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TRADE OPENNESS VOLATILITY AND ECONOMIC GROWTH IN NIGERIA

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ABSTRACT

The study investigated the impact of trade openness volatility on economic growth in Nigeria. Time series data were used for the study sourced from the Central Bank of Nigeria Statistical Bulletin and World Bank Indicator, which spanned from 1986 to 2017. Considering the volatility of total natural resources rents, oil revenue exchange rate and non-oil export revenue, the study used unit root test, co-integration test and employed Generalized Autoregressive Conditional Heteroskedasity GARCH (1 1) for empirical analysis. The Augmented Dickey Fuller (ADF) and Philips Perron (PP) tests showed that all variables were stationary at first difference at both tests while Johansen co-integration test result showed 5 co-integrating equations at the 0.05 level. The findings revealed that trade openness, total natural resources rents, oil revenue, exchange rate and interest rate impact positively on economic growth. On the other hand, non-oil revenue has negative impact on economic growth. The ARCH term found the presence of volatility clustering in the variables investigated while the GARCH term ascertained the existence of long term persistence volatility in economic growth. Based on the findings, the study recommended adequate policies to improve non-oil export to contribute significantly to economy growth. There is need to diversifying the products base of the economy and building local capacity to make trade openness profitable to Nigeria economy. Effective and efficient channelling of oil revenue to develop other sectors should be prioritised to reduce the impact of volatility clustering on oil revenue in Nigeria.

Keywords: Trade openness volatility, oil revenue, non-oil revenue, economic growth.

1. INTRODUCTION

The new world economic order of globalization has brought about an increased trade openness and foreign capital inflow across borders which Nigeria is basically inclusive. Azeez, Dada & Aluko (2014) stated that the globalized nature of an economy enhances its direct participation in the world market consequently leading to market expansion. In the other hand, trade not only strengthens the economic interdependence among

nations but promotes consumer welfare by providing a variety of commodities (Gwaison, Zakari & Maimako 2018).

According to The World Bank (2016), trade openness in Nigeria reached 48.57%, 71.38% and 21.45% in 1980, 2000 and 2015 respectively. In terms of economic growth, Nigeria's real GDP per capita recorded USD871, USD377 and USD2640 in 1980, 2000 and 2015, respectively. Corresponding GDP growth rates respectively reached 4.20%, 5.31% and 2.65%. However, Nigerian economy has grossly underperformed relative to its economic endowment and her peer nations considering the different natural resources and solid minerals available in the country. Also, one of the largest gas and oil reserves in the world, the economic performance of the country is rather weak when compared to the emerging Asian countries such as Thailand, Malaysia, China, India and Indonesia and even Brazil. These countries had by far lagged behind Nigeria in time past, but later they were better able to transform their economies to emerge as major players on the global economic arena through openness and technological advancement. Today, China occupied an enviable position even as the second largest economy after the United State of America, largely owing to her self-esteemed trade position (Adeleye, Adeteye & Adewuyi, 2015). Meanwhile, for trade openness to be beneficial to any country there must be favourable balance of trade with the use of sound macroeconomic policies.

World Bank (2018) shows that economic gains were largely driven by an expansion in oil output and continued steady growth in non-oil sector in Nigeria. There is no negation that Nigeria is an import-dependent nation, her most important export commodity is oil. The focus of the government on crude oil exports led to the neglect of the agricultural sector; hence, the reduction in the overall productivity of the economy (Azeez, Dada & Aluko 2014).

It is apparent that the Nigerian economy depends largely on oil rents, natural gas rents, coal rents such as petroleum products for its sustenance and the use of these resources to translate into sustainable economic growth (Garba, Bello, Abdullahi & Abubakar 2016). The experience from the fall in oil prices from around $114 a barrel to below $50 in 2015, dipping further below $35 a barrel, which further crashed to $30/barrel in 2016 has shown that consistent fall in oil prices causes more damage on the macroeconomic variables of oil dependent countries like Nigeria (Adugbo, 2016). It is evident from the foregoing that fall in crude oil price in the international market exposed Nigerian economy to external shocks that caused distortion and poor economic performance as a result of excessive reliance on the fortunes of the oil market which has displayed disappointing signs and a threat towards the achievement of any meaningful economic growth. Therefore, the major objective of this study is to examine the impact of trade openness volatility on economic growth in Nigeria. The study is organised into five sections. Section one focuses on introduction to the study. Section two contains empirical literature review and theoretical underpinning. Section three concentrates on research methods. Section four shows analysis and interpretation of results. Finally, section five presents the conclusion of the findings and recommendations of the study.

2. LITERATURE REVIEW

Trade openness measures the international competitiveness of a country in the global market. Trade openness variable is measured by the ratio of import to GDP or alternatively, the ratio of trade to GDP. It is now generally accepted that increase openness with respect to both trade and capital flows will be beneficial to a country. Increased openness facilitates greater integration into global markets. Integration and globalization are beneficial to developing countries although there are also some potential risks (Iyoha & Oriakhi, 2002).

Endogenous growth theory assumes that economic growth is primarily the result of endogenous and not external forces. Endogenous growth theory started with Romer (1986) and Lucas (1988) due to dissatisfaction of neoclassical models treats that technological progress as exogenous, the theories stressed the role of capital accumulation on long run economic growth. According to the endogenous growth theory, a more open trade regime allows a country to reorient factors of production in sectors that have comparative advantages. As factor endowments are better utilized due to trade openness, the endogenous theory also underlines that a higher equilibrium growth rate can be achieved in the long-run through increasing specialization and lowering cost of inputs (Romer 1986). Solow (1957) reports that trade openness can create a room for technological progress and efficiency in allocating inputs by eliminating protection for import substitution industries which, in turn, influences economic growth.

Elijah & Zoramawa (2018) investigated the impact of trade openness on economic growth in Nigeria between 1980 and 2016 without considering the effect of volatility variable. The econometric techniques used in the analysis were: unit root test, Johansen cointegration test, and error correction models (ECM). From the analysis, results revealed that openness was found to have impacted negatively on economic growth in both the long-run and the short-run. Gwaison, Zakari & Maimako (2018) employed error correction model (ECM) technique examine the impact of international trade on economic growth. The result of the analysis showed that international trade had a significant impact on economic growth in Nigeria from 1986-2016 at 5% level of significance and there is a unidirectional causality among variables.

Nicholas and Malefa (2018) studied the impact of trade openness and economic growth in South Africa. The study employs the autoregressive distributed lag (ARDL) bound testing approach to investigate the dynamic impact of trade openness on economic growth. Unlike some previous studies, the current study uses four proxies of trade openness, with each proxy addressing a different aspect of trade openness. The first proxy of trade openness is derived from the ratio of exports plus imports to gross domestic product (GDP) which this study adopted as a result of combination of export and import variable. The second proxy is the ratio of exports to GDP, while the third proxy is the ratio of imports to GDP. The last proxy is an index of trade openness, which accounts for the country size and geography. Based on the long run empirical results, this study finds that trade openness has a positive and significant impact on economic growth when the ratio of total trade to GDP is used as a proxy, but not when

the three other proxies are employed. However, in the short run, when the first three proxies of openness are used, the study finds trade openness to have a positive impact on economic growth, but not so when the trade openness index is employed.

Egbulonu & Ezeocha (2018) examined the relationship between Trade openness and Economic growth in Nigeria but with no inclusion of volatility variable and usage GARCH. The study covered the period 1990 – 2015, using ARDL approach to cointegration. The ARDL result confirmed the existence of a long-run relationship between Economic Growth, Trade Openness, Foreign Direct Investment and Gross Capital Formation. It was found that Trade Openness and Gross Capital Formation had positive and negative impacts respectively on growth rate of GDP in the short run. Therefore, this study concluded by recommending that trade openness should be regulated by government; from our result an increase in trade openness caused a decrease in our GDP.

Ehigiamusoe & Lean (2018) examined the tripartite relationship between financial development, trade openness and economic growth in Ghana, Nigeria and South Africa. The study showed that financial development and trade openness can be deployed to accelerate growth, while growth and financial development can be used to promote trade openness. Additionally, trade openness spurs financial development. Therefore, a tripartite relationship exists between the three variables. Hence, interdependence between financial development, trade openness and economic growth is found and consequent policy recommendations are made.

Khobai, Kolisi & Moyo (2018) examined the long run relationship between trade openness and economic growth in Ghana and Nigeria within the period of 1980 and 2016. It incorporated investment, exchange rates and inflation as the additional variables. The autoregressive distributed lag model was used in the study. The findings of the study showed that trade openness has a positive impact on economic growth and significant at the 1% level in Ghana while in Nigeria trade openness has a negative but insignificant effect on economic growth.

Ezeuchenne & Lawal (2017) on the impact of international trade on Nigerian economic growth, a unit root test, Johansen Cointegration test and vector error correction models were employed as techniques of analysis. Results of the analysis proved that there is insignificant long-run relationship between imports and economic openness; while a unidirectional relationship exists between economic growth and trade openness. Ewubare, Ajie & Ojiya (2017) investigated the impact of non oil exports on economic growth in Nigeria from 1980 to 2015. Autoregressive Distributed Lags (ARDL) econometric technique and other econometric tools were used. Findings from the study revealed that non oil exports have performed below expectations giving reason to doubt the effectiveness of the sector and export promotion strategies that have been adopted in the Nigerian economy. The study reveals that the Nigerian economy is still far from diversifying from crude oil export and as such the crude oil subsector continues to be the single most important sector of the economy.

Sakyi, Villaverde, & Maza (2015) provided evidence of positive bi-directional causal relationship between trade and economic growth for a sample of 115

developing countries. Were (2015) finds that trade exerts a positive and significant effect on economic growth rate in developed and developing countries, but its effect is not significant for least developed countries which largely include African countries. In a study of China, Hye, Wizarat & Lau
(2016) showed that trade openness is positively related to growth in the long and short run. Brueckner & Lederman (2015) employed the instrumental variable approach to a panel of 41 Sub-Saharan African countries. They find that trade openness increases economic growth both in the short and long run. Musila & Yiheyis (2015) investigated the case of Kenya and find that trade openness has positive effect on investment ratio but not on the rate of economic growth. Polat *et al.* (2015) found that trade openness impedes economic growth in South Africa. Finally, Lawal, Nwanji, Asaleye, & Ahmed (2016) applied the ARDL methodology to Nigeria and find a negative long-run impact of trade openness on economic growth but a positive growth effect in the short run. Further, a two-way causality was found between the two variables. On the empirical front, studies on the issue of trade openness and economic growth have been examined. However, the focuses of researchers were majorly on openness and economic growth without any discourse to the volatility impact which make this study relevant with the use of Generalized Autoregressive Conditional Heteroskedasity which no study has investigated.

3. METHOD

Model Specification

The study adopted the model used by Kalu & Agodi (2015) following the study of Ajakaiye & Soyibo (1999). The model specified gross domestic product (GDP) growth rate as dependent on volatility of real effective exchange rate (VolREER) and some other factors as control variables which have been identified in growth literature to influence economic growth. The functional specification is written as:

RGDP = *F* (EXCH, INT, TOP) (1)

Where, RGDP= real gross domestic product, EXCH = exchange rate, INT = interest rate, TOP = trade openness. For the purpose of this study, this model is re-specified to capture volatility of oil revenue and others explanatory variables predetermined to influence output volatility. The model is re-specified below:

GDPG = *F* (TOP, TNRR, OILR, NOILR, EXCH, INT) (2)

Where: GDPG = gross domestic product (Growth rate), TOP = trade openness, TNRR = total natural resources rents, OILR = oil revenue volatility proxy of cash flow from oil export, NOILR = non-oil revenue (Export), EXCH = official exchange rate and INT = monetary policy rate

The study is based on Generalized Autoregressive Conditional Heteroskedasity modeled by Bolerslev (1986). The models are used to estimate the effect of volatility of natural resources on economic growth in Nigeria. Bolerslev introduced the GARCH model by extending the work of Engle & Bollerslev (1986) framework and has been popular since the early 1990s. The (1, 1) in GARCH (1, 1) refers to the presence of a first-order autoregressive GARCH term (the first term in parentheses) and a first-order

moving average ARCH term (the second term in parentheses). An ordinary ARCH model is a special case of a GARCH specification in which there are no lagged forecast variances in the conditional variance equation {*i.e.,* a GARCH(0, 1)}.

This specification is often interpreted in a financial context, where an agent or trader predicts this period's variance by forming a weighted average of a long term average (the constant), the forecasted variance from last period (the GARCH term), and information about volatility observed in the previous period (the ARCH term).
GARCH (1, 1) specification takes the form:

$Y_t = X_t\,\theta + \varepsilon_t$ (3)

$\sigma_t^2 = \varpi + \alpha\,\varepsilon_{t-1}^2 + \beta\sigma_{t-1}^2$ (4)

in which the mean equation given in equation (3) is written as a function of exogenous variables with an error term. Since σ_t^2 is the one-period ahead forecast variance based on past information, it is called the conditional variance. The conditional variance equation specified in equation (4) is a function of three terms:

ϖ= is the long run weighted variance (constant term);

ε_{t-1}^2 = News about volatility from the previous period, measured as the lag of the squared residual from the mean equation (the ARCH term).

σ_{t-1}^2 = is the last period's forecast variance: (the GARCH term).

α and β = are the ARCH and GARCH parameters. The summation of α and β gives volatility persistence; the closer their sum is to one the more persistent is volatility.
The condition required to have mean reverting variance is that: the long run weighted average (>0); ARCH parameter (α >0); and GARCH parameter (β >0). But the introduction of predetermined (regressors) variables in the variance equation does not guarantee these underlying condition, hence the forecasted variance in equation are not guaranteed to be positive. To estimate the determinants of output volatility, the model include explanatory variables in the variance equation, controlling for other exogenous shocks. The conditional variance equation is specified as:

$\sigma_{GDPG}^2 = \varpi + \alpha\,\varepsilon_{t-1}^2 + \beta\sigma_{t-1}^2 + \sum_{j=0}^{p}\gamma_i\,Y_{t-i}$ (5)

Where: Y = is a vector of stationary explanatory variables predetermined to influence volatility in output.

The variables are specified in econometric model.

$GDPG_t = \lambda_0 + \lambda_1 TOP_{t-1} + \lambda_2 TNRR_{t-1} + \lambda_3 OILR_{t-1} + \lambda_4 NOILR_{t-1} + \lambda_5 EXCH_{t-1} + \lambda_6 INT_{t-1} + \varepsilon_t$ (6)

The *a priori* expectations are $\lambda_1>0$, $\lambda_2>0$, $\lambda_3>0$, $\lambda_4>0$, $\lambda_5>0$ and $\lambda_6>0$

To evaluate the volatility clustering in the GARCH (1 1) model, the structural relationship between volatility and its determinants is specified below with all variables understudy in equation (6).

$\sigma_{GDPG}^2 = \varpi + \alpha\,\varepsilon_{t-1}^2 + \beta\sigma_{t-1}^2 + \sum_{j=0}^{p}\gamma_i\,Y_{t-i}$ (7)

Where: Y = TOP, TNRR, OILR, NOILR, EXCH, INT.

Measurement of the Variables

Gross Domestic Product (GDPG) measures the annual percentage growth rate of all goods and services produced in a year. Trade openness is calculated as ratio of total

value of imports plus total value of exports i.e. total trade to gross domestic product. Total natural resources rents (TNRR) are the sum of oil rents, natural gas rents, coal rents. Trade openness is taken as the exports plus imports as percent of GDP. Oil revenue (OILR) is the cash flow from oil export, while non-oil revenue (NOILR) is the revenue generated from non-oil sectors. The exchange rate (EXCH) is the rate at which the Naira is exchanged to the US dollar. Interest rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector. This rate is normally differentiated according to creditworthiness of borrowers and objectives of financing.

Scope, Types and Sources of Data

This study makes use of time-series data which are basically secondary data. The data were sourced from Central Bank of Nigeria (CBN) Statistical Bulletin and World Development Indicator. This study examines the impact of trade openness volatility on economic growth in Nigeria within the period of 1986 to 2017. The adoption of the Structural Adjustment Programme (SAP) of 1986 was one of the decisive initiatives leading to the opening of the country's economy to international trade in Nigeria while 2017 is used to give current understanding and up-to-date findings.

Method of Data Analysis

The study employed Generalised Autoregressive Conditional Heteroscedasticity (GARCH) Models developed by Bollerslev (1986), in determining the volatility of trade openness and dutch disease on economic growth in Nigeria under study period. The choice of the model is based on the fact that the GARCH model is very robust in modelling the volatility characterized variables. It is designed to forecast conditional variances. The variance of the dependent variable is modelled as a function of past values of the dependent variable and independent or exogenous variables. The method measure output volatility as the standard deviation of change in real output.

4. ANALYSIS AND INTERPRETATION OF RESULTS

Unit Root Test

To determine the order of integration of the variables, the Augmented Dickey-Fuller and Philips Perron tests were used to test for stationarity of the time series.

Augumented Dicky-Fuller and Philips Perron tests Unit Root Tests Result Table

VARIABLES	ADF		DECISION	PP		DECISION
	LEVEL	1ST DIFF		LEVEL	1ST DIFF	
GDPG	-1.945139	-9.920054		-1.847356	-11.69350	
	-2.963972	-2.963972		-1.952066	-1.952473	
	(0.3082)	(0.0000)*	I(I)	(0.0623)	(0.0000)*	I(I)
TOP	-0.505203	-7.078130		-0.317620	-7.815069	

	-1.952066	-1.952473		-1.952066	-1.952473	
	(0.4893)	(0.0000)*	I(I)	(0.5629)	(0.0000)*	I(I)
TNRR	-0.510407	-6.585199		-0.665067	-7.354036	
	-1.952910	-1.952910		-1.952066	-1.952473	
	(0.4866)	(0.0000)*	I(I)	(0.4208)	(0.0000)*	I(I)
OILR	-0.659095	-5.853512		-0.516589	-5.856918	
	-1.952066	-1.952473		-1.952066	-1.952473	
	(0.4234)	(0.0000)*	I(I)	(0.4846)	(0.0000)*	I(I)
NOILR	-1.06377	-5.482053		-1.18959	-5.492284	
	-2.960411	-2.963972		-2.960411	-2.963972	
	(0.9962)	(0.0001)*	I(I)	(0.9973)	(0.0001)*	I(I)
EXCH	-0.99915	-4.617831		-2.46905	-4.065008	
	-2.960411	-2.963972		-1.952066	-1.952473	
	(0.9955)	(0.0009)*	I(I)	(0.9957)	(0.0002)*	I(I)
INT	-0.647595	-8.990747		-0.094618	-6.550598	
	-2.991878	-2.991878		-1.952066	-1.952473	
	(0.8417)	(0.0000)*	I(I)	(0.6431)	(0.0000)*	I(I)

*Stationary at 5% Critical Level
Source: Author's Computation Output (2019).

The results from the Augumented Dicky-Fuller (ADF) and Philips Perron (PP) tests in the **Table** above show that GDPG, TOP, TNRR, OILR, NOILR, EXCH and INT were all stationary at first difference level as shown in the table. The result implies that all the variables are integrated together in the same order, as this is the first sign of a long-run relationship among the variables in absolute term.

Co-integration Test

This study employed Johansen Co-integration Test to check whether the regression residuals are co-integrated, that is, to test whether there is a long-run relationship between dependent and independent variables in the model. This test makes use of Trace Statistics by comparing their values with the critical values at 5% level. If the values of the Trace Statistics are greater than the Critical values, the study conclude that there will be long run relationship. Otherwise, the regression residual is not co-integrated.

Co-integration Test Result Table

Hypothesized No. of CE (s)	Eigenvalue	Trace Statistics	0.05 Critical value	Prob.**
None *	0.999302	476.2029	134.6780	0.0000
At most 1 *	0.954357	265.4563	103.8473	0.0000
At most 2 *	0.894227	175.9363	76.97277	0.0000
At most 3 *	0.846600	110.7889	54.07904	0.0000
At most 4 *	0.720419	56.42243	35.19275	0.0001
At most 5	0.363624	19.46301	20.26184	0.0641
At most 6	0.196817	6.356023	9.164546	0.1650
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level *** denotes rejection of the hypothesis at the 0.05 level** ****MacKinnon-Haug-Michelis (1999) p-values**				

Source: Author's Computation Output (2019).

The results from Table above show that the trace statistics indicates 5 co-integrating equations at the 0.05 level. This denotes the rejection of the Null Hypothesis at the 0.05 level. The statistical significance is evidenced from the p-values. Based on the finding from the results, there is a long run equilibrium relationship between the dependent and independent variables.

The Estimation of GARCH Model

The Generalised Auto Regressive Conditional Heteroscedastic (GARCH) model was engaged in testing the impact of trade openness, Dutch disease on economic growth in Nigeria.

GARCH Result Table

Dependent Variable: GDPG
Convergence achieved after 48 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(8) + C(9)*RESID(-1)^2 + C(10)*GARCH(-1)

Variable	Coefficient	Std.Error	Z-Statistics	P. value
C	-2.099521	4.079615	-0.514637	0.6068
TOP	0.003846	0.102319	0.037590	0.9700
TNRR	0.491279	0.169876	2.891992	0.0038
OILR	0.001892	0.000774	2.445069	0.0145
NOILR	-0.003618	0.002076	-1.742741	0.0814
EXCH	0.429218	12.46412	3.393113	0.0007
INT	0.686578	0.262325	2.617284	0.0089
R-squared	0.789248	Mean dependent var		4.524188
Adjusted R-squared	0.642667	S.D. dependent var		3.955960

S.E. of regression	3.442669	Akaike info criterion	5.679715
Sum squared resid	296.2993	Schwarz criterion	6.137757
Log likelihood	-80.87544	Hannan-Quinn criter.	5.831543
Durbin-Watson stat	1.836605		

Source: Author's Computation Output (2019).

GARCH Result Table

The table above reported the Generalised Auto Regressive Conditional Heteroscedastic (GARCH) model. The results demonstrate that trade has a positive relationship with economic growth, which is in line with the findings of Nicholas and Malefa (2018), but not statistically significant. This implies that trade policies adopted over the study period has no impact on Nigeria's economy which could not embraced trade liberation as the world moved towards globalization. This makes the degree of trade openness in Nigeria insignificant to economy growth. The coefficient of total natural resources rents signed positive and statistically significant which agrees with the study theoretical proposition. The finding implies that a 1% rise in total natural resources rent would lead to increase in economic growth by about 49%. This finding is in consonant with the study of Garba, Bello, Abdullahi & Abubakar (2016).

Export oil revenue is statistically significant at 1% level and has a positive relationship with economic growth in Nigeria. The result agrees with the study apriori expectation, the finding shows that Nigerian economy depends so much on crude oil export, which is vulnerable to shocks and fluctuation that most times characterized the crude oil trade in the international market. The non oil export coefficient signed negative and not statistically significant, this result implies that non-oil exports do not contribute to economic growth. This result signifies that, economic growth is not stimulated by non oil revenue due to presence of high volatility of the variables investigated.

Exchange rate is positively and significantly related to economic growth, this implies that changes in exchange rate significantly spurred economic growth. The result signifies that a unit rise in exchange rate increases economic growth by 42%. This finding corroborates the work of Nteegah, Nelson & Owede (2017). Though, the country depends so much on crude oil export, earns very little from export trade due to shocks and fluctuation that most times characterized the crude oil trade in the international market hence the rise in exchange rate stimulate export and economic growth in Nigeria. Monetary policy rate coefficient affects economic growth by about 68%.

The empirical estimations for serial autocorrelation and heteroskedasticity are reported. The results show that the model passed the diagnostic tests. The dynamic model diagnostic test shows that the explanatory variables account for about 78% of the variation in economic growth in Nigeria. Thus, the overall goodness of the model is relatively satisfied. The Akaike information criterion and Schwarz criterion show that the model is correctly specified. The Durbin-Watson statistics is approximately 2, this shows that there is no serial autocorrelation problem in the model.

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Estimation of Volatility Index

Variance Equation		
Variable	Coefficient	P. value
C	8.536169	0.8344
ARCH (-1)	0.461824	0.0482
GARCH (-1)	0.574354	0.0029

Source: Author's Computation Output (2019).

The result of the variance equation indicates that the ARCH term has a positive impact on Nigeria economic growth and statistically significant at 5%, thus implying the presence of volatility clustering in the variables investigated. The GARCH term is statistically significant and this indicates that there is long term persistence volatility in the model. The sum of the ARCH and GARCH term tends to unity and this confirms that the volatility of explanatory variables is high. The variance equation of the GARCH model shows that previous shocks affect conditional volatility of other periods.

Stability Test

To confirm the stability of the model over the period of study and the absence of wrong functional form and model specification error. The recursive graph shows the two red lines which are the upper and lower bounds and the blue line which is the model. This indicates that the model is blue and within bounds.

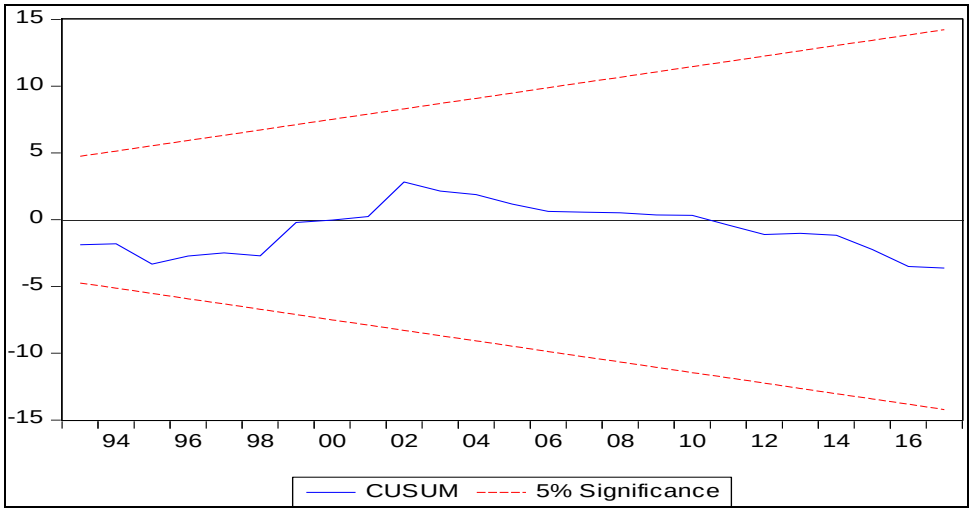

Figure 1: Plot of Cumulative Sum of Recursive Residual

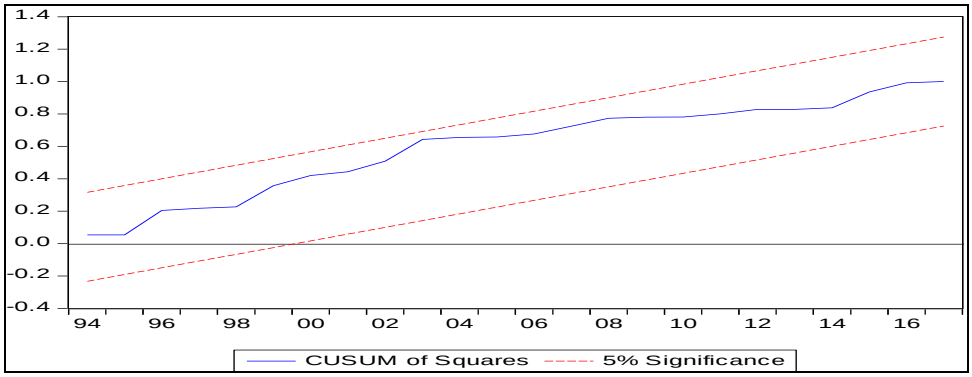

Figure 2: Plot of Cumulative Sum of Square Recursive Residual

In testing the stability of the long-run coefficients alone with the short-run dynamics, the recursive residual and cumulative sums (CUSUM) were used. A graphical illustration of recursive residual and CUSUM as shown in the graphs above, the recursive residuals and CUSUM lines stayed within the 5% critical bound. As depicted in Figure 1 and 2, neither the recursive residual nor CUSUM plots across the 5 percent critical lines, hence these statistics prove the stability of the long-run coefficients of the regressors that have an effect on the economic growth in Nigeria.

5. CONCLUSION AND RECOMMENDATIONS

Findings from the study revealed that oil revenue impacted positively on economic growth, while economic growth is not stimulated by non-oil revenue in Nigeria economy over the years investigated. The study found that trade openness has no significant impact on economy growth in Nigeria. The study concludes that Nigeria has gained very little from the degree of trade openness over the period investigated, coupled with depletes in non-oil revenue export which hampered economic growth. It can also be concluded from the study that total natural resources rents have a positive impact on economic growth in Nigeria. It was also discovered that changes in exchange rate and monetary policy rate significantly spurred economic growth in Nigeria. The volatility index, the ARCH term found the presence of volatility clustering in the variables investigated while the GARCH term ascertained the existence of long term persistence volatility in economic growth. The GARCH model showed that previous shocks affect conditional volatility of other periods. The study recommends adequate policies to improve non-oil export to make trade openness profitable to Nigeria economy. Also, the proceeds from oil revenue and total natural resources rents should be channel to develop other sectors of the economy to prevent the impact of volatility clustering and fluctuation of the oil revenue in future. Finally, the study suggests need for macroeconomic stability through appropriate application of trade policies, fiscal and monetary policies in Nigeria.

Reference

Adeleye J. O., Adeteye O. S. and Adewuyi M. O. (2015). Impact of international trade on economic growth in Nigeria (1988-2012). *International Journal of Financial Research* 6 (3),123-129.

Adugbo, D. (2016), Nigeria: Oil Price Fall - How the Mighty Are Crawling. Daily Trust. Available from: http://www.allafrica.com/ stories/201601130544.html.

Ajakaiye, O., and Soyibo, A. (1999). Trade Liberalization in Nigeria, 1970-93: Episodes, Credibility and Impact. *Regional Integration and Trade Liberalization in Sub-Saharan Africa*, *2*, 147-177.

Azeez, B. A., Dada, S. O. and Aluko, O. A. (2014). Effect of International Trade on Nigerian Economic Growth: The 21stcentury Experience. *International Journal of Economics, Commerce and Management*. 2(10), 1-8

Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of econometrics*, *31*(3), 307-327.

Brueckner, M. and Lederman, D. (2015). Trade openness and economic growth: Panel data evidence from Sub-Saharan Africa. *Economica, 82*, 1302–1323.

Egbulonu, K. G. and Ezeocha, J. A. (2018). Trade Openness and Nigeria's Economic Growth. *International Journal of Development and Economic Sustainability*. 6 (3), 1-11

Ehigiamusoe K.U. and Lean H.H. (2018). Tripartite Analysis of Financial Development, Trade Openness and Economic Growth: Evidence from Ghana, Nigeria and South Africa. *Economics Program, School of Social Sciences, Malaysia*. 12 (2), 189-206

Elijah, S. and Zoramawa, L. B. (2018). Trade Openness And Economic Growth Nexus: An Impact Analysis Of Nigerian Economy. *Journal of Social Science and Humanities Research*. 3 (11), 28-42.

Engle, R. F. and Bollerslev, T. (1986). Modelling the persistence of conditional variances. *Econometric reviews*. *5*(1), 1-50.

Ewubare D.D., Ajie, C. O. Ojiya, E.A. (2017). An Examination of the Impact of Non-oil Exports and Economic Growth in Nigeria: An ARDL Approach. *International journal of business and applied social sciences*. 3(5), 24-43.

Ezeuchenne, K., and Lawal, O.E. (2017). International Trade and Economic Growth in Nigeria. *Journal of Humanities and Social Science*. 22(6), 33-43

Garba T., Bello U., Abdullahi H. and Abubakar M. (2016). Institutions, Natural Resources and Economic Growth: An Application of Co-integration with Structural Break on Nigerian Dataset. *Central Bank of Nigeria Economic and Financial Review*. 54 (4), 1-27

Gwaison, P. D., Zakari, S. and Maimako, L. N. (2018). Impact of International Trade on Economic Growth In Nigeria: A Causality Approach (1986-2016). *Dutse Journal of Economics and Development Studies*. 6(1), 132-143.

Hye, Q. M., Wizarat, S., and Lau, W. Y. (2016). The impact of trade openness on economic growth in China: An empirical analysis. *The Journal of Asian Finance, Economics and Business*. 3 (3), 27-37.

Iyoha, M. A. and Oriakhi, D. (2002). Explaining African Economic Growth Performance: The Case of Nigeria. A Revised Interim Report on Nigerian Case Study prepared for the African Economic Research Consortium Research.

Kalu, U.D. and Agodi, J.E. (2015). Does Trade Openness Make Sense? Investigation of Nigeria Trade Policy. *International Journal of Academic Research in Economics and Management Sciences*. 4 (1), 6-21.

Khobai, H., Kolisiz, N. and Moyo, C. (2018). The Relationship Between Trade Openness and Economic Growth: The Case of Ghana and Nigeria. *International Journal of Economics and Financial Issues*. 8 (1), 77-82.

Lawal, A. I., Nwanji, T. I., Asaleye, A., and Ahmed, V. (2016). Economic growth, financial development and trade openness in Nigeria: An application of the ARDL bound testing approach. *Cogent Economics & Finance*, *4*(1), 1258810.

Lucas, R. (1988). On the mechanics of economic development. *Journal of Monetary Economics*. 22 (1988,) 3-42

Musila, J. W., and Yiheyis, Z. (2015). The impact of trade openness on growth: The case of Kenya. *Journal of Policy Modeling*. 37 (2), 342-354.

Nicholas, M. O. and Malefa, R. M. (2018). Impact of Trade Openness on Economic Growth: Empirical Evidence from South Africa. *Unisa Economic Research Working Paper Series*. Working Paper 05/2018.

Nteegah, A., Nelson M, and Owede V.M (2017). Trade Liberalization and Economic Growth in Nigeria. *International Journal of Social Science and Economics Invention*. 3 (1), 120-132

Polat, A. S., M., Rehman, I. U., and Satti, S. L. (2015). Revisiting linkages between financial development, trade openness and economic growth in South Africa: fresh evidence from combined cointegration test. *Quality & Quantity*. 49 (2), 785-803.

Romer, P. (1986). Increasing returns and long run growth. *Journal of political economy*. 94 (5), 1002-37

Sakyi, D., Villaverde, J., and Maza, A. (2015). Trade openness, income levels, and economic growth: The case of developing countries, 1970–2009. *The Journal of International Trade & Economic Development*. 24 (6), 860-882.

Solow, R. (1957). A contribution to the Theory of Economic Growth, *Quarterly Journal of Economics*. 70: 65-94.

Were, M. (2015). Differential effects of trade on economic growth and investment: A cross country empirical investigation. *Journal of African Trade*. 2, 71–85.

World Bank (2016). World development indicators. [Online]. Available at: http://bit. ly/1Cd8EkQ. [Accessed: 25 March 2016].

World Bank (2018). Nigeria biannual economic update: Connecting to compete. http://documents.worldbank.org/curated/en/769551524576691390/pdf/WPNigeriaBiannualEconomicUpdateAprilFinalVersion-PUBLIC.pdf