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Article

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GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

Trade openness and economic growth nexus: Exploring the role of institutional quality in Nigeria

Philip C. Omoke¹ and Silva Opuala–Charles²

Abstract: This study attempts to fill the prior knowledge gap in the nexus between trade openness and economic growth in Nigeria by incorporating the role of institutional quality. The study covers the period from 1984 to 2017 and employs three indicators of trade openness including total trade, import trade, and export trade. Cointegration among the variables is examined using the ARDL bounds testing approach. The results provide evidence of a long-run relationship among the variables. The estimates suggest that export trade has a significant positive impact on economic growth while the impact of import trade on economic growth is negative and significant. The results also show that the negative long-run effects of import trade on economic growth in Nigeria decreases as institutional quality (quality of governance) improves. These empirical results have important policy implications for Nigeria. Among others, this study highlights the needs to improve the quality of governance in the country. Good governance and quality institutions can help channel the dividends of trade openness into growth-enhancing activities.

Subjects: International Economics; International Trade (incl. trade agreements & tariffs); Development Economics; Political Economy

Keywords: Trade openness; Economic growth; institutional quality; Nigeria

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PUBLIC INTEREST STATEMENT

Nigeria has focussed on liberalizing the trading environment, a strategy adopted to stimulate economic growth. In this study, we examined the trade openness and economic growth nexus in Nigeria, accounting for the role of institutional quality. The protection of economic transactions is a primary condition for creating enabling trade and investment environment and accounting for the role in the analysis could aid policy formulation. The study shows that trade openness can have a negative effect on economic growth, specifically through the import channel. Furthermore, as long as increased trade openness is likely to expose the economy to external shocks, the benefit from trade openness will depend on the quality of institutions. We concluded by highlighting the need to fight and eliminate corruption in all segments of the economy, promote law and order and bureaucratic quality in the country.

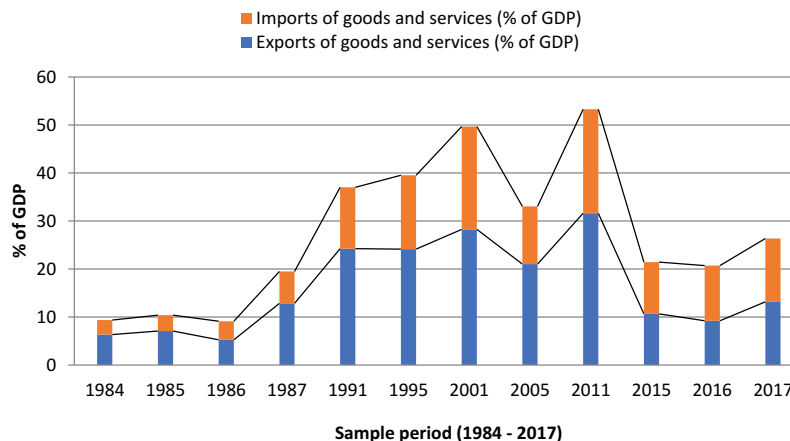
1. Introduction

Recent years have witnessed increased research attention on the nexus between trade openness and economic growth in developing economies. This development is motivated by (i) the increasing integration of economies at the global level (Shahbaz, 2012), and (ii) the belief that trade liberalization is a required condition for accelerating the transition from a relatively closed to open economy (Zahonogo, 2016). Theoretical literature suggests that international trade promotes the transfer of new technologies, facilitate technological progress, and innovation and that these conditions depend on the degree of economic openness (see Grossman & Helpman, 1991). This explanation has often been an incentive for the implementation of trade liberalization policies in developing economies (Zahonogo, 2016). Although the theoretical literature offers dominant support for the gains of trade openness on economic growth, evidence from recent empirical studies are however inconclusive. Some studies have reported a positive relationship between trade openness and economic growth (Keho & Grace Wang, 2017; Sakyi et al., 2015a; Shahbaz, 2012), while others have identified no significant relationship or even a negative interaction (see Malefane and Odhiambo, 2019).

This study examines the impact of trade openness on economic growth in Nigeria with emphasis on the role of exports and imports. Since the implementation of the Structural Adjustment Program in the 1980s, Nigeria has focussed on liberalizing the trading environment, a strategy adopted to stimulate growth and development (see Robertson, 1992). More recently, there have been far-reaching efforts to actively pursue external trade dealings through the adoption of various strategic policies (see Omojimite & Akpokodje, 2010). These policy changes have opened up the Nigerian economy to international trade. Figure 1 shows that both exports and imports have increased in recent years. Total trade measured in proportion to the total output of the economy increase from 19.50% in 1987 to 53.23 in 2011. The period from 2015 to 2017 has however experienced a significant decline in total trade, with a sharp decline in exports and the number of imports for the first time exceeding exports in 2017. This may not be unconnected to the global decline in crude oil demand. As the main export of the economy, the fall in global crude oil demand during 2015–2017 period may have resulted in lower export trade, and interestingly with little or no significant impact on imports. Overall, the fluctuations in total trade volume signifies how the policy environment, driven by a number of political, economic, and social institutional variables influences the integration of the Nigerian economy through trade.

A number of empirical studies suggests that the growth effect of trade openness may depend on institutional and socio-economic factors (Baliamoune-Lutz and Ndikumana, 2007; Duodu et al., 2020; Sakyi et al., 2015b; Zahonogo, 2016). Of particular relevance for this study is the finding from Baliamoune-Lutz and Ndikumana (2007), attributing the failure of trade reforms in generating

Figure 1. Evolution of trade in Nigeria (classified into exports and imports of goods and services).



economic growth in African economies to poor institutions. Quality of institutions shaped by the interacting effects of economic, social, political, cultural, and technological factors provide structures for protecting economic transactions (Efobi, 2015). The protection of economic transactions is a primary condition for creating enabling trade and investment environment (Ajide, 2017). Therefore, as the main contribution, this study demonstrates how institutional quality impacts the trade openness and economic growth nexus in Nigeria, a developing SubSaharan African economy. The institutional frameworks in Nigeria are characterized by a high level of corruption, political instability, terrorism, absence of Law and order, high public Bureaucracy, and poor service delivery (Ajide, 2017). This is crucial because existing studies on the drivers of economic growth in Nigeria have not explored the role-played by this interaction (see Akinlo, 2004; Olubiyi, 2014; Adeniyi et al., 2015; Maji, 2015; Lawal et al., 2016).

This study extends existing studies in two key areas. First, three measures of trade openness are used comprising total trade, exports, and imports. As highlighted in Figure 1, export and import trade components in Nigeria may offer varied options for policy formulation. By addressing these identified gaps in existing literature, this study provides insight for policy discourse, capable of facilitating economic growth in Nigeria. Second, the role of institutional quality in the trade openness and economic growth nexus is not restricted to total trade. The empirical steps taken in this study have considered how the interaction between total trade, export trade, and import trade impact economic growth in the economy. By way of modeling, this study implements elaborative econometric investigations contributing to economic literature by using an extended Cobb–Douglas production function.

In the remaining components of this study, a brief review of related studies is presented. This is followed by the presentation of the implemented model and econometric techniques. The results from the analysis are presented and discussed. The last section concludes the study, identifying some policy actions from the study.

2. A brief literature review

The nexus between trade openness and economic growth has attracted significant interest in the literature. Recent studies have investigated both regional and individual country experiences, incorporating other institutional, social, economic, and technological factors (see Dowrick and Golley, 2004; Yanikkaya, 2003; Awokuse, 2008; Shahbaz, 2012; Menyah et al., 2014; Olubiyi, 2014; Sakyi et al., 2015a, 2015b; Yusoff & Nuh, 2015; Ee, 2016; Salahuddin & Gow, 2016; Zahonogo, 2016; Khamphengvong et al., 2017; Mireku et al., 2017; Keho & Grace Wang, 2017; Pradhan et al., 2017; Darku & Yeboah, 2018; IDRIS et al., 2018; Huchet-Bourdon et al., 2018; Malefane and Odhiambo, 2019; Benita, 2019; Burange et al., 2019; Ma et al., 2019; Tang et al., 2019; Duodu et al., 2020; Nwadike et al., 2020).

Using the Autoregressive Distributed Lag (ARDL) approach to long-run analysis, Shahbaz (2012) examined the relationship between trade openness, financial development, capital, labor, and economic growth in Pakistan over the period from 2010 to 2011. The results suggest that exports, imports, terms of trade, and total trade all positively drive economic growth in Pakistan. However, Granger causality and variance decomposition analyses show that the causality runs from economic growth to trade openness in the economy. Sakyi et al. (2015b) examined the long-run impact of trade openness on economic growth in Ghana based on the framework of the endogenous growth model using data spanning from 1970 to 2011. The results from the ARDL analysis suggests that the interaction of foreign direct investment and exports promotes economic growth in Ghana. Zahonogo (2016) investigated the impact of trade openness on economic growth in the developing subSaharan African (SSA) economies using a dynamic growth model covering the period from 1980 to 2012. The results from the analysis indicate that the trade openness threshold exists below which increasing the openness of the economy to trade has increasing effects on economic growth and above which the openness effect on growth declines. The empirical analysis concludes that a number of policy considerations are needed in the developing subSaharan African (SSA) countries to enhance the growth impact of trade openness.

Keho and Grace Wang (2017) assessed the interaction that exists between trade openness and economic growth in Cote d'Ivoire over the period 1965 to 2014 using a multivariate framework that incorporated the role of capital stock and labor. The results shows that trade openness promotes economic growth in the economy. From the empirical estimates, the positive growth effects of openness of the economy to trade remains significant even in the long-run. The study also documented a positive and strong complementary interaction between trade openness and capital formation in the promotion of economic growth in Cote d'Ivoire. Malefane and Odhiambo (2019) explored the dynamic impact of trade openness on economic growth in Lesotho covering the period from 1979 to 2013. Using ARDL approach to long-run analysis and four measures of trade openness, capturing the role of total trade, exports, imports, and country size and geography in trade, the study shows that openness of the economy to trade has no significant impact on economic growth in Lesotho. This economic condition exists for both short-run and long-run analyses and remains the conclusion of the study irrespective of the measure of trade openness considered. Tang et al. (2019) investigated the relationship between trade openness and economic growth in Mauritius over the period 1963 to 2013. The results show that trade openness contributes to economic growth in the small island economy. However, the coefficient of trade openness in the empirical analysis shows that the positive economic growth effect of trade openness is weak and import-led.

There are also other findings on the interaction between trade openness and economic growth that should be noted. Yanikkaya (2003) used a panel of over 100 countries to examine the impact of trade openness on economic growth covering the period from 1970 to 1997. Contrary to the suggestions from the theoretical growth literature, the results show that trade restrictions positively and significantly generates economic growth in developing economies. Dowrick and Golley (2004) shows that the advantages of trade openness vary across economies, with the gains accruing significantly to developed economies since 1980 because of their productive capacity. Menyah et al. (2014) used a panel of 21 countries to show that limited support exists for trade-led growth hypotheses in Africa. Duodu et al. (2020) examined the condition in Ghana covering the period from 1984 to 2018 and incorporating the role of institutional quality. Short-run and long-run estimates from the autoregressive-distributed lag model (ARDL) suggest that trade openness and quality of institutions have a significantly positive impact on economic growth while the interaction between the two variables has an insignificant impact.

For the particular case of Nigeria, Olubiyi (2014) and Lawal et al. (2016) provide varied results. Olubiyi (2014) investigated the impact of trade components, exports, and imports, on economic growth in Nigeria for the period spanning from 1980 to 2012. The results show that export trade generates economic growth in Nigeria. Lawal et al. (2016) used the Autoregressive Distributed Lag bounds (ARDL) estimation technique to examine the existence of a long-run relationship between economic growth, financial development, and trade openness. The results show that the relationship between economic growth and trade openness in Nigeria is negative and significant in the long run but positive and significant in the short run. A more recent study, Nwadike et al. (2020) using the ratio of total trade to GDP concludes that trade openness has a significantly positive impact on economic growth in Nigeria for the period 1970–2011.

3. Data, empirical model and methodology

3.1. The model specification and data description

Following Mankiw et al. (1992) and Shahbaz (2012), Cobb–Douglas production function in period t is given below:

$$Y = A(t)L(t)^\beta K(t)^{1-\beta} \quad 0 < \beta < 1 \quad (1)$$

In which Y is defined as real domestic output, A for technological progress, K for capital stock and L is for labor. In this analysis the above production function is extended by assuming that

technological progress is determined by trade openness, institutional quality, and financial sector development. This is given as follows:

$$A(t) = \varphi \cdot TO(t)^\alpha IQ(t)^\delta DC(t)^\sigma \quad (2)$$

where φ is time-invariant constant, TO is trade openness, IQ is quality of governance and DC is for financial sector development. Substituting Eq. (2) into Eq. (1) gives:

$$Y = \varphi \cdot TO(t)^\alpha L(t)^\beta K(t)^{1-\beta} IQ(t)^\tau DC(t)^\sigma \quad (3)$$

The extended log-linear form of the model can be given as:

$$\ln Y_t = \alpha_0 + \alpha_1 \ln TO_t + \alpha_2 \ln L_t + \alpha_3 \ln K_t + \alpha_4 \ln IQ_t + \alpha_5 \ln DC_t + \varepsilon_t \quad (4)$$

where α_0 is a constant term, $\ln Y$ is for real GDP, $\ln To$ is for trade openness, $\ln L$ for labor, $\ln K$ is for real capital stock, $\ln IQ$ is the institutional quality indicator, $\ln DC$ is for financial development indicator, and ε_t is the white noise error term. This study uses annual data spanning from 1984 to 2017. Economic growth is measured as GDP expressed in 2010 constant US dollars. Three measures of trade openness are used: (i) total trade (Export and Import % of GDP), (ii) imports of goods and services (% of GDP), and (iii) exports of goods and services (% of GDP). The labor estimate used in this study is calculated by multiplying the employment to population ratio by the active population. Active population is defined as the total population within ages of 15–64. The real capital stock is calculated from gross fixed capital formation adopting the perpetual inventory model:

$$K_t = K_{t-1}(1 - \delta) + I_t \quad (5)$$

In which K_t is the current capital stock, K_{t-1} is the capital stock of the year before the current, δ is the capital depreciation rate, and I_t is the capital investment in the current year. Following Lin and Atsagli (2017) the annual rate of depreciation (δ) of 5% is used in this study. The initial level of capital stock is computed as:

$$K_0 = I_0 / (g + \delta) \quad (6)$$

In which K_0 is the initial capital stock, I_0 is the initial capital investment, δ is the capital depreciation rate, and g represents the average growth rate of capital investment over the period of the study. Financial sector development is measured as domestic credit to the private sector by banks (% of GDP). Data on these variables are sourced from the World Development Indicators, World Bank. Institutional quality is measured using the quality of governance dataset from the International Country Risk Guide (ICRG). The quality of governance index is an index consisting of three indicators: Corruption, Law and order, and Bureaucracy quality.

This study considers it meaningful to capture the role of institutional quality in the trade openness – economic growth nexus by incorporating the interaction between the quality of institution and trade openness as an additional explanatory variable in the model. This is achieved in the log-linear model specified in Eq. (7) below:

$$\ln Y_t = \beta_0 + \beta_1 \ln TO_t + \beta_2 \ln L_t + \beta_3 \ln K_t + \beta_4 \ln IQ_t + \beta_5 (\ln TO_t * \ln IQ_t) + \beta_6 \ln DC_t + \varepsilon_t \quad (7)$$

Theoretically, β_1 is expected to be positive and that will suggest that trade openness increases economic growth. Also, β_2 , β_3 , β_4 , and β_6 are all expected to produce positive coefficients to indicate a positive impact on economic growth for labor, real capital stock, institutional quality,

and credit to the private sector, respectively. $(\ln TO_t * \ln IQ_t)$ is an interaction term, capturing the combined effect of trade and quality of institutions on economic growth in Nigeria. If $\beta_5 < 0$, then the interaction between institutional quality and trade openness has a negative effect (i.e. the combined effect is negative) on economic growth. A positive coefficient (i.e. $\beta_5 > 0$) suggests that the interaction between the two variables promotes economic growth (i.e. the combined effect is positive) in Nigeria.

3.2. Estimation method

The autoregressive-distributed lag (ARDL) from Pesaran et al. (2001) is used in this study. ARDL has been widely used in the recent empirical analysis because of its robustness, reliability, and statistical properties, considered superior to other long-run analytical techniques in the literature (see Abango et al., 2019; Aboagye, 2017; Balcilar et al., 2019; Manasseh et al., 2017; Nampewo & Opolot, 2016; Nwosa & Akinbobola, 2016). This technique to cointegration is used to model the log-linear specifications in Equation (4 & 7) as follows:

$$\begin{aligned} \Delta \ln Y_t = & a_0 + \sum_{i=1}^n a_{1i} \Delta \ln Y_{t-i} + \sum_{i=0}^n a_{2i} \Delta \ln TO_{1t-i} + \sum_{i=0}^n a_{3i} \Delta \ln L_{2t-i} + \sum_{i=0}^n a_{4i} \Delta \ln K_{3t-i} \\ & + \sum_{i=0}^n a_{5i} \Delta \ln IQ_{4t-i} + \sum_{i=0}^n a_{6i} \Delta \ln DC_{5t-i} + a_7 \ln Y_{t-1} + a_8 \ln TO_{t-1} + a_9 \ln L_{t-1} + a_{10} \ln K_{t-1} \\ & + a_{11} \ln IQ_{t-1} + a_{12} \ln DC_{t-1} + \varepsilon_t \end{aligned} \tag{8}$$

$$\begin{aligned} \Delta \ln Y_t = & \beta_0 + \sum_{i=1}^n \beta_{1i} \Delta \ln Y_{t-i} + \sum_{i=0}^n \beta_{2i} \Delta \ln TO_{1t-i} + \sum_{i=0}^n \beta_{3i} \Delta \ln L_{2t-i} + \sum_{i=0}^n \beta_{4i} \Delta \ln K_{3t-i} + \sum_{i=0}^n \beta_{5i} \Delta \ln IQ_{4t-i} \\ & + \sum_{i=0}^n \beta_{6i} \Delta (\ln TO * \ln IQ)_{5t-i} + \sum_{i=0}^n \beta_{7i} \Delta \ln DC_{6t-i} + \beta_8 \ln Y_{t-1} + \beta_9 \ln TO_{t-1} + \beta_{10} \ln L_{t-1} \\ & + \beta_{11} \ln K_{t-1} + \beta_{12} \ln IQ_{t-1} + \beta_{13} (\ln TO * \ln IQ)_{t-1} + \beta_{14} \ln DC_{t-1} + \varepsilon_t \end{aligned} \tag{9}$$

Pesaran et al. (2001) and Narayan (2005) provides upper and lower critical bounds for the evaluation of the null hypothesis of no cointegration among variables. Comparing the computed F-statistic from Eq.(8 and 9) to the critical bounds, the null hypothesis is rejected when the calculated F-statistics is greater than the upper critical bound, accepted when it is less than the lower bound, and considered inconclusive when the calculated F-statistics remains between the lower and upper critical bounds (see Narayan, 2005; Pesaran et al., 2001). The error correction model for the estimation of the short-run relationships is specified as:

$$\begin{aligned} \Delta \ln Y_t = & a_0 + \sum_{i=1}^n a_{1i} \Delta \ln Y_{t-i} + \sum_{i=0}^n a_{2i} \Delta \ln TO_{1t-i} + \sum_{i=0}^n a_{3i} \Delta \ln L_{2t-i} + \sum_{i=0}^n a_{4i} \Delta \ln K_{3t-i} \\ & + \sum_{i=0}^n a_{5i} \Delta \ln IQ_{4t-i} + \sum_{i=0}^n a_{6i} \Delta \ln DC_{5t-i} + \lambda_1 ECM_{t-1} + u_{2t} \end{aligned} \tag{10}$$

$$\begin{aligned} \Delta \ln Y_t = & \beta_0 + \sum_{i=1}^n \beta_{1i} \Delta \ln Y_{t-i} + \sum_{i=0}^n \beta_{2i} \Delta \ln TO_{1t-i} + \sum_{i=0}^n \beta_{3i} \Delta \ln L_{2t-i} + \sum_{i=0}^n \beta_{4i} \Delta \ln K_{3t-i} \\ & + \sum_{i=0}^n \beta_{5i} \Delta \ln IQ_{4t-i} + \sum_{i=0}^n \beta_{6i} \Delta (\ln TO * \ln IQ)_{5t-i} + \sum_{i=0}^n \beta_{7i} \Delta \ln DC_{6t-i} + \lambda_2 ECM_{t-1} + u_{2t} \end{aligned} \tag{11}$$

where λ_i is the coefficient of the error correction term (ECM_{t-1}) expected to be negative and significant to show that short-run disequilibrium will converge back to the established long-run relationship.

4. Empirical results

4.1. Descriptive statistics and unit root tests

Summary of key description statistics for the variables are provided in Table 1. Cointegration analysis starts with the examination of the stationarity properties of the variables. This is specifically important in the case of this study, given that ARDL does not accept $I(2)$ variables. The Ng and Perron (2001) test is performed for this purpose. The stationarity properties of the variables from the test are presented in Table 2. The test results show that apart from $\ln L$ that is stationary at the level $I(0)$, the other variables are only stationary at first difference $I(1)$. With the test results showing that the variables are integrated of a different order $I(0)$ and $I(1)$, ARDL remains the most appropriate econometric technique for this empirical analysis.

Optimal lag length for all ARDL Models selected automatically based on Akaike information criterion (AIC), restricted intercept, and no trend.

Notes: * and ** indicate rejection of null hypothesis at 1% level and 5% level of significance, respectively;

Source of Asymptotic critical value bounds: Narayan (2005)

4.2. Results of ARDL co-integration test

Table 3 presents the calculated F-statistics from the ARDL cointegration test and compares it with the critical values from Narayan (2005). The results indicate that in all the specifications, the null hypothesis of no cointegration is rejected. This shows that there is a long-run causal relationship between trade openness, economic growth, capital, labor, quality of governance, and financial development in Nigeria. The results in Panel C of Table 4 show that all the estimated ARDL specifications passed all required diagnostic tests, proving that all the estimates are reliable. The CUSUM and CUSUMSQ tests in Figure 2–6 show that the estimations are also stable.

4.3. Long-run and short-run estimates

Specifications 1 and 2 in Table 4 present the ARDL estimates from Eq. (9). In Specification 1 trade openness is measured as total trade (Export and Import % of GDP). The estimated long-run coefficients are presented in Panel B. The results show that the long-run coefficient of trade openness measured as total trade (Export and Import % of GDP) is positive but statistically insignificant. Interestingly, Nwadike et al. (2020) had documented a statistically significant

Table 1. Descriptive statistics								
	$\ln RGDP$	$\ln L$	$\ln K$	$\ln TO$	$\ln EX$	$\ln IM$	$\ln IQ$	$\ln DC$
Mean	7.4419	17.5318	10.8075	3.4360	2.9252	2.4920	-1.2361	2.1925
Median	7.3223	17.5502	10.8021	3.5624	3.0509	2.5668	-1.2809	2.0995
Maximum	7.8493	17.8556	11.1092	3.9755	3.5842	3.1273	-0.8109	3.1031
Minimum	7.1886	17.1256	10.4560	2.2122	1.6581	1.1085	-1.9095	1.5990
Std. Dev.	0.2420	0.2305	0.1732	0.4660	0.4763	0.5117	0.2408	0.3951
Skewness	0.5168	-0.2139	-0.0986	-1.3749	-1.1150	-1.2914	0.0998	0.5435
Kurtosis	1.6276	1.7152	2.3988	4.1886	3.4974	4.2576	3.7024	2.5242
Jarque-Bera	4.1814	2.5979	0.5671	12.7132	7.3949	11.6909	0.7554	1.9948
Probability	0.1236	0.2728	0.7531	0.0017	0.0248	0.0029	0.6854	0.3688
Observations	34	34	34	34	34	34	34	34

Table 2. Ng and Perron (2001) unit root test

	Level form I(0)				First difference I(1).			
	MZa	MZt	MSB	MPT	Mza	MZt	MSB	MPT
<i>ln</i> RGDP	-0.6927 [1]	-0.4522	0.6527	31.6807	-14.0829 [0]*	-2.6045	0.1849	1.9246
<i>ln</i> TO	-3.1263 [0]	-1.2353	0.3951	7.8118	-14.8673 [0]*	-2.7104	0.1823	1.7083
<i>ln</i> IM	-2.3717 [0]	-1.0236	0.4316	9.9184	-15.1460 [0]*	-2.7490	0.1815	1.6285
<i>ln</i> EX	-4.9883 [0]	-1.5791	0.3166	4.9120	-14.4149 [0]*	-2.6566	0.1843	1.8057
<i>ln</i> L	-13.8849 [2]*	-2.4599	0.1772	2.4101	-23.9221 [5]*	-3.3995	0.1421	1.2196
<i>ln</i> K	-2.7519 [0]	-1.1656	0.4236	8.8767		-15.9071[0]*	-2.8156	0.1770
1.5573								
<i>ln</i> IQ	-2.5192 [2]	-1.0904	0.4328	9.5610	-9.6384 [0]**	-2.1676	0.2249	1.6484
<i>ln</i> DC	-2.7839 [0]	-1.0274	0.3691	8.3157	-19.0903 [4]*	-3.0656	0.1606	1.3686

*, ** and *** indicate significance at 1% level, 5% level and 10% level respectively; lag values in []

Table 3. Results of the cointegration test

Models		K	Optimal lag length	F-statistic	Result
1	[<i>ln</i> RGDP <i>ln</i> TO, <i>ln</i> L, <i>ln</i> K, <i>ln</i> IQ, <i>ln</i> DC]	5	ARDL(1, 2, 2, 1, 2, 0)	6.2929*	Cointegration
2	[<i>ln</i> RGDP <i>ln</i> IM, <i>ln</i> EX, <i>ln</i> L, <i>ln</i> K, <i>ln</i> IQ, <i>ln</i> DC]	6	ARDL(1, 2, 1, 2, 0, 0, 1)	9.2085*	Cointegration
3	[<i>ln</i> RGDP <i>ln</i> TO, <i>ln</i> L, <i>ln</i> K, <i>ln</i> IQ, <i>ln</i> TO* <i>ln</i> IQ, <i>ln</i> DC]	6	ARDL(1, 2, 2, 1, 0, 2, 0)	6.6827	Cointegration
4	[<i>ln</i> RGDP <i>ln</i> IM, <i>ln</i> EX, <i>ln</i> L, <i>ln</i> K, <i>ln</i> IQ, <i>ln</i> IM* <i>ln</i> IQ, <i>ln</i> DC]	7	ARDL(1, 2, 1, 2, 0, 0, 0, 1)	8.9296	Cointegration
5	[<i>ln</i> RGDP <i>ln</i> IM, <i>ln</i> EX, <i>ln</i> L, <i>ln</i> K, <i>ln</i> IQ, <i>ln</i> EX* <i>ln</i> IQ, <i>ln</i> DC]	7	ARDL(1, 2, 1, 2, 0, 0, 0, 1)	8.5112	Cointegration
Critical Value Bounds			1%	5%	10%
K = 5 IO Bound			4.134	2.910	2.407
I1 Bound			5.761	4.193	3.517
K = 6 IO Bound			3.713	2.685	2.254
I1 Bound			5.326	3.960	3.388
K = 7 IO Bound			3.599	2.597	2.196
I1 Bound			5.230	3.907	3.370

Optimal lag length for all ARDL Models selected automatically based on Akaike information criterion (AIC), Restricted intercept and no trend

Notes: * and ** indicate rejection of null hypothesis at 1% level and 5% level of significance respectively;

Source of Asymptotic critical value bounds: Narayan (2005)

Table 4. ARDL estimates

Variable	Specification 1		Specification 2	
	Coefficient	t-Statistic	Coefficient	t-Statistic
Panel A: Short-Run Coefficients				
ECM(-1)	-0.1179*	-7.5048	-0.2131*	-9.3288
$\Delta \ln TO$	0.0328**	2.1353		
$\Delta \ln TO(-1)$	0.0610*	4.1653		
$\Delta \ln IM$			-0.0296***	-1.7878
$\Delta \ln IM(-1)$			0.0540*	3.9535
$\Delta \ln EX$			0.0261***	1.8175
$\Delta \ln L$	7.1106**	2.6933	7.1786**	2.5873
$\Delta \ln L(-1)$	-10.2798*	-3.6460	-13.5686*	-4.5516
$\Delta \ln K$	-0.0026	-0.0793	0.0082	0.2590
$\Delta \ln IQ$	0.0164	1.0595	0.0047	0.8730
$\Delta \ln IQ(-1)$	-0.0243*	-4.6196		
$\Delta \ln DC$	-0.0241	-1.1661	-0.0396*	-1.7388
C	6.7323	0.5552	-11.4213**	-2.2385
$\ln TO$	0.2217	1.0544		
$\ln IM$			-0.5618*	-4.0819
$\ln EX$			0.5179*	3.3251
$\ln L$	2.1686*	4.4751	2.2538**	8.3653
$\ln K$	0.2844***	2.0088	-0.0959	-0.3870
$\ln IQ$	0.8119	-1.2188	0.0167	0.5986
$\ln DC$	0.1243	0.5954	0.0522	0.4247
Panel C: diagnostic Tests				
Durbin-Watson stat	1.7276		1.8145	

(Continued)

Table 4. (Continued)

	Specification 1		Specification 2			
	Coefficient	t-Statistic	Coefficient	t-Statistic		
Jarque-Bera	0.6711	0.7149	1.2816	0.5269		
ARCH Test	0.8355	0.3678	0.9310	0.3418		
B-G SC LM Test:	0.1467	0.7062	0.0852	0.7733		
Ramsey RESET Test	0.0466	0.9634	1.1253	0.2738		
CUSUM	Stable		Stable			
CUSUMSQ	Stable		Stable			
ARDL EstimatesCONT.						
	Specification 3		Specification 4		Specification 5	
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
Panel A: Long-Run Coefficients						
ECM(-1)	-0.1172*	-8.2313	-0.1966*	-9.7595	-0.1963*	-9.6484
$\Delta \ln TO$	0.0863*	3.9170				
$\Delta \ln TO(-1)$	0.0741*	5.1915				
$\Delta \ln IM$			-0.0635*	-2.8291	-0.0073	-0.4307
$\Delta \ln IM(-1)$			0.0541*	3.9951	0.0527*	3.8574
$\Delta \ln EX$			0.0241***	1.7597	-0.0305	-1.2631
$\Delta \ln L$	5.5609**	2.2548	7.9070*	2.9248	8.5179*	3.0425

(Continued)

Table 4. (Continued)

	Specification 1			Specification 2		
$\Delta \ln L(-1)$	-10.5515*	-3.9777	-13.8017*	-4.7830	14.5217*	4.8407
$\Delta \ln K$	-0.0052	-0.1735	0.0234	0.7835	0.1055**	2.1543
$\Delta \ln IQ$	0.0874	1.4596	0.0860	1.1549	0.0123	0.4061
$\Delta(\ln TO * \ln IQ)$	0.0182	1.5763				
$\Delta(\ln TO * \ln IQ)(-1)$	-0.0088*	-4.9942				
$\Delta(\ln IM * \ln IQ)$			0.0435	1.3412		1.5316
$\Delta(\ln EX * \ln IQ)$					0.0448	
$\Delta \ln DC$	-0.0215	-1.1043	-0.0502**	-2.2596	-0.0526	-2.3185
Panel B: Long-Run Coefficients						
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
C	11.2574	0.8912	-12.9909**	-2.3617	-12.2196**	-2.1962
$\ln TO$	0.6330	1.1653				
$\ln IM$			-0.7218*	-3.3035	-0.5144*	-3.4819
$\ln EX$			0.5183*	3.1401	0.2985*	4.7149
$\ln L$	1.7005*	3.2767	2.2218*	7.9390	2.2392*	7.7372

(Continued)

Table 4. (Continued)

	Specification 1			Specification 2		
lnK	-0.7084	-1.1595	0.0099	0.0384	-0.0335	-0.1260
lnIQ	0.7867	1.2710	0.4122	1.0639	-0.3719	-0.8173
lnTO*lnIQ	1.0060**	2.8344				
lnIM*lnIQ			1.0395*	8.1450		
lnEX*lnIQ					0.1517	0.9494
lnDC	-0.0696	-0.3480	0.0187	0.1398	0.0255	0.1866
Panel C: diagnostic Tests						
Durbin-Watson stat	1.7796		1.8531		1.8317	
Jarque-Bera	0.6092	0.7374	0.6562	0.4369	1.5615	0.4581
ARCH Test	0.4390	0.5124	1.2004	0.2814	1.4855	0.2318
B-G SC LM Test:	0.0989	0.7566	0.0675	0.7978	0.0989	0.7566
Ramsey RESET Test	0.2428	0.8108	1.4301	0.2465	1.2941	0.2694
CUSUM	Stable		Stable		Stable	
CUSUMSQ	Stable		Stable		Stable	

Notes: *, **, *** indicate rejection of null hypothesis at 1% level, 5% level and 10% level of significance respectively

Notes: *, **, *** indicate rejection of null hypothesis at 1% level, 5% level and 10% level of significance respectively

Figure 2. CUSUM and CUSUMSQ plots for specification 1.

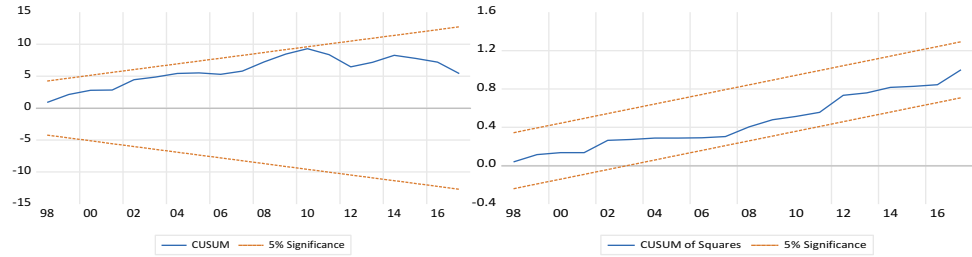


Figure 3. CUSUM and CUSUMSQ plots for specification 2.

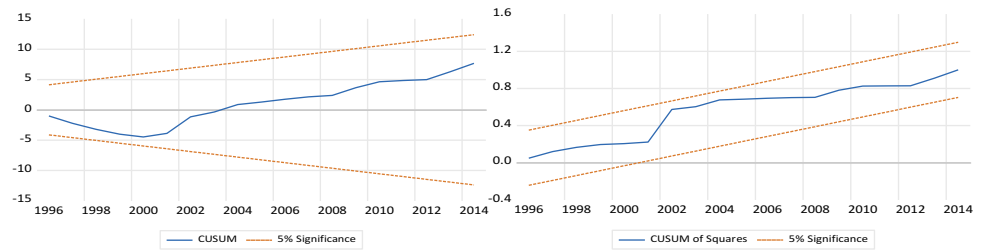


Figure 4. CUSUM and CUSUMSQ plots for specification 3.

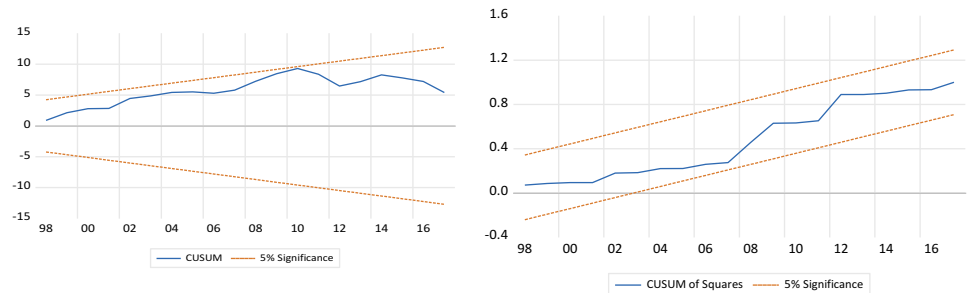


Figure 5. CUSUM and CUSUMSQ plots for specification 4.

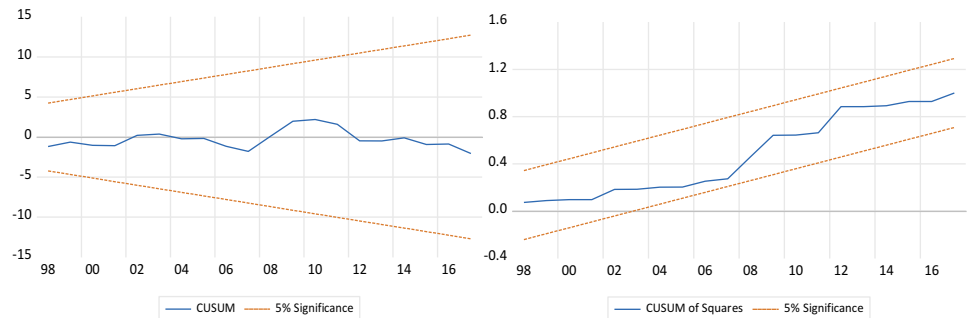
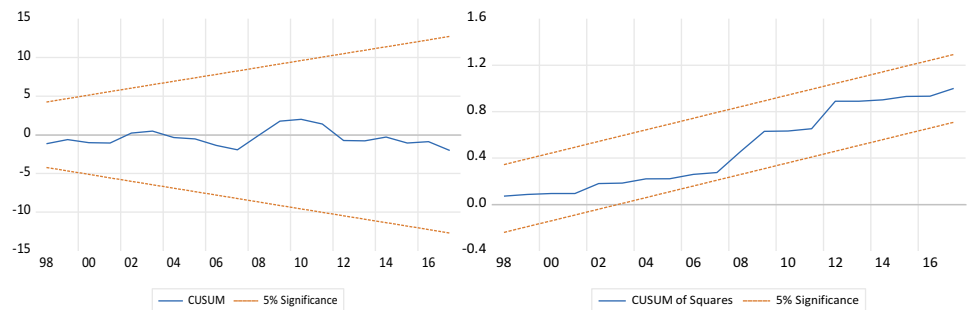


Figure 6. CUSUM and CUSUMSQ plots for specification 5.



coefficient for the period 1970 – 2011. In another study, Lawal et al. (2016) documented a statistically negative long-run coefficient. This identified variation in estimates is expected given recent changes in the trade environment significantly accommodated in this present study by the extension of the sample period to 2017. In comparison to results from other African economies, Nigeria differs from the case of Cote d'Ivoire documented by Keho and Grace Wang (2017) but similar to the condition Duodu et al. (2020) identified for Ghana. The coefficient of labor is positive and statistically significant at the 1% level. Although positive, the coefficient of capital is only significant at 10% level. From the coefficients, a 1% increase in labor and capital generates about 2.17% and 0.28% increase in economic growth, respectively. The short-run estimates in Panel A shows that the coefficient of trade openness is positive and statistically significant at 5% level with a 1% increase in openness of the economy to international tradeable to generate a 0.03% increase in economic growth in Nigeria. The short-run effect of an increase in labor is found to be positive and statistically significant at 1% level.

In specification 2, total trade is decomposed into two components: imports of goods and services (% of GDP) and exports of goods and services (% of GDP). Interestingly, the long-run coefficients (see Panel B) show that import and export trade affects economic growth in Nigeria differently. From the coefficients, the impact of import trade on economic growth in Nigeria is negative and statistically significant at 1% level. A 1% increase in import trade, from the coefficient, decreases economic growth by 0.56% in the long-run. The long-run coefficient of export trade is positive and statistically significant at 1% level, with a 1% increase in export tradeable to generate about a 0.52% increase in economic growth in the economy. These results support the findings from Olubiya (2014), concluding that economic growth in Nigeria is export-led. This condition is however different from what Malefane and Odhiambo (2019) observed for Lesotho. The long-run coefficient of labor is positive and statistically significant at 5% level. The short-run coefficients in Panel A suggests that export-led growth hypothesis also exists in the short-run for Nigeria. The negative coefficient of import trade and the positive coefficient of export trade are statistically significant at 10% level.

Specifications 3 – 5 in Table 4 present the ARDL estimates from Eq. (10). The coefficient of $ECM(-1)$ is negative and significant at 1% level in all the specifications. This shows that short-run disequilibrium will converge back to the established long-run relationship. The specifications extended Eq. (9) by incorporating an interaction term to capture the role of institutional quality in the trade openness – economic growth nexus in Nigeria. In Specification 3, the coefficient of trade openness is positive but only significant in the short-run. Interestingly, while the positive coefficient of $\ln TO$ is not significant in the long-run, the interaction term ($\ln TO * \ln IQ$) has a positive coefficient statistically significant at 5% level. This is different from the condition Duodu et al. (2020) identified for Ghana. The statistically significant-combined effect on economic growth for trade openness and institutional quality highlights the importance of building quality institutional frameworks as part of strategies designed to facilitate growth potentials of openness to trade. Achieving this condition will require reducing the level of corruption and political instability and strict adherence to rule of Law.

In specification 4, the coefficient of the interaction term ($\ln IM * \ln IQ$) is positive and statistically significant at 1% level suggesting that the negative long-run effects of import trade on economic growth in Nigeria decreases as institutional quality (quality of governance) improves. In other words, openness to import trade when institutional frameworks that provide governance are weak creates economic conditions that negatively impacts on economic activities. This could be a case of the import of goods and services contributing to unsustainable consumption and diversion of economic resources through corrupt practices. Evidence from specification 5 shows that the coefficient of the interaction term ($\ln EX * \ln IQ$) is positive but statistically insignificant. This shows that the role of exports in the trade-economic growth nexus in Nigeria is not dependent on institutional quality. While these empirical results support the findings from Balioune-Lutz and Ndikumana (2007), it is, however, important to note that in the particular case of Nigeria, import trade forms the channel through which poor institutional quality can weaken economic growth.

4.4. Conclusion and policy implications

This study examined the nexus between trade openness and economic growth in Nigeria over the period 1984 to 2017 within the framework of the endogenous growth literature, incorporating the role of institutional quality. The study employs three indicators of trade openness including total trade (exports and imports), import trade, and export trade. ARDL provides evidence of a long-run relationship among these variables of interest. The estimates suggest an insignificant relationship between total trade and economic growth. Decomposing total trade into exports and imports yields interesting results. The estimates show that in Nigeria, export trade has a significant positive impact on economic growth. The impact of import trade on economic growth is also found to be significant, but negative. Interestingly, further empirical estimation through the introduction of the interaction variable shows that the negative long-run effects of import trade on economic growth in Nigeria decreases as institutional quality (quality of governance) improves. Conversely, increasing import trade when the institutional frameworks that constitutes the governance structure in the country is weak would create opportunities for wasteful uses of resources with negative consequences on economic growth.

These findings call for a number of policy considerations in Nigeria. Among others, this study suggests the need for policymakers to incorporate export-led growth strategies in long-term development plans. Given that Nigeria has opened up its economy to international trade, the findings of these suggest that as long as increased trade openness is likely to expose the economy to external shocks, the benefit from trade openness will depend on the quality of institutions. There is therefore every need to fight and eliminate corruption in all segments of the economy, promote law and order and bureaucratic quality in the country. Good governance and quality institutions can help channel the dividends of trade openness into growth-enhancing activities. Also, important is the urgent need for an import substitution strategy to curtail the negative impact of import trade on economic growth in the country.

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