

The Effects of Trade Openness, Foreign Direct Investment and Exchange Rate Fluctuations on Non-oil Gross Domestic Product Growth in Nigeria

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Abstract

This study investigates the effects of trade openness, foreign direct investment (FDI), and exchange rate on non-oil GDP in Nigeria between 1986 and 2019. Annual time series data on trade openness measured as the ratio of exports plus imports to GDP $((X+M)/GDP)$, FDI, exchange rate and non-oil GDP growth rate were sourced from the Central Bank of Nigeria's Statistical Bulletin, National Bureau of Statistics, and the World Bank World Development Indicators (2020) database. The data analysis was done via 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 (NOG), implying that higher degree of trade openness negatively affects NOG in the current year, but this effect turns positive by the end of first year. FDI on the other hand, has a positive but statistically insignificant relationship with Nigeria's NOG in the short run, and exchange rate fluctuations negatively affect NOG 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. The insignificant impact of the variables could be explained and attributed to inconsistency and abrupt change of policy, wide fluctuations in the flow of FDI and exchange rate movements. The study recommends that increasing the efficiency of the country's external sector, particularly the export sector would enable Nigeria to reap full benefits of trade openness. The study further recommends that deliberate efforts be made to redirect the flow of Foreign Direct Investment to the productive sector of the economy particularly the agricultural sector.

Keywords: *International Trade, Trade Openness, FDI, Exchange Rate, GDP, Non-Oil Sector, Nigeria.*

JEL Classification Codes: *F10, F13, F14, F31, F41, F43.*

1. Introduction

The relationship between trade openness, foreign direct investment (FDI), exchange rate movement, and economic growth has spurred a growing number of economic studies. The heightened attention stems from the significance of trade openness and foreign direct investment as factors in achieving sustainable economic growth (Levine, 1997; Rajan & Zingales, 1998; Kim, 2011; Pradhan, Arvinb, & Bahmanic, 2018). According to Hsu, Tian, & Xu (2014), the fastest paths through which a nation can achieve sustainable economic growth and development are trade and inflow of foreign investment. Aditya (2014), Ali & Abdullah (2015), Bekele (2017), and Duru & Ehidihamhen (2018) corroborated this view when they noted that regional, bilateral or multilateral trade openness encourages knowledge diffusion and technology transfer, creates a competitive environment, expands the domestic market, leads to job creation, and improves productivity. This, in turn, leads to economic growth and the growing economy would transform into an attractive destination for investment, particularly FDI (Duru & Ehidihamhen, 2018). It is for the above reasons that discussion on trade openness has remained among top agendas in international policy dialogue ever since 1947, when the General Agreement on Tariffs and Trade (GATT) was created.

Conceptually, trade openness is synonymous to trade liberalization. According to Armah, *et al* (2014) and the World Bank (2019), trade openness refers to the reduction or outright removal of taxes/tariffs on goods and services, elimination of import quotas, subsidies and other nontariff barriers to trade. Additionally, trade openness implies a reduction and/or removal of trade-distorting policies, the provision of free access to market and market information as well as a reduction of monopoly/oligopoly power, allowing for free movement of capital and labour between and within countries and establishment of free trade zones. The original argument for trade openness can be traced to Adam Smith's theory of productivity, Heckscher-Ohlin's trade theory which highlights the significance of specialization in production and trade and Ricardo's theory of comparative advantage.

Given the importance both theories and empirical studies accord trade openness as the main driver of growth, a number of countries including China, India, Malaysia adopted policies promoting greater openness to trade and attracting foreign direct investments between late 1980s to early 1990s. This, according to World Bank (2019), has increased the ratio of global trade to GDP from 27.30% in 1970 to 60.27% in 2019. The growth in world trade, according to Qazi (2015) has further improved standard of living, income, and financial sector growth across the globe. In corroborating this view, Newfarmer & Sztajerowska (2015) observed that China's output contribution to the world economy accelerated after its economic openness in 1992 and this brought economic benefits to a number of countries, particularly developing countries. In a similar vein, Krueger (1997) and Dollar & Kraay (2013) averred that the experience of the "Asian Tigers", Hong Kong, Taiwan, South Korean and Singapore in rapid industrialization and development is traceable to beneficial impact of trade liberalization

strategies adopted by these countries.

In some Sub-Saharan African countries (SSA), just like other developing countries, policies of trade openness were adopted with varying degrees of success from the mid-1980s. The policies, according to Qazi Muhammad (2015), emanated from World Bank and the International Monetary Fund's (IMF) requirements for financial support under the Structural Adjustment Programs (SAPs). These institutions are of the belief that free market system or policies friendly to the market would spur growth through increased FDI, lower prices of goods which in turn lead to increased welfare for the people. However, the growth outcomes recorded in those countries have not been as striking as those recorded by the "Asian Tigers". According to World Trade Report (2019), African countries' exports are predominantly of primary products over 70% of which are largely unprocessed. The report further stated that trade within African countries as a percentage of Africa's total trade with the rest of the world averaged 15% between 1990 to 2017. This is substantially lower than the 33% with the countries of the Americas, 55% with Asia and 65% with European countries (Africa Export-Import Bank, 2017).

In Nigeria, despite implementation of trade liberalization policy since 1986, the extent to which trade openness, and foreign direct investment have impacted on GDP remained a burning issue. According to the National Bureau of Statistics (NBS, 2020), Nigeria's GDP growth performance after adoption of trade liberalization policy showed a contrast to the ones experienced prior to the adoption of the policy. This is in addition to the unabated depreciation of the country's currency, and staggering trade deficit (Tyopev, 2019). NBS (2020) reported that non-oil GDP growth rate, prior to liberalization of the Nigeria's economy in 1986, averaged 0.28% per annum. With trade openness, however, the non-oil GDP has generally followed a downward trend, averaging 0.22% per annum between 1987 and 2019.

While policy analysts, economic observers among others have argued that excessive importation of goods as a result of trade openness leads to a reduction in local productivity, no known study has attempted to provide empirical proof on the effects of trade openness, FDI and Exchange rate on nonoil GDP in Nigeria, thus raising uncertainty. The central question this paper seeks to answer, then is: what are the effects of trade openness, foreign direct investment and exchange rate fluctuations on the non-oil GDP growth rate in Nigeria?

1.1. Study Aims/Objectives

This study is designed to achieve the following specific objectives:

- i. Examine the magnitude of the effects of trade openness on non-oil GDP growth;
- ii. Assess the link between FDI and non-oil GDP growth rate; and
- iii. Evaluate relationship between exchange rate movement and non-oil GDP growth.

The remaining parts of the paper are structured as follows: section 2 focuses on literature review and theoretical framework, section 3 focuses on methodology, section 4 presents data, analysis and discussions, while section 5 presents conclusions and recommendations.

2. Literature Review

The focus of this study is on the nexus between trade openness and foreign direct investment, exchange rate and non-oil sector GDP growth rate in Nigeria. Conceptually, trade openness refers to the ratio of foreign trade (export + import) to the gross domestic product (GDP) of a country (Okpoko, 2005; Manni & Afzai, 2012). This implies that the larger the ratio, the higher the degree of trade openness. Foreign Direct investment, according to International Monetary Fund (IMF) (2003), is the investment that is made to acquire a lasting interest in an enterprise operating in an economy other than that of the investors, the investor's purpose being to have effective voice in the management of the enterprise. The foreign entity or group of association entities that makes the investment is termed the direct investor. This is different from foreign portfolio investment, which relates to the purchase of securities and other financial assets such as bonds, shares, mutual funds from other countries.

Exchange rate, on the other hand, relates to the rate at which a domestic currency is exchanged for a foreign one (IMF, 2003). It is the ratio of one currency expressed in terms of another. As an example, the exchange rate between the US Dollar and the Nigerian Naira for instance, refers to the sum of Naira required to purchase one US Dollar. The rate is normally determined in the foreign exchange market. To Schultz (1961), economic growth relates to the steady process by which the production capacity of the economy increases overtime to bring about rising levels of national income. It is usually measured using gross domestic product (GDP). Just as in many resource rich countries, Nigeria's GDP can be broadly classified into oil and non-oil GDP. The non-oil GDP which is the focus of this paper refers to output from sub-sectors such as agricultural, industrial, service, manufacturing, and other economic activities outside the petroleum and gas industry.

The argument for the relationship among trade openness, foreign direct investment, exchange rate, and real sector of an economy can be traced to the traditional trade theories such as the classical theory (Smith and Ricardo) and neo-classical theory (Heckscher-Ohlin-Samuelson). These theories, according to Salvatore (2007), focus on differences among countries and argue that trade is as a result of differences in technology (classical theory) or in relative factor endowment (neo-classical theory). Both the classical and the neo-classical theories share similar assumption that presupposes that gains from trade come from exchange and specialization and all countries will benefit from trade because of a more rational allocation of productive resources in the real sector and lower relative prices for the importing competing product.

Another theoretical perspective that has been used by scholars to support the link between trade openness and real sector performance are the endogenous growth theories which emerged in the 1980s and 1990s. Proponents of this school of thought (Grossman & Helpman, 1991; Romer, 1989; Lucas, 1988; Rabelo, 1991; Dollar, 1992) as noted by Aghion & Howitt (2009), argue that there exists a positive relationship between trade openness and economic growth. This, according to the theorists, arises from access and acquisition of advanced technologies which implies that a more trade-open country has a better chance of acquiring and applying advanced technologies developed in other countries. This capacity in turn permits its economic sectors to grow faster than those of a country with lesser degree of trade openness. In corroborating the above view, Balamoune-Lutz & Ndikumana (2007) argue that the mutual interaction between growth and trade works through a number of direct and indirect channels. In this regard, the authors aver that trade openness provides not only access to FDI and technological innovations thereby facilitating transfer of technology and spill overs. Trade openness is also a gateway for access to new markets with its attendant competition that encourages efficiency and innovation through Research and Development (R&D) as well as facilitating investment and productivity growth (Aghion & Howitt, 2009).

Beyond theoretical appeal, the relationship between trade openness and real sector growth has been found to have some empirical basis. For instance, Pradhan, Arvin & Norman (2015) investigated the impact of financial depth and trade openness on economic growth in India between 1990 and 2014. The specific objectives of the study were to ascertain if there was a long-run relationship between the variables and whether there was causality among them. The study employed the Autoregressive Distributive Lag (ARDL) bounds testing procedures and Vector Autoregressive Error Correction Model (VECM). The study found a long run relationship among financial depth, trade openness, and economic growth in India. Another finding from the study is that trade openness, economic growth and financial sector depth Granger-caused each other. The study concluded that higher trade openness can accelerate India's economic growth.

In a related study, Pilinkienė (2016) examined the extent to which openness of trade impacts on growth and competitiveness in Central and Eastern European countries (CEEs). Panel data for 11 CEE countries over the period from 2000 to 2014 as well as Panel Granger-Causality Test and Vector Autoregressive Model were utilised. The study found that trade openness impacts positively on economic growth and competitiveness and that economic growth leads to the improvement of trade openness. Other findings from the study include;

- a) competitiveness of the CEE region leads to an improvement in economic growth,
- b) economic growth in turn has a long-lasting effect on trade openness and
- c) indicators of competitiveness similarly have a long-lasting effect on GDP per capita in CEEs.

Benita (2019) investigated how bilateral trade openness impacted on per capita gross domestic product in 15 Latin American countries during the 2008 financial crisis. Utilising the Augmented Gravity Model of trade for pre-, during and post-crisis periods (2004–2006, 2007–2009 and 2010–2012, respectively) the study considered democracy rates of countries and geographical characteristics as instrumental variables. Following the estimation of data, the study found that trade openness is slightly positively related to growth in Latin American countries only, but negatively related for all importer countries.

Awili, & Ahmed (2019) validated the work of Pradhan, Arvin & Norman (2015) in a study exploring the effects of changes in financial markets on the real economies of the Melanesian Spearhead Group (MSG) countries between 1970 to 2015. In line with financial intermediation theories the study confirmed that a well-functioning financial system is not only critical but has a significant effect on economic performance through enhancing intermediation efficiency. The study established that in the long-run, there exists a relationship between trade openness and economic growth implying that trade liberalization schemes had direct positive effects on their income's growth.

Raghutla (2020) evaluated the effects of trade openness on economic growth. The study sampled five economies of emerging market and obtained panel data from 1993 to 2016. By employing panel estimation techniques, the study found long-run relationships between trade openness, economic growth, financial development, inflation, labour force, and technology. A variable-by-variable analysis reveals that economic growth in all the sample countries was positively and significantly impacted on by trade openness. Other findings of the study were an existence of a) a bidirectional causality between economic growth and inflation, b) a unidirectional causality that runs from economic growth to trade openness and from economic growth to financial development in the short run. In addition, the study also found that trade openness substantially promotes economic growth while also enhancing economic development in these five emerging market economies.

In a study of 40 Sub-Saharan African countries, Yameogo & Omojolaibi (2021) analysed the linkage between trade openness, economic growth and poverty level. After obtaining panel data for between 1990 to 2017, they employed Autoregressive Distributed Lag (APDL), Vector Autoregression (VAR) and Generalised Methods of Moments (GMM) estimation techniques. Findings from the study indicated that trade openness, foreign direct investment and institutional quality had the effects of significantly increasing economic growth in the long-run while institutional quality reduces economic growth in the short-run. Furthermore, the study found that trade liberalization, institutional quality and population growth reduce poverty in the long-run while trade openness results in adverse effects in the short-run. Additionally, the response of poverty to trade openness and growth shocks was found to be rather insignificant despite presenting a positive change. Based on the findings, the study recommended that

programmes of poverty reduction in Africa needed to be reviewed if the goals of achieving sustainable development are to be attained.

Nduka (2013) investigated the linkage between trade openness and economic growth in Nigeria. The study obtained annual time series covering a period of 1970 to 2008. The Ordinary Least and Cointegration Models were employed. The study found existence of a long-run equilibrium relationship between trade openness and economic growth in Nigeria, as trade openness was found to have a positive and significant relationship with economic growth. Furthermore, Nduka, Chukwu, Ugbor, & Nwakaire (2013) assessed the relationship between trade openness and economic growth in Nigeria. The study period covers pre and post SAP periods (1970Q1 to 1985Q4 and 1986-2011 respectively). The Engle-Granger Cointegration Model was employed. The study found that a long-run relationship between the study variables exists. As for causality, it was found to be unidirectional, running to trade openness from economic growth without any feedback, prior to the Structural Adjustment Programme (SAP) era. In the period following SAP, a bi-directional causality was observed between economic growth and trade openness. Nonetheless, the findings indicated that trade openness had greater impacts on economic growth post- SAP era.

A similar study on the effects of trade openness on economic growth in Nigeria by Kalu, Nwude & Nnenna (2016) utilised classical linear Regression Model over the period 1991 to 2013, and found that both total export and net export significantly related to economic growth whereas import had a positive and significant link to economic growth.

Contrary to the works of Nduka (2013), Nduka, Chukwu, Ugbor, & Nwakaire (2013), and Kalu, Nwude & Nnenna (2016), Elijah & Musa (2019) in evaluating the effects of openness of trade on Nigeria's economic growth between 1980–2016 and using the Error Correction Model (ECM) to explore the short-run and long-run relationship among the variables, found that trade openness negatively impacts on economic growth in Nigeria. Another study with similar result is Ajayi & Araoye (2019) which investigated the effects of openness of trade between the period of 1970 to 2016 on Nigeria's economic growth. The study used the VECM. The study found a long-run linkage between trade openness and economic growth. However, trade openness was found to have a negative impact on economic growth in Nigeria.

Ayadi (2009) investigated the relationship between FDI and economic growth in Nigeria. The study utilised annual time series data between 1980 and 2007. The data were analysed using a multivariate regression mode and found a very weak correlation and causality between the variables and recommends that infrastructural development, human capital building and strategic policies toward attracting FDI should be intensified.

Evidence from the literature reviewed above have shown that the impact of trade openness, FDI, and Exchange rate on economic growth differs from country to country and from sector to sector but no study has so far studied the impact of the three variables on the Nigerian

economy. This study therefore aims to fill this gap by empirically investigating the impact of trade openness, FDI and foreign exchange fluctuation on the Nigerian economy.

3. Research Methodology

3.1. Data

The study is centred on assessing the link between trade openness, FDI, Exchange rate, and economic growth in Nigeria. Thus, annual time series data for the study variables from 1986 to 2019 (see Table 3.1) were obtained from the Central Bank of Nigeria’s Statistical Bulletin, National Bureau Statistics, and the World Bank World Development Indicators (WDI) database. Economic theory, data availability, and the choice of the variables was informed by relevant economic theory and data availability. Furthermore, the dependent variable, non-oil GDP growth, was computed from Gross Domestic Product (GDP) data stated in constant 2010 US Dollars, while trade openness was measured using the gross sum of exports and imports expressed as a ratio of GDP ((X+M)/GDP). FDI and exchange rate were taken as control variables. The variables names, definitions, sources and expected signs are as shown in Table 3.1.

Table 3.1: Variable Description

Variable	Definition	Source	A Priori Sign
Non-oil GDP growth (NOG)	Rate of growth of non-oil GDP	Computed using data from NBS	Dependent variable
Trade openness (TOI)	Sum of exports plus imports divided by GDP	WDI	Positive
Foreign direct investment (FDI)	FDI (US\$)	WDI	Positive
Exchange rate (EXR)	The rate at which naira is exchanged for US\$	CBN	Positive

3.2. Model Specification

The effects of Trade Openness, FDI and Exchange Rate on the growth of the Nigeria economy is examined by means of a Multivariate Regression Model. The model is derived from the theoretical perspectives of the endogenous growth theories which postulate economic growth as a function of Trade Openness and FDI among other factors. The model is specified thus:

$$\ln NOG_t = \alpha + \beta_1 \ln TOI_t + \beta_2 \ln FDI_t + \beta_3 \ln EXR_t + \mu_t \quad (1)$$

Where NOG, TOI, FDI, and EXR are as previously defined.

β_i (i = 1-3) = a vector of parameters to be estimated

ln = a natural logarithm to normalise data variability

The Autoregressive Distributed Lag (ARDL) bound testing method is applied to estimate the study model as specified in equation 1 above. This choice of the ARDL Bounds testing approach is premised on the lagged-effect of policy (Ramey, 2011; Barro & Redlick, 2011). Equation 1 is therefore re-specified in an ARDL form as follows:

$$\begin{aligned} \Delta \ln NOG_t &= \psi + \eta_0 \ln TOI_{t-1} + \eta_1 \ln FDI_{t-1} \\ &+ \eta_3 \ln EXR_t + \sum p_j = \beta_1 \ln NOG_{t-1} + \sum p_j = \beta_2 \ln TOI_{t-1} + \sum p_j \\ &= \beta_3 \ln FDI_{t-1} + \sum p_j = \beta_4 \ln EXR_{t-1} + t \quad (2) \end{aligned}$$

The study aims to confirm the stochastic property of the series by means of the Augmented Dickey-Fuller unit root test.

4. Results and Discussion

This section contains results (descriptive statistics, optimal lag test, unit root test results, and ARDL results) of this empirical analysis.

4.1. Descriptive Statistics

Table 4.1: Summary Statistics of Study Variable

	EXR	FDI__US\$_	NOG	TOI
Mean	107.8800	2,950,000,000.00	21.83116	35.23385
Median	119.5724	1,920,000,000.00	18.20350	35.25827
Maximum	306.9210	8,840,000,000.00	49.60547	53.27796
Minimum	1.754523	193,000,000.00	6.075657	9.135846
Std. Dev.	91.67846	2,640,000,000.00	11.92715	10.31464
Skewness	0.673044	0.862682	1.065813	-0.431293
Kurtosis	2.750598	2.536928	3.127693	2.924827
Observations	34	34	34	34

Source: Extract from Appendix I.

Descriptive statistics for Exchange Rate, FDI, non-oil GDP (NOG), and Trade Openness index (TOI) are contained in Table 4.1. It is evident by the skewness statistics being statistically different from zero, the results in the table indicate that the data on all the study variables are not normally distributed. A closer analysis of these statistics shows that only trade openness index (TOI) with negative skewness value is skewed to the left while the rest of the variables are positively skewed. Contained in the table also are Kurtosis statistics which reveal whether distributions of the series are light-tailed or heavy-tailed. By studying the Kurtosis statistics, it

can be noted that growth rate of non-oil GDP with Kurtosis value of 3.127693 tends to have heavy tail followed by TOI among others.

Furthermore, an analysis of the results presented in Table 4.1 shows that the average exchange rate between 1986 and 2019 is N107.88, with a maximum of 306.92 and a minimum 1.7545. In addition, it is worthy of note that the average FDI into Nigeria between the study period is about US\$2,950,000,000, ranging from US\$193,000,000 to US\$8,840,000,000. The high standard deviation of US\$2,640,000,000 suggests high fluctuations in FDI inflows in Nigeria. Concerning non-oil GDP growth, the study reveals that the average growth rate is 21.83%, and it varies between the range 6.08% minimum and 49.61%. On trade openness however, the table shows that this ranges from a minimum of 9.134% to a maximum of 53.28% with an average of 35.234%.

The pattern of movements between non-oil GDP, FDI, EXR between 1986 and 2019 are cast in Figure 4.1.

Figure 4.1: Trend of non-oil GDP, FDI, EXR between 1986 and 2019

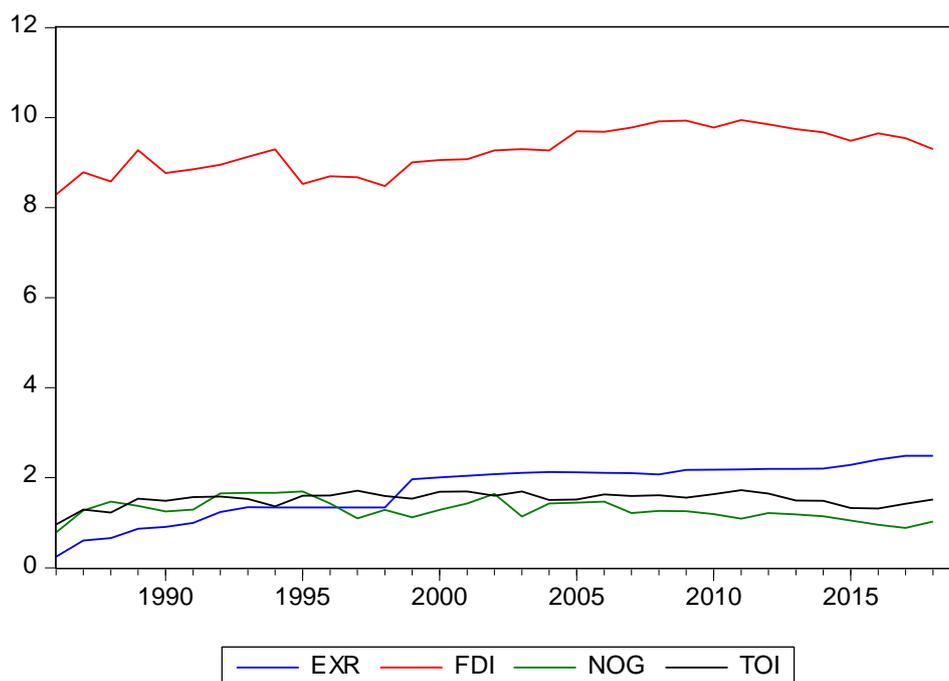


Figure 4.1 and Appendix I contain trends of the study variables between 1986 and 2019. As shown in the figure, FDI and exchange rate fluctuated but generally followed upward trends throughout the period. However, TOI and non-oil GDP generally followed downward trends. One important feature of the relationship among the variables as the graph shows is that when NOG and TOI in the period under review moved in the same direction, the rate of change in TOI appeared to be lower than that of NOG, suggesting that TOI could be identified as partly

explaining the character of change in NOG in Nigeria. In general, the variations in the variables of FDI, TOI, and EXR have a corresponding effect on NOG in Nigeria.

4.2. Unit Root Test

The results of the stationarity test conducted using the ADF test are presented in Table 4.2. As shown in the table, EXR and FDI were stationary after first differencing while NOG and TOI were stationary at levels. The implication of the unit root test results is that EXR and FDI are integrated of order 1, i.e., I(1) while NOG, and TOI are integrated of order zero, i.e., I(0). Against this backdrop, the bounds testing approach which is best suitable for cointegration test involving mixture of levels is estimated (Pesaran, Shin, & Smith, 2001).

Table 4.2: ADF Unit Root Test Results

Variables	ADF Statistics		Remark
	Level	First Difference	
EXR	-	-3.980283**	I(1)
FDI	-	-3.426640**	I(1)
NOG	-3.207128**	-	I(0)
TOI	-4.607242**	-	I(0)

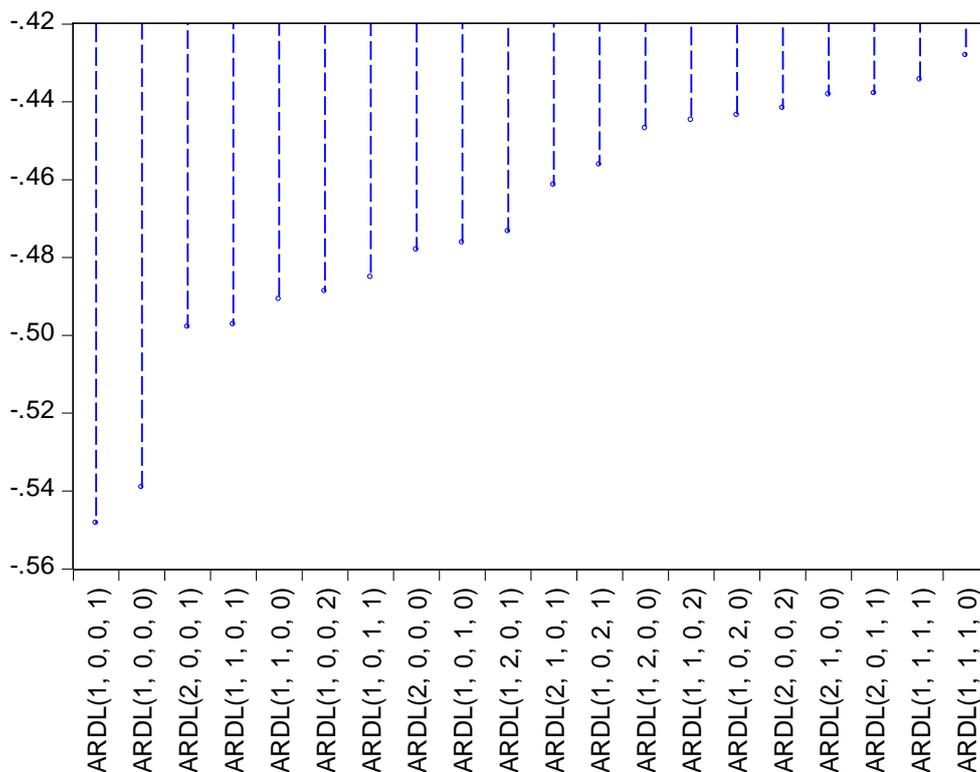
** means significant at 5% sig level

Lag length of 2 was selected based on Akaike information criterion (AIC).

The lag length for the ARDL specified in the previous section was done using the AIC and the study selected maximum lag lengths of 2 for both the dependent and independent variables. After 20 evaluations, the selected ARDL model (1, 0, 0,1) has the minimum information (-.55) based on AIC as shown in Figure 4.2.

Figure 4.2: Model Selection

Akaike Information Criteria (top 20 models)



4.3. Bounds Test Cointegration

Table 4.3: Results of Bounds Test: H_0 : No longrun relationship exists

<i>K</i>	Critical Bounds Value of the <i>F</i> -statistic					
	1% level		5% level		10% level	
	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)
3	4.29	5.61	3.23	4.35	2.72	3.77

Calculated *F*-statistic = 4.213809

The results of the bounds test for the presence of long-run relationships are shown in Table 4.3. the calculated *F*-statistic is 4.213809, which is substantially higher than the critical values for the lower and upper bound values of Pesaran test statistic at 10% level of significance. This is an indication that there is long run association among trade openness, foreign direct investment, exchange rate and non-oil GDP in Nigeria between 1986 and 2019.

4.4. Short-run and Long-run Impact of Trade Openness, Foreign Direct Investment, Exchange Rate on Non-oil GDP in Nigeria

The result of the short run coefficients is presented in Table 4.4 from the ARDL model as shown in the table - the lagged value of nonoil GDP (NOG) was positive and statistically significant ($P(t) = 0.0108$), exchange rate fluctuations (EXR) was negatively related to NOG, but not statistically significant ($P(t) = 0.0926$). The negative sign is in line with the a priori expectation. It implies that the rising exchange rate (given that Nigeria is an import reliant country) tends to increase cost of production in Nigeria which in turn reduces real sector performance in the current year.

Table 4.4: Result of ARDL Model Estimation

ARDL Cointegrating and Longrun Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
NOG(-1)	0.428106	0.155881	2.746357	0.0108
EXR	-0.164267	0.094085	-1.745935	0.0926
FDI	0.004035	0.101125	0.039898	0.9685
TOI	-0.187392	0.316292	-0.592467	0.5587
TOI(-1)	0.287160	0.271825	1.056415	0.3005
C	0.852013	0.951388	0.895547	0.3787
CointEq(-1)	-0.571894	0.155881	-3.668773	0.0011

$$R\text{-Squared} = 0.485659; \text{Cointeq} = \text{NOG} - (-0.2872*\text{EXR} + 0.0071*\text{FDI} + 0.1745*\text{TOI} + 1.4898)$$

FDI on the other hand, has a positive but statistically insignificant relationship with NOG in Nigeria. What this means is that an increase in FDI would positively (but insignificantly) increase non-oil GDP in the current year. The insignificant impact of FDI on the non-oil sector may not be unconnected to the concerns that FDI inflows to Nigeria are mainly directed to the oil sector. Finally, the table shows that trade openness has a non-linear relationship with non-oil GDP in Nigeria, suggesting that higher openness of trade tends to reduce NOG (but insignificantly) in the current year. By the end of first year however, the effect of higher trade openness becomes positive though insignificant.

The error correction term (ECM) satisfies economic expectations given that it has a negative sign and is statistically significant at 5% significance level. The ECM term shows that 57.19% of shocks within the system are corrected within one year by the economy. Just as in the short run, none of the exogenous variables (TOI, FDI, and EXR) is statistically significant at 5% on NOG in the long run. The insignificant impacts in both periods could be justified and attributed to inconsistency in policy, wide fluctuations in the flow of FDI and exchange rate movements.

4.5. Post Estimation Test

Table 4.5: Serial Correlation Test - Breusch-Godfrey Serial Correlation LM

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.510935	Prob. F(2,24)	0.6063
Obs*R-squared	1.306849	Prob. Chi-Square(2)	0.5203

The serial (auto) correlation test was performed using the Breusch-Godfrey Serial Correlation LM Test. As shown in the above table, the probability of the Chi-Square (0.5203) is higher than the critical value of 0.05 at 5% significance level. This suggests that the residual in the short-run ADRL model has no serial correlation.

Table 4.6: Test for Model Specification - Ramsey RESET Test

	Value	df	Probability
t-statistic	0.512168	25	0.6130
F-statistic	0.262316	(1, 25)	0.6130

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.007700	1	0.007700
Restricted SSR	0.741520	26	0.028520
Unrestricted SSR	0.733820	25	0.029353

Table 4.6 contains the Ramsey RESET Test. The test checks if the estimated model is correctly specified. It tests the null hypothesis that the model is specified correctly. This hypothesis is rejected if the p-value of F-statistic is lower than the critical value of 0.05. As shown in Table 4.6, the p-value of 0.6130 is higher than the critical value of 0.05. This suggests that the estimated ARDL model in this study was correctly specified.

5. Conclusion and Policy Implication of Findings

This paper has assessed the impact of trade openness, FDI, and Exchange rate on non-oil GDP in Nigeria between 1986 and 2019. The analysis has shown that the relationship is, indeed ambiguous. From the data estimation and analysis, the study concludes that trade openness is non-linearly related to non-oil GDP (NOG) in Nigeria as evidenced by the negative and positive relationships with NOG in the current year and the end of first year respectively. FDI on the other hand, has a positive but statistically insignificant relationship with Nigeria's NOG in the short run. The insignificant impact of FDI may be attributed to the pattern of FDI inflows, which is mainly directed to the oil sector of Nigerian economy. Another short run conclusion by the study is that exchange rate fluctuations negatively affect NOG. The negative impact of exchange rate is explained on the ground that Nigeria is an import reliant country, and a rising

exchange tends to increase cost of production which, in turn reduces real sector performance in the short run.

The long run conclusion drawn by the study is that trade openness, FDI, and exchange rate have no significant effects on Nigeria's non-oil GDP. The insignificant impact of the variables could be explained and attributed to inconsistency and abrupt change of policy, wide fluctuations in the flow of FDI and exchange rate movements. Nevertheless, the co-integrated behavior of the variables suggests that, with effective macroeconomic management, trade openness, foreign direct investment, and exchange rate could be used to raise non-oil GDP in the Nigerian economy. For this reason, efforts must be made to ensure that the country's external sector, particularly the export sector be more efficient so that full benefits of trade openness may be reaped.

There is also the need for proper management of exchange rate since rising exchange rate also impacts negatively on non-oil sector GDP growth. Finally, and more importantly, deliberate efforts should be put to redirect the flow of Foreign Direct Investment to the productive sector of the economy, particularly the agricultural sector, as against the petroleum sector in order to enhance more domestic capital formation and diversify the economy.

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Appendix I: Descriptive Statistics

Year	TOI	FDI (US\$)	EXR	NOG**
1986	9.14	193,214,907.53	1.755	6.076
1987	19.50	610,552,091.47	4.016	18.752
1988	16.94	378,667,097.69	4.537	29.528
1989	34.18	1,884,249,738.79	7.365	23.567
1990	30.92	587,882,970.63	8.038	17.837
1991	37.02	712,373,362.47	9.909	19.656
1992	38.23	896,641,282.47	17.298	44.974
1993	33.72	1,345,368,587.00	22.065	46.032
1994	23.06	1,959,219,858.16	21.996	46.310
1995	39.53	335,842,164.96	21.895	49.605
1996	40.26	499,276,809.47	21.884	26.732
1997	51.46	469,577,019.81	21.886	12.429
1998	39.28	299,566,658.26	21.886	19.314
1999	34.46	1,004,915,630.71	92.338	13.192
2000	49.00	1,140,167,556.02	101.697	19.307
2001	49.68	1,190,618,643.59	111.231	26.677
2002	40.04	1,874,070,753.14	120.578	43.923
2003	49.33	2,005,353,563.06	129.222	13.764
2004	31.90	1,874,060,886.98	132.888	26.854
2005	33.06	4,982,533,930.22	131.274	27.767
2006	42.57	4,854,353,979.09	128.652	29.648
2007	39.34	6,036,021,404.82	125.808	16.344
2008	40.80	8,194,071,895.46	118.567	18.378
2009	36.06	8,555,990,006.72	148.880	18.029
2010	43.32	6,026,253,091.35	150.298	15.568
2011	53.28	8,841,062,050.77	153.863	12.392
2012	44.53	7,069,908,427.94	157.500	16.447
2013	31.05	5,562,857,987.47	157.312	15.363
2014	30.89	4,693,828,631.90	158.553	13.919
2015	21.33	3,064,168,904.45	192.440	11.216
2016	20.72	4,448,732,916.67	253.492	9.031
2017	26.35	3,502,999,130.97	305.790	7.615
2018	33.01	1,997,485,164.95	306.084	10.624
2019	34.02	3,299,085,482.96	306.921	15.389

Sources: World Bank Development Indicator, Central Bank of Nigeria's Annual Report.

** Author's computation using National Bureau of Statistics' Statistical Bulletin.

	EXR	FDI_US\$	NOG	TOI
Mean	107.8800	2,950,000,000.00	21.83116	35.23385
Median	119.5724	1,920,000,000.00	18.20350	35.25827
Maximum	306.9210	8,840,000,000.00	49.60547	53.27796
Minimum	1.754523	193,000,000.00	6.075657	9.135846
Std. Dev.	91.67846	2,640,000,000.00	11.92715	10.31464
Skewness	0.673044	0.862682	1.065813	-0.431293
Kurtosis	2.750598	2.536928	3.127693	2.924827
Jarque-Bera	2.655054	4.521031	6.460188	1.062081
Probability	0.265132	0.104297	0.039554	0.587993
Sum	3667.919	1.00E+11	742.2594	1197.951
Sum Sq. Dev.	277363.0	2.29E+20	4694.475	3510.928
Observations	34	34	34	34

