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Trade Openness Gross Domestic Product Nexus In Nigeria: An Application Of Autoregressive Distributed Lag (ARDL) Model Approach

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ABSTRACT:

Trade openness is prevalent among governments as a panacea for growth. Conventional wisdom holds that openness drives economic growth. However, although various theoretical models predict that openness to international trade will promote economic growth, the empirical evidence is imprecise. This study, therefore, examined the relationship between trade openness and gross domestic product in Nigeria using the autoregressive distributed lag (ARDL) method. The study covers the period from 1990 to 2021. The study conducted an ADF unit root test, an Augmented Dickey-Fuller test for co-integration, and a long-run analysis. Econometric analysis shows that trade openness and exchange rates exert a positive influence on Nigeria's economic growth, while real interest rates and FDI had a negative impact on the growth of the Nigerian economy during the period under review. In the long run, a unit increase in TR and EXCH will lead to economic growth of 0.3 and 0.01 units, respectively. On the other hand, a unit increase in RIR leads to a decrease in growth of 0.05 units. Like wisely, FDI has a negative but imperceptible impact on economic growth. The short-run co-integration equation shows an adjustment speed of 77% between the dependent variable and the independent variables. The research results also show that in the short term, TR and EXCH positively impacted economic growth, while FDI and RIR maintained a negative relationship with economic growth. Therefore, we recommend that the government accelerate policy implementation in infrastructure development and promote stringent regulatory measures to help protect businesses operating in Nigeria.

KEYWORDS: *Trade Openness, Economic Growth, ARDL.*

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INTRODUCTION

The role of export in the economic performance of developing countries like Nigeria has become one of the most intensively debated issues over the years. The performance of a given economy in terms of output

growth rate and per capita income has been based on domestic production and consumption activities and the exchange of goods and services across country frontiers.
In the 1960s and early 1970s, Nigeria's export trade was primarily dominated by non-oil products, for example, cocoa, rubber, palm oil, and cotton, to mention but few. These commodities accounted for Nigeria's total exports of about 66% within these periods (CBN, 2002). Overall, agricultural output accounted for 70.8% of the revenue, while oil accounted for the remaining percent. However, there was a change in the trend between 1973-1974, when oil and its revenue became the primary income earner of the Nigerian economy, followed by agricultural productivity. The oil boom affected the economy negatively. According to Ehinomen and Oguntona (2012), the crux was that while oil exports grew positively, non-oil exports declined negatively, making the dominance more rapid and pervasive.

Like other developing countries, Nigeria has initiated and altered commercial or trade policies to affect their terms of trade, balance of payments positions and exchange rates problems. In particular, the trade liberalization policies embarked upon by the Nigerian government in 1986, as an element of the structural adjustment program (SAP), are aimed at reducing the effective rate of protection, thus lessening export bias and, to a large extent, liberalizing imports (Ajayi & Atanda, 2012). It was targeted at removing the over-valuation of the naira exchange rate, thereby increasing the competitiveness of Nigeria's exports and stimulating the production and diversification of export goods to include manufactured exports.

Under this policy environment, Oluwaseyi and Adejoke (2013) noted the devaluation of the exchange rate and enhanced implementation of export promotion strategies. For example, the naira depreciated from ₦1.60K to $1 in 1986 to over ₦96 to $1 in 1999. Moreover, the performance of the non- oil exports improved unsatisfactorily. The share of non-oil exports to total exports rose from 6% in 1986 to 13. 12% in 2019 but fell to 11.45% in 2020, with some evidence of diversification (CBN, 2023). The manufactured exports as a percentage of total exports rose from 0.04% in 1986 to 0.92% in 1991. By 2021, manufactured exports as a percentage of total exports rose to 5.75% (CBN, 2023). The tardy pace and unsatisfactory performance of the manufactured component of non-oil exports relative to the extent of incentives and other unsatisfactory economic conditions question the rationale of Nigeria's various trade policy regimes. Thus, this study is focused on assessing the impact of trade on economic growth in Nigeria from 1990 to 2021.

LITERATURE REVIEW

In this section, we survey the literature on trade-GDP nexus. The section aims at laying the theoretical foundation of the study. Theoretically, some factors have been identified as determinants of economic growth. They include domestic investment (Solow, 1956), economic policies and macroeconomic conditions (Barro, 1991), foreign direct investment (Lensink & Morrisey, 2006), institutional framework (Lewis, 1995), political regimes (Lipset, 1959), socio-cultural factors (Barro & Mccleary, 2003) and ethnic diversity (Easterly and Levine, 1997).

Thus, economists have canvassed several trade theories to explain details that address the relationship between trade openness and economic growth. However, this study is anchored on Export-Led-Growth theory. This is because the theory explained and established a strong relationship between trade openness and economic growth. Export-led growth theory is part of the consensus among economists about the gains of economic openness that took hold in the 1970s (Alimi & Atand, 2011). The theory postulates that export expansion is one of the main determinants of growth. It provides the economy with the foreign exchange needed for imports of goods and services that cannot be produced domestically and encourages the overall development of an economy by providing employment opportunities for the people (Yasiru, et al., 2016). The theory further stated that greater capacity utilization, economies of scale, technological progress, labor productivity, improved allocation of scarce resources, relaxation of current account pressures, and foreign investment attraction (Medina-Smith, 2001) are benefits of export-led growth.

Empirical Review

Some authors have attempted to examine the impact of trade openness on the economy. For example, Abinabo and Abubakar (2023) analyzed the relationship between trade openness and economic growth in Nigeria from 1990 to 2021. The study adopted descriptive statistics, the Augmented Dickey-Fuller (ADF) unit root test for stationarity, the Johansen Co-integration test for long-run relationship, and the Error Correction Mechanism (ECM) model as the estimation methods. The results indicated that a long-run relationship exists between trade openness on economic growth in Nigeria. Furthermore, the result revealed that trade openness has a positive and statistically significant impact on economic growth in Nigeria and that import has a negative significant impact on economic growth in Nigeria.

Ohwofasa and Ekaruwe (2023) scrutinized the relationship between trade openness and economic growth in Nigeria by disaggregating trade openness into solid mineral export earnings, manufacturing, agricultural, and oil export earnings. The study employed the Autoregressive Distributed Lag (ARDL) model covering the data period from 1986 to 2020. Accordingly, the bound test result revealed that all four sectoral export variables had long-run equilibrium relations with economic growth in Nigeria. In the short run, the study found that economic growth is significant and positively responsive to changes in agriculture and crude oil exports, contrary to its significant and negative response to changes in solid mineral exports. However, manufacturing exports were statistically insignificant in exerting an impact on economic growth in the short run. In the long run, the study also found that agriculture and manufacturing exports significantly impacted growth. In contrast, the effect of solid minerals and oil exports is negative and statistically significant.

Oppong-Baah et al. (2022) determined the impact of trade openness on economic growth in Ghana and Nigeria using panel data from 1998 to 2017. To arrive at the results, the study used pooled ordinary least squares (OLS), fixed effects, random effects, and a Hausman test with panel data. The results showed that trade openness and real exchange rate positively and significantly impact economic growth using the random effect. In contrast, inflation and investment have an insignificant impact on economic growth using Random effect estimated models. Afolabia (2022) examined the impact of financial liberalization and trade openness as well as their interactive effects on the growth of the Nigerian economy using annual time-series data from 1981 to 2018. The results of the Augmented Dickey-Fuller (ADF) unit root test show that all the variables are stationary at the first difference, and the Johansen co-integration test results confirmed the existence of a long-run relationship among the variables in the model. Two equations were specified and estimated using the dynamic ordinary least square (DOLS) estimation technique, and the Granger causality test was carried out. The results revealed that financial development, exchange rate, and interest rate spread significantly influence real GDP in Nigeria. In contrast, trade openness, as well as its interaction with financial development, does not significantly impact economic growth in Nigeria.

Salik and Aras (2022) investigated the effects of trade openness, foreign direct investment (FDI), and exchange rate on non-oil GDP in Nigeria between 1986 and 2019. Data on trade openness, FDI, exchange rate, and non-oil GDP growth rate were employed in the study. The data analysis was done via the Autoregressive Distributed Lag (ARDL) method and Vector Error Correction Mechanism. The study established that trade openness is non-linearly related to Nigeria's non-oil GDP, implying that a higher degree of trade openness negatively affects Nigeria's non-oil in the current year. However, this effect turns positive by the end of the first year. Conversely, FDI has a positive but statistically insignificant relationship with Nigeria's NOG in the short run, and exchange rate fluctuations negatively affect Nigeria's non-oil in the short run. In the long run, the study found that trade openness, FDI, and Exchange rate have no significant impact on non-oil GDP in Nigeria.

Okere et al. (2022) investigated the relationship between trade openness, FDI inflow, and economic growth of Nigeria by accounting for the effects of the global economic crisis of 2007–2008 and the commodity crisis of 2016 using Bayer and Hanck approach to cointegration and augmented autoregressive distributed lag (AARDL) method on time series data from 1982 to 2018. The results proved that the global economic crisis significantly dampens economic growth; the negative interaction of total trade, FDI, and global financial-economic crisis is substantive enough to dampen the trade-growth and FDI-growth-led relationship. Also, the negative interaction of FDI-inflow with the global economic crisis is more pronounced and substantive in the long and short run. Umar et al. (2021) explored the relationship between Nigeria's trade openness and economic growth. The study used gross domestic product (GDP) as the dependent variable, real exchange rate, and degree of trade openness from 1980 to 2020. The study used the Augmented Dickey-Fuller (ADP) and Philips Perron (PP) unit root test. The co-integration test of the Autoregressive Distributed Lags (ARDL) bound test was also utilized during the estimation process. The result shows a positive and significant long-run impact of export and exchange rate on economic growth, while a negative impact of import on economic growth in Nigeria.

METHODOLOGY

This section defines the analytical framework underpinning the study. The various theoretical postulations of economic growth include classical, neo-classical, endogenous growth, and export-led models. However, the export-led model is the theoretical framework adopted in this study. Theoretically, export is a factor for growth. An increase in export trickles down to an increase in employment in export sector industries, increasing income and GDP. Secondly, export supports foreign exchange earnings, which also assist in

importing capital goods and intermediate goods (Awokuse, 2005). Hence, export growth is one of the critical determinants of economic growth. It, therefore, holds that the overall growth of an economy can be generated not only by increasing the amounts of labor and capital within the economy but also by expanding exports such that exports can perform as an engine of growth. Some empirical studies have been carried out on the relationship between exports and economic growth using the export-led growth hypothesis. They include Musonda (2003) for Zambia and Andre and Joel (2007) for Botswana, to mention a few. All their results using different approaches support the export –led growth hypothesis.

Model Specification

Using the export-led growth hypothesis as the theoretical framework and adapting the models of Kim (2008), Oluwaseyi, and Adejoke (2013) with modification. Our model is specified as follows:

$$y_{gt} = \alpha + \beta td + \varnothing w + u \quad (1)$$

Where: y_g = growth rate of per capita GDP, td = total trade openness (i.e., exports and imports to gross domestic product), W = vector of conditional variables; α = intercept or constant, β, $\varnothing$ = parameters or coefficient of explanatory variables, and u = error term.

According to Kim (2008), the vector of conditional variables includes initial real GDP per capita to control for convergence, the average year of schooling to proxy the level of human capital in the economy, and policy variables like inflation rate as a measure of economic stability, ratio of government expenditure to GDP, and financial development indicator proxy as bank credit to private sector as a share of GDP. Oluwaseyi and Adejoke (2013) specified them as follows:

$$InRY_t = \alpha + \beta InTRO_t + \phi_1 1nRYt_{-1} + \phi_2 InFIN + \phi_3 FSDt + \phi_4 INF_t + \phi_5 LER_t + U \quad (2)$$

Where RY = Real gross domestic product, FIN = Foreign Investment proxy for foreign private investment, FSD = Financial sector development proxy for domestic credit to the private sector as a ratio of GDP, INF = Inflation rate, LER = lending rate proxy for monetary policy, α = Intercept or constant, β, $\varnothing$ = parameters or co-efficient of explanatory variables, and U = error term.
Therefore, the model of this study with modifications is stated thus:

$$GDPCG_t = \beta_0 + \beta_1 TR_t + \beta_2 EXCH_t + \beta_3 RIR_t + \beta_4 FDI_t + \varepsilon_t \quad (3)$$

Where: $GDPCG_t$ = real gross domestic product at time t, TR_t = Trade openness (import and export to the ratio of GDP), EXCH = exchange rate, RIR = real interest rate, FDI= foreign direct investment α and ϕ = parameters or the coefficient of explanatory variables and ε = stochastic error term. The variables used in the paper are annual time series sourced from the World Bank indicators from 1990 to 2021.

Description of Variable and A priori Expectations

FDI: Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than the investor's.
TR: Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.
RIR: rate of interest an investor receives after allowing for inflation.
EXCH: the price of one currency in terms of another currency
GDPCG: Annual percentage growth rate of GDP per capita based on constant local currency. GDP per capita is gross domestic product divided by midyear population.

Estimation Techniques and Discussion of Empirical Results

Equation (3) was estimated using the ARDL estimation technique. However, before the estimation, the underlying properties or processes that generated our time series variables were tested tand est, and whether the variables were stationary or non-stationary was determined. The unit root test of the Augmented Dickey-Fuller was used.

Table 1: ADF Unit Root Test

Variable	Order	Test statistic	Critical value	Conclusion
Exch	At levels	1.872801	-2.960411	I(1)
	1st difference	-3.734343	-2.963972	
FDI	At levels	-1.900321	-2.971853	I(1)
	1st difference	-7.177295	-2.963972	
GDPCG	At levels	-3.706362	-2.960411	I(0)
	1st difference	-	-	
RIR	At levels	-2.206655	-2.971853	I(1)
	1st difference	-4.246727	-2.971853	
TR	At levels	-2.809028	-2.960411	I(1)
	1st difference	-5.422172	-2.967767	

Source: Researcher's compilation, 2023 from Eviews 9

The results in Table I revealed that all the variables are stationary at first difference except GDPCG, which is stationary at levels. Given the unit–root properties of the variables, we proceed to establish whether or not there is a long–run co-integrating relationship among the variables using the autoregressive distributed lag approach (ARDL).

The study estimated the ARDL Bond Test to ascertain the existence of co-integration in the study. The ARDL bound test in Table 2 has established the existence of co-integration in the ARDL model. The Bounds test result showed that the F-statistics value is 4.15. This value is greater than the upper bound critical values of I(1) at a 5% significance level.

ARDL Bounds Test

Table 2: ARDL Bound Test

Test Statistic	Value	k
F-statistic	5.324495	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Researcher's compilation, 2023 from Eviews 9

This result, therefore, showed the existence of a long-run relationship in the model. As such, the study conducted the short-run and long-run forms of the ARDL model.

ARDL Long-Run Result

Accordingly, the ARDL long-run result in Table 3 below showed that FDI within the period under investigation does not exert any perceptible influence on economic growth. Real interest rates exerted a negative influence on economic growth. For a 1% increase in RIR, GDPCG will dwindle by 0.05%. On the other hand, trade openness and exchange rates all positively impact economic growth. Thus, a 1% increase in EXCH and TR will result in 0.01% and 0.3% increase in economic growth, respectively.

Table 3: ARDL Long Run Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TR	0.353719	0.148072	2.388837	0.0251
EXCH	0.015229	0.011995	1.269601	0.2164
RIR	-0.059806	0.107891	-0.554320	0.5845
FDI	-0.000000	0.000000	-0.869083	0.3934
C	-14.400676	6.484753	-2.220698	0.0361

Source: Researcher's compilation, 2023 from Eviews 9

ARDL Short-Run Result

The short-run result is contained in Table 4 below. The error correction term (ECM) coefficient is significant, with a negatively signed value suggesting convergence at any incidence of short-run disequilibrium in the long run. The result showed that the coefficient of the one period of the error correction term ECMt-1 is negative (approximately -0.77) and highly statistically significant at a 5 percent level. The value -0.77 implies that the previous year's error will be corrected in the year ahead at an adjustment speed of 77%. The negativity of the ECMt-1 signals that the system is stable enough and is capable of converging to the long run equilibrium after some shocks/disturbances in the system.

Table 4: ARDL Short run

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TR)	0.107659	0.077392	1.391094	0.1770
D(EXCH)	0.011739	0.008110	1.447418	0.1607
D(RIR)	-0.046101	0.078018	-0.590895	0.5601
D(FDI)	-0.000000	0.000000	-0.829554	0.4150
CointEq(-1)	-0.770836	0.185927	-4.145901	0.0004

Source: Researcher's compilation, 2023 from Eviews 9

Post Estimation Test

The model is further assessed using a series of diagnostic and stability checks to ensure the independence of the residuals from the fitted model, in addition to the individual test of significance and other statistical criteria applied. The residuals must display the necessary independence during the checks for a model to be robust.

Table 5: Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.031470	Prob. F(2,22)	0.9691
Obs*R-squared	0.088435	Prob. Chi-Square(2)	0.9567

Source: Researcher's compilation, 2023 from Eviews 10

As shown in Table 5 above, the probability value of 0.9 corresponding to the Obs*R-squared is greater than the acceptance critical value of 0.05. The implication is that serial correlation does not exist in the model. Hence, the null hypothesis of no serial correlation cannot be rejected.

Heteroskedasticity Tests

The Heteroskedasticity Tests were conducted, and the result is shown in Table 6 below:

Table 6: Heteroskedasticity Test

Breusch-Pagan-Godfrey			
F-statistic	1.294873	Prob. F(6,24)	0.2971
Obs*R-squared	7.581118	Prob. Chi-Square(6)	0.2704

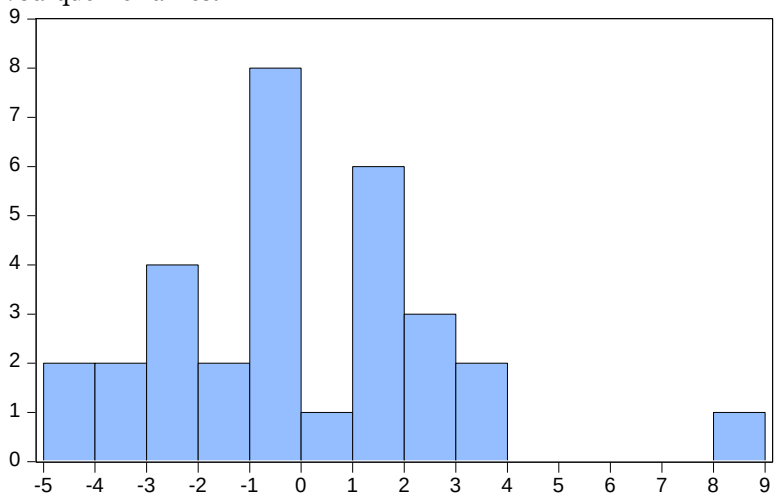
Source: Researcher's compilation, 2023 from Eviews 10

Estimates from the Heteroskedasticity tests show the probability value 0.2704 for Observed R-squared exceeds the 0.05 critical values. Thus, concerning the result, the study accepts the null hypothesis and concludes that heteroskedasticity does not exist in the estimated model.

Normality Test

Jarque-Berra test statistic was used to examine whether the variables in the model are normally distributed. The outcome of the test statistic is shown in Figure 1 below:

Figure 1: Jarque-Berra Test



The calculated Jarque-Bera statistics is 3.3 with a probability value of 0.18, above the 0.05 critical values. Thus, evidence abounds that the null hypothesis of multivariate normal distribution will be accepted at the 5% significance level, meaning that the residuals are normally distributed.

CONCLUSION AND RECOMMENDATIONS

This study estimated Nigeria's Trade openness–GDP nexus from 1990 to 2021. It was observed from the study that, in the long run, exchange rate, trade openness, and domestic trade influence economic growth positively and, therefore, uphold the effectiveness of the different trade and exchange rate policy regimes in Nigeria. Furthermore, it was observed that FDI and real interest rates negatively influence economic growth. Particularly, FDI does not have any perceptible influence on growth. Thus, it suggests that the economy is experiencing capital flight. Where foreign direct investment exists, it is boggled by corrupt practices that restrict their impact on the economy both in the short and long run.

The policy implication of the above results is clear. First, the government should step up policy implementation in infrastructural development and promote strict regulatory measures that would help protect businesses operating in Nigeria. To correct the perceived anomaly, the Government should also diversify its revenue base, embark on a budget surplus, and limit frenzy spending.

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