trade liberalization, exports, imports and population of Nigeria during 1980-2011. Empirical findings of the paper contradict with that of Olaifa *et al.* (2003) and Akomolafe *et al*. (2015), which suggest a negative effect of trade openness on the growth of Nigerian economy. Furthermore, Olufemi (2004) estimates the relationship between trade openness and economic growth on the basis of a VECM for Nigeria using data from 1970 to 2012. The paper observes a positive long-run relationship between openness and economic growth. This finding is echoed in Effiom *et al.* (2013), Nduka (2013), and Olaleye *et al.* (2015), where the relationship between trade openness and economic growth is analyzed on the basis of the autoregressive distributed lag (ARDL) in Effiom *et al.* (2013) while Johansen co-integration is applied in the other three studies.

Regarding the empirical studies on the relationship between financial development and economic growth, many theoretical and empirical studies have flourished over the years. Building on the pioneering work of Schumpeter (1911), Hassan *et al.* (2011) provide on the basis of geographic regions that positive relationship exists between financial development and economic growth in the developing countries. The study found bidirectional causality between financial development and economic growth for most countries under-study; although a unidirectional causality runs from economic growth to financial development for two poorest regions. More so, Kar *et al*. (2011) investigate the direction of causality between finance and growth in MENA countries. The study reveals no clear-cut evidence because the findings are basically country-specific in nature. In more recently, Adeniyi *et al.* (2015) revisited the argument of finance-growth linkage for Nigeria by incorporating threshold effects in the model. The results provide a negative effect of financial development on economic growth in Nigeria, owing to the threshold effect factored in the model.

Furthermore, Menyah *et al*. (2014) apply panel bootstrapped causality approach to investigate the causal relationship between financial development, trade openness, and economic growth in Africa. The result suggests limited support for finance-led growth and trade-led growth hypotheses. Omri *et al.* (2015) found a feedback causal relationship between financial development and trade openness and further revealed that a unidirectional causal nexus runs from financial development to economic growth. Similarly, Ghirmay (2004) and Agbetsiafia (2004) all found evidence supporting a causal relationship running from financial development to economic growth. However, Wolde-Rufael (2009) reports that the causality between economic growth and financial growth is bidirectional in Kenya while Quartey and Prah (2008) found no evidence in support of the causality between financial growth and economic growth.

3. METHODOLOGY OF THE RESEARCH

3.1. DATA

To investigate the impact of trade openness on the growth of the Nigerian economy, we used an Autoregressive Distributed Lag (ARDL) approach by applying time-series data from the period 1986-2016. The five variables used include the gross domestic product (RIPC) in constant 2010 US dollars, trade openness i.e. (imports + exports) as a percentage of GDP, oil rents as the percentage of GDP following Usman and Musa (2018), gross capital formation at constant 2010 US dollars and financial development index. The financial development index used is measured as a combination of financial institutions and financial markets in three broad areas, which include depth, access, and efficiency. Depth captures the size and liquidity of markets, access deals with the ability of individuals and companies to access financial services, and efficiency is the ability of institutions to provide financial services at possible low cost and with sustainable revenues as well as the degree of activity of capital markets. All the variables are obtained from the World Development Indicators (WDI) except the index of financial development, which is obtained from the IMF databased.

3.2. ESTIMATION TECHNIQUE

The empirical route of this study proceeds as follows: First, we test for the unit root, i.e. the stationarity properties of the variables using the Augmented Dicker Fuller (ADF) and the Phillip Perron (PP) tests for this purpose[2]. We also test for the long-run relationship among the variables with the aid of the bounds test method. The robustness of this cointegration test is performed using the Johansen co-integration test proposed by Johansen (1988). Given the conclusions of the abovementioned preliminary analyses, the study employs a flexible ARDL approach to analyze the short- and long-run relationships between trade openness and economic growth with other macroeconomic variables controlled for in this study.Finally, we check the direction of the causation based on a bootstrap test for causality with endogenous lag order, which is superior to existing causality tests based on the size and power properties.

The causality test is argued by Hatemi-J (2007) and Hacker and Hatemi-J (2012) to be robust to ARCH effects that are normally associated with economic and

[2]See Dickey and Fuller (1979) and Phillips and Perron (1988) for technical details of these tests.

financial data. In addition, irrespective of a different order of integration of variables and their cointegration, the test can be performed.

3.3. MODEL SPECIFICATION

To obtain the short- and long-run estimates of the growth function in this study, we specify the functional relationship between the variables captured in the model as follows:

$$ln\,RIPC_t = \beta_0 + \beta_1 TO_t + \beta_2 lnFDV_t + \beta_3 OILR_t + \beta_4 lnGCF_t + \varepsilon_t \quad (1)$$

Where *lnRIPC* is the log of real gross domestic product, TO denotes total trade as a percentage of GDP, *lnFDV* is the log of financial development index, OILR represents oil rent as a percentage of GDP, and *lnGCF* measures the log of gross capital formation. ε_t is the error term, assumed to have zero mean. We estimate the short-run and long-run coefficients by applying a dynamic unrestricted error correction model (UECM), derived from the Autoregressive Distributed Lag (ARDL) approach of Pesaran *et al.* (2001) as follows:

$$\Delta RIPC_t = \alpha_0 + \alpha_1 lnRIPC_{t-1} + \alpha_2 TO_{t-1} + \alpha_3 lnFDV_{t-1} + \alpha_4 OILR_{t-1} +$$
$$+\alpha_5 lnlnGCF_{t-1} + \sum_{i=1}^{n} \eta_i \Delta lnRIPC_{t-i} \sum_{i=1}^{k} \beta_{1,i} \Delta lnTO_{t-i} +$$
$$\sum_{i=1}^{k} \beta_{2,i} \Delta lnFDV_{t-i} \sum_{i=1}^{k} \beta_{3,i} \Delta OILR_{t-i} \sum_{i=1}^{k} \beta_{4,i}\, \Delta lnGCF_{t-i} + \varepsilon_t \quad (2)$$

where all the variables remained as previously defined. Δ is the difference operator and μ_t is the error term assumed to be independently and identically distributed (i.i.d). As noted by Pesaran *et al*. (2001) and Balcilar *et al.* (2019 a), this method of estimation can be applied whether the variables are I(0), I(1) or integrated fractionally. Also, it performs well better compared to other cointegration tests in a small sample size. Therefore, to execute a cointegration test among variables, Pesaran *et al.* (2001) proposed an F-test. The null hypothesis of this test is that $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0$ and the alternative is that $\alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 = 0$. Furthermore, following equation (2), whenever any of the explanatory variables change, economic growth may not quickly adjust its long-run equilibrium state; hence, there will be short-run disequilibrium in the system. To this extent, the short-run disequilibrium normally adjusts to a long-run equilibrium through the error correction mechanism (ECM). The ECM equation is expressed as follows:

$$\Delta RIPC_t = \alpha_0 + \sum_{i=1}^{n} \alpha_i \Delta lnRIPC_{t-i} \sum_{i=1}^{k} \beta_{1,i} \Delta TO_{t-i} +$$
$$+ \sum_{i=1}^{k} \beta_{2,i} \Delta lnFDV_{t-i} \sum_{i=1}^{k} \beta_{3,i} \Delta OILR_{t-i} + \sum_{i=1}^{k} \beta_{4,i} \Delta lnGCF_{t-i} +$$
$$+\varphi ECM_{t-1} + \mu_t \quad (3)$$

where the pace of adjustment to the long-run equilibrium level is captured by ECM_{t-1}, which is defined as one period of lagged residuals in the long-run equation

and the coefficients of the short run are given by $\boldsymbol{\alpha_{i,}\beta_{1,i}}$, $\boldsymbol{\beta_{2,i}}$, $\boldsymbol{\beta_{3,i}}$, and $\boldsymbol{\beta_{4,i}}$ respectively.

3.4. HACKER AND HATEMI-J (2012) CAUSALITY TEST

The Hacker and Hatemi-J (2012) causality test has its origin from the Toda and Yamamoto (1995) causality test. This test uses the vector autoregressive model of order *k*, VAR(*k*) by suggesting a Modified Wald Statistic in order to test the causal relationship between the variables. The method argument VAR(k) with *d* extra lags (d_{max}), where $d_{\max}$ is referred to the maximum order of integration in the VAR system, *k* is the lag length employed which is 4 based on the AIC. This test is robust to ARCH effects that normally associate with economic and financial data and as such possesses good forecasting properties since it uses Hatemi-J Criterion (HJC) to select optimal lag order, which is robust to ARCH effects. In addition, irrespective of a different order of integration of variables and their cointegration, the test can be performed.

The HJC information criterion used in selecting the optimal lag order is proposed by Hatemi-J (2003), which can be computed based on the following:

$$HJC = ln\left(\left|\widehat{D}\right|\right) + j\left(\frac{n^2 lnT + 2n^2 \ln(lnT)}{2T}\right),\ k = 0, 1, \dots, K \qquad (4)$$

Where from Eq. (4), $\left|\widehat{D}\right|$ signifies a determinant of the estimated error terms of variance-covariance matrix in the VAR model with lag order representing the number of equations. *T* is the number of observations in the VAR model and *K* is the maximum lag order. The null hypothesis of non-causality can be tested using a modified version of Wald statistic[3].

As suggested by Hacker and Hatemi-J (2012) a bootstrapped distribution provides more precise outcome in a small sample size like the present study, and it is also most appropriate when there is presence of ARCH effects. This suggestion concurs with Balcilar *et al.* (2019b) who provide that the bootstrap method tends to reduce bias in inference by providing more precise critical values. To this extent, the bootstrapped critical values are estimated with 1000 simulations. Following the framework of Toda-Yamamoto, a VAR(*k*) is specified as:

$$\begin{bmatrix} \ln \mathrm{RIPC}_t \\ TO_t \\ \ln \mathrm{FD}V_t \\ \mathrm{OIL}R_t \\ ln\mathrm{GCF}_t \end{bmatrix} = \begin{bmatrix} \beta \\ \delta \\ \gamma \\ \vartheta \\ \sigma \end{bmatrix} + \sum_{i=1}^{k} \begin{bmatrix} \theta_{11i}\theta_{12i}\theta_{13i}\theta_{14i}\theta_{15i} \\ \theta_{21i}\theta_{22i}\theta_{23i}\theta_{24i}\theta_{25i} \\ \theta_{31i}\theta_{32i}\theta_{33i}\theta_{34i}\theta_{35i} \\ \theta_{41i}\theta_{42i}\theta_{43i}\theta_{44i}\theta_{45i} \\ \theta_{51i}\theta_{52i}\theta_{53i}\theta_{54i}\theta_{55i} \end{bmatrix} \times \begin{bmatrix} \ln \mathrm{RIPC}_{t-i} \\ TO_{t-i} \\ \ln \mathrm{FD}V_{t-i} \\ \mathrm{OIL}R_{t-i} \\ ln\mathrm{GCF}_{t-i} \end{bmatrix}$$

[3]For detail information, interested readers should see Hatemi-J, (2003; 2007); Hacker and Hatemi-J (2012).

$$+\sum_{j=k+1}^{d_{max}}\begin{bmatrix}\varphi_{11j}\varphi_{12j}\varphi_{13j}\varphi_{14j}\varphi_{15j}\\ \varphi_{21j}\varphi_{22j}\varphi_{23j}\varphi_{24j}\varphi_{25j}\\ \varphi_{31j}\varphi_{32j}\varphi_{33j}\varphi_{34j}\varphi_{35j}\\ \varphi_{41j}\varphi_{42j}\varphi_{43j}\varphi_{44j}\varphi_{45j}\\ \varphi_{51j}\varphi_{52j}\varphi_{53j}\varphi_{54j}\varphi_{55j}\end{bmatrix}\times\begin{bmatrix}\ln \mathrm{RIPC}_{t-j}\\ TO_{t-j}\\ \ln \mathrm{FDV}_{t-j}\\ \mathrm{OIL}R_{t-j}\\ ln\mathrm{GCF}_{t-j}\end{bmatrix}+\begin{bmatrix}u_{1t}\\ u_{2t}\\ u_{3t}\\ u_{4t}\\ u_{5t}\end{bmatrix} \qquad (5)$$

Where, Granger causality from TO_t to $lnRIPC$ implies that $\Theta_{15i} \neq 0\forall_i$; likewise Granger causality from $lnRIPC$ to TO_timplies that $\Theta_{51i} \neq 0\forall_i$.

4. EMPIRICAL RESULTS

Table 1 presents the descriptive statistics of the variables. Based on this Table, we observe that the OILR has the highest mean score among the variable, followed by the log of GCF, RIPC, FDV and TO. It can also be seen that the standard deviation of all the variables is less than one except OILR which is as high as 11.62. This implies that all the variables are not volatile except OILR. Furthermore, the skewness and kurtosis of the variables are positive with values of approximately zero for the case of skewness and approximately three for the case of kurtosis. Consequently, the Jarque-Bera probability values cannot be rejected in all the variables, indicating that the variables have a normal distribution. More so, the time plots of the selected macroeconomic variables are evaluated as shown in Figure 1. This is to help assess the existence of drift, trend, structural breaks, etc. Based on this Figure, we observe fluctuations in all the variables with evidence of structural breaks. Also, we observe that with the exception of RIPC and GCF which begin to trend upward clear after the year 2002, no other variable exhibits a clear-cut trend among the variables.

Table 1: *Descriptive statistics*

Variable	LNRIPC	TO	LNFDV	OILR	LNGCF
Mean	7.385302	-1.067812	-1.620478	24.05922	23.93246
Median	7.185222	-1.096447	-1.634699	24.83506	23.59736
Maximum	7.876569	-0.785743	-1.242612	54.08481	24.98025
Minimum	7.039713	-1.326672	-2.004649	3.033855	23.20014
Std. Dev.	0.292782	0.140078	0.167574	11.62245	0.616895
Skewness	0.474722	0.302899	0.115023	0.393367	0.638266
Kurtosis	1.497331	2.139423	2.792190	3.194829	1.793359
Jarque-Bera	4.080966	1.430630	0.124138	0.848508	3.985459
Probability	0.129966	0.489038	0.939818	0.654258	0.136323
Sum	228.9444	-33.10217	-50.23481	745.8359	741.9062
Sum Sq. Dev.	2.571633	0.588652	0.842431	4052.441	11.41678
Observations	31	31	31	31	31

Source: Authors' Computation

Table 2 displays the ADF and the PP test results. The lag length was selected in a way to ensure that the residuals are white noise. The results indicate that TO and log of FDV is stationary at level, i.e. I (0) while the log of RIPC, log of GCF and OILR become stationary after their first differences, i.e. they are I(1).

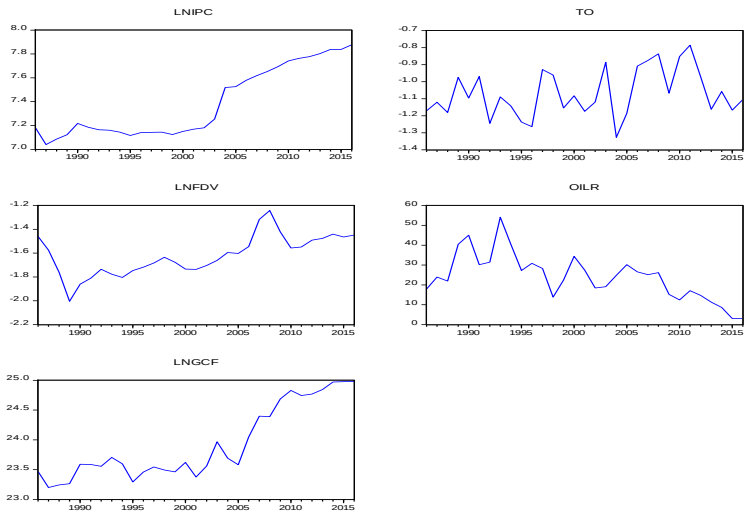

Figure 1. *Time plots of the log RIPC, log FDV, log GCF, TO, and OILR*

UNIT ROOT TEST RESULTS

Hence, we can proceed to examine their long-run relation using a bound testing approach. The result of this cointegration test as shown in Table 3 indicates that there is a valid cointegration between economic growth and fundamental variables namely – trade openness, financial development index, oil rent, and gross capital formation. This finding is validated by the result of the Johansen cointegration test[4].

Table 2*. ADF and PP Unit Root Tests*

Variables	Augmented Dickey-Fuller Test		Phillips-Perron Test	
	Intercept	**Intercept & Trend**	**Intercept**	**Intercept & Trend**
$lnRIPC$	0.5063	-2.1460	0.5063	-2.1460
TO	-4.2814***	-4.4275***	-4.2814***	-4.3997***
$lnFDV$	-1.2619	-5.1362***	-1.8191	-4.6143***
$OILR$	-0.2692	-2.4292	-1.6571	-3.6677**
$lnGCF$	-0.1659	-1.2870	-0.1144	-2.2448
$\Delta lnRIPC$	-5.5032***	-5.4163***	-5.4596***	-5.3877***
ΔTO	-6.0079***	-5.9527***	-18.4443***	-19.9589***

[4]The results of the Johansen (1988) cointegration test is available, and as such provided upon request.

$\Delta lnFDV$	-4.8332***	-4.6970***	-4.7340***	-4.7942***
$\Delta OILR$	-7.3116***	-7.9709***	-7.3714***	-11.7165***
$\Delta lnGCF$	-2.9916**	-6.0441***	-6.1170***	-5.7591***

Notes: *** and ** denote significance level at 1% and 5%.

Table 3. *Pesaran et al. (2001) bounds testing cointegration analysis*

Models	**Statistics**	**K**
$lnRIPC = f(TO, lnFDV, OILR, lnGCF)$	F-Stat: 8.7595*	4

Critical Value Bound Tests	Lower I(0)	Upper I(1)
F-Statistic at 1 Percent	3.29	4.37

Notes: * denotes significance level at 1%. The maximum lag order is 4 and the optimal lag order is selected by the Akaike Information Criterion (AIC), which is 3.

Table 4. *Long-run and Short-run Coefficients*

Dependent Variable = ΔlnRIPC$_t$			
Variable	**Coefficient**	**t-Statistic**	**P-value**
ΔlnRIPC$_{t-1}$	1.2807***	10.044	0.0002
ΔlnRIPC$_{t-2}$	1.5251***	9.7708	0.0002
ΔlnRIPC$_{t-3}$	0.2074*	2.0626	0.0941
ΔTO	-0.5450***	-12.891	0.0001
ΔTO$_{t-1}$	-0.0339	-0.9881	0.3685
ΔTO$_{t-2}$	-0.046542	-1.3295	0.2411
ΔTO$_{t-3}$	0.057498	1.6437	0.1612
ΔlnFDV	1.1528***	9.7362	0.0002
ΔlnFDV$_{t-1}$	-0.4351***	-6.4697	0.0013
ΔlnFDV$_{t-2}$	-0.5877***	-7.5968	0.0006
ΔOILR	0.0034**	3.6046	0.0155
ΔlnOILR$_{t-1}$	-0.0054***	-6.5998	0.0012
ΔlnOILR$_{t-2}$	-0.0021**	-2.7079	0.0424
ΔlnOILR$_{t-3}$	-0.0060***	-6.2226	0.0016
ΔlnGCF	0.5278***	10.119	0.0002
ΔlnGCF$_{t-1}$	-0.0806*	-2.4289	0.0595
ECM$_{t-1}$	-1.9149**	-10.253	0.0002
TO	-0.3719**	-4.6307	0.0057
lnFDV	0.5883***	9.1795	0.0003
OILR	0.0033**	4.2429	0.0081
lnGCF	0.3962***	20.524	0.0000
Intercept	-1.6670**	-2.9528	0.0318

Note: ***, ** and * denote significance at 1%, 5%, and 10% significance level, respectively.

Table 4 presents the model estimates based on the ARDL for the long run and short run. The results based on the long run indicate that trade openness has a negative relationship with economic growth. Specifically, a 1% point increase in

trade openness reduces economic growth by 0.37%. This result, therefore, implies that Nigeria as the largest oil exporter in the continent of Africa relies heavily on the exportation of crude oil and eventually imports most of its goods and services for consumption. This perhaps makes the balance of trade unfavorable as encapsulated in a study by Usman and Musa (2018).

The results further reveal that financial development index, oil rent, and gross capital formation have positive relationships with economic growth. A 1% increase in financial development stimulates economic growth by 0.59%. Similarly, a 1% increase in gross capital formation causes economic growth to rise by 0.396% while a 1% point rise in oil rent increases economic growth by 0.003%. The negative relationship between economic growth and trade openness found is consistent with the Effiom *et al*. (2013) and Olabisi *et al.* (2013) while the relationship between the measure of investment and trade openness concurs with Tsen (2006). However, our finding of the negative effect of trade openness on economic growth is not consistent with Olufemi *et al.* (2004) and Josheski *et al.* (2012). The major factor contributing to this difference could be traceable to the period of study. The positive relationship between financial development and economic growth found is not consistent with Adeniyi *et al.* (2015), and the reason as admitted by the authors themselves is due to the threshold effects factored in the model.

Based on a short run analysis, the error correction term of the model is -1.9149, which suggests that Nigeria's economic growth converges to its long-run equilibrium level by a 191.5% speed of adjustment on yearly basis. This adjustment occurs through the contribution of trade openness, financial development index, oil rent, and gross capital formation. Furthermore, our empirical results reveal that trade openness has a negative relationship with economic growth, concurring with the long-run effect with a much larger coefficient. Particularly, a 1% increase in trade openness decreases economic growth by 0.55%. The short-run results further suggest that a 1% increase in financial development, oil rent, and gross capital formation would increase the economic growth of Nigeria by 1.15%, 0.004%, and 0.43%. These relationships are all statistically significant and easily pass through a 1% level of significance.

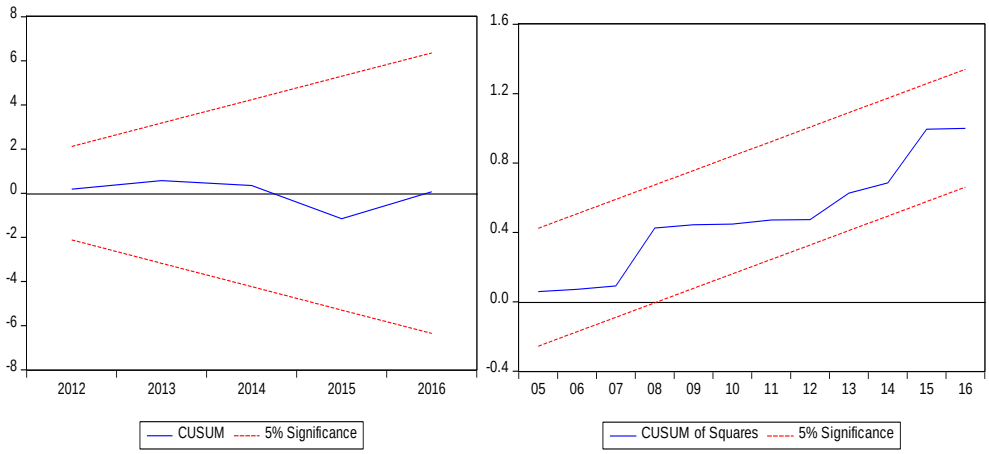

Figure 2. *CUSUM and CUSUM of squares.*

From Table 5, which shows the diagnostic test results of the model used for this study, provides that the estimation results based on the ARDL are free from misspecification. The Breusch-Godfrey Serial Lagrange Multiplier Test result suggests no evidence of serial correlation. More so, the result of the ARCH test for heteroscedasticity indicates that the model has no heteroscedasticity while the Ramsey RESET test shows that the ARDL model is well and correctly specified. Although, the result of the Jarque-Bera Normality test cannot be rejected only at 10% level of significance. In addition, the Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSq) indicate that the model which estimates the long-run and short-run parameters are no doubt stable as CUSUM and CUSUMSq lie within the 5% critical bounds.

Table 5. *Diagnostic Tests*

Residual Diagnostics	**Statistic**	**P-value**
Breusch-Godfrey Serial LM Test [2]	3.7944	0.1508
ARCH Test for Heteroscedasticity [1]	0.6349	0.4333
Ramsey RESET Test [1]	0.0280	0.8752
Jarque-Bera Normality Test	8.5439	0.0139

[ ] denotes lag length.

Table 6 reveals the results of the bootstrapped Toda-Yamamoto Causality test. The results suggest that a causal relationship running from economic growth to financial development and to gross capital formation, a measure of investment. In other words, in causality sense, economic growth causes financial development and also gross capital formation. This finding concurs with Adeniyi *et al.* (2012) who found that financial development causes foreign direct investment and hence affect growth indirectly. However, our result does not support the earlier finding documented by Wolde-Rufael (2009) for Kenya who found bidirectional causality between economic growth and financial development. More so, we found that trade

openness Granger-cause oil rent. Lastly, gross capital formation is found to cause trade openness in Nigeria.

These findings imply that the past value of economic growth can predict financial development and gross capital formation in Nigeria. In addition, while the past value of trade openness predicts oil rent, the past value of gross capital formation adequately predict trade openness in the Nigerian economy. Therefore, our results would provide greater insight into policymaking.

Table 6. *Hacker and Hatemi-J (2012) Causality Test Results*

Null Hypothesis	Estimated Test Value	*P*-Value
TO ≠> LNIPC	0.9647	0.6173
LNIPC ≠> TO	3.0179	0.2211
LNFDV ≠> LNIPC	0.7217	0.6971
LNIPC ≠> LNFDV	9.6412***	0.0081
OILR ≠> LNIPC	3.4189	0.1810
LNIPC ≠> OILR	3.6725	0.1594
LNGCF ≠> LNIPC	1.24569	0.5364
LNIPC ≠> LNGCF	16.7595***	0.0002
LNFDV ≠> TO	1.2952	0.5233
TO ≠> LNFDV	1.3634	0.5058
OILR ≠> TO	0.0967	0.7996
TO ≠> OILR	7.8708**	(0.0195
LNGCF ≠> TO	4.7171*	0.0946
TO ≠> LNGCF	1.1283	0.5688
OILR ≠> LNFDV	0.5826	0.7473
LNFDV ≠> OILR	4.6745	0.0966
LNGCF ≠> LNFDV	0.3224	0.8511
LNFDV ≠> LNGCF	0.2328	0.8901
LNGCF ≠> OILR	1.5518	0.4603
OILR ≠> LNGCF	1.5389	0.4632

Notes: ***, ** and * denote rejection of the null hypothesis at $1^{\%}$, $5^{\%}$ and $10^{\%}$ level of significance.

5. CONCLUSION AND POLICY IMPLICATIONS

The main objective of this study is to re-investigate the pivotal role of trade openness and financial development in the Nigerian growth process during the post-SAP era, which is characterized by market-based economic policies. To achieve this objective, we account for oil rent and gross capital formation, which are important based on theoretical and empirical evidence. We first checked the stationarity properties of the variables in the model estimation and then their cointegration. The results display that the variables are all integrated of order one I(1) except trade openness which is said to be stationary both at the level and first difference. This, therefore, informs the use of the flexible ARDL model.

The results from the ARDL indicate that in the long run and short run, the relationship between trade openness and economic growth is negative and significant, while financial development, oil rent, and gross capital formation increase economic growth. Furthermore, the results based on a bootstrapped Toda-Yamamoto causality test developed by Hacker and Hatemi-J (2012) support the growth-led financial development hypothesis and growth-led gross capital formation hypothesis for Nigeria. The result further shows that trade openness causes oil rent and also gross capital formation Granger-cause trade openness. These results have many policy implications in Nigeria. First, the negative relationship between trade openness and economic growth indicates the unfavorable balance of trade. Therefore, there is a need to reduce imports and stimulate exports. This can be achieved by enhancing domestic production of goods and services apart from crude oil. Second, the findings of this study strongly support policies to encourage stimulating economic growth in order to develop financial sector and gross capital formation. More so, the openness to trade causes oil rent in causality sense. Therefore, to stimulate oil revenue in Nigeria, there is need to increase the degree of openness.

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