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ANALYSIS OF NON-OIL EXPORT PERFORMANCE IN DIVERSIFYING THE PRODUCTIVE BASE OF NIGERIAN ECONOMY

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Abstract

The aim of this paper is to empirically analyze the performance of non-oil export in diversifying the productive base of Nigerian economy. The econometric techniques employed to achieve the research objective include the Fully Modified OLS (FMOLS) technique, Engel-Granger 2-Step cointegration approach, and Pairwise Granger causality test. The results revealed that nonoil export is positively and significantly related with Nigerian economy where a 1% increase in nonoil export induce the economy to grow by 0.04% and 0.44% in the short run and long run respectively and there is evidence of unidirectional causality running from nonoil export to Nigerian economy. The implication of the results is that nonoil export is effective in diversifying the productive base of Nigerian economy and that export-led-growth hypothesis is valid in Nigeria context. The paper recommends that Nigerian government should enlighten and orient members of the public on ways, benefits, and ethics associated with nonoil export as well as reviewing Nigerian nonoil export policies and strategies.

Keywords: Diversification, Export-Led-Growth Hypothesis, Nonoil Export, Economic Growth

***JEL Classification*:** C33, F43, F10, L81, L98

1. Introduction

Diversification! Diversification! Diversification! This is what we have been hearing overtime. So what does that implies? Diversification means exploring more ways of undertaking or obtaining something in addition to the usual or existing way of doing it in order to avoid risk and often, a way of accumulating more to the existing. Nigeria as a country which more than 90% of its total foreign-exchange earnings come from the proceeds of oil, despite the efforts of the Federal Government to diversify the economy away from oil to nonoil sector (OPEC, 2017); export diversification can mean exporting more of non-oil products so as to secured the economy from being vulnerable to external shocks that frequently hit the economy through oil export and this will also serve as a way of earning more to the economy. Recently, the issue of economic diversification has once again being the pinnacle of political agenda of the Nigerian government owing largely to the collapse of oil price at the international oil market from $125.45 in March 2012 to $110.72 in December 2013 and further to $30.7 in Jan 2016 (Nwosa and Ajibola, 2016) while on the other hand, since the post-independence era the growth of Nigeria's nonoil export has been sluggish - falling from about 40% in 1979 to 5% in 2010 (John and Ogege 2012). Typical effect of such shock can be seen from the current recession which the economy just experienced, as the price of oil in the world market which the Nigerian economy heavily rely on continue to deteriorate. The multiple adverse effects include: the fall of the impressive

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economic growth rate experienced in the country over the period 2000 to 2010 averaging 6.3% to 4.2% in 2012, decline in foreign exchange earnings, decline in foreign reserves, increase in deficit financing, increase in exchange rate volatility, devaluation and depreciation of the domestic currency (Naira) among others (Nwosa and Ajibola, 2016). In addition, absence of diversification is the responsible for the rising rate of unemployment in Nigeria, because the oil proceeds crowds out other economic activities as was the case in the early 1970s where the growth of oil revenue led to the decline in economic activities of the non-oil sectors such as agricultural and manufacturing sectors – a term known as "Dutch Disease" (Al-Kawaz, 2008; Hvidt, 2013; Sannassee *et al.*, 2013). This restates the need to diversify the productive base of Nigerian economy from oil to non-oil based economy. As a result of that the Federal Government, has, over the years, set up various incentive schemes for companies whose business is export focused. The incentives range from tax exemption to duty drawbacks as well as other forms of grants. But what is the nature of the relationship? Does nonoil export impacting the growth of Nigerian economy? To what rate does the nonoil export impact Nigerian economy? Do export diversification strategies sufficiently encourage nonoil export in Nigeria? What is the direction of the causation? Answers to these questions will help to verify whether the relationship is positive or negative, the rate to which the nonoil export impact Nigerian economy, whether the impact is statistically significant, and the nature of the causality between the variables. These facts are important to policymakers in formulating appropriate policies for diversifying the productive base of Nigerian economy from oil to nonoil based.

Going by the existing literature there are various studies that studied the impact of nonoil export in diversifying the productive base of Nigerian economy but to the best of the author's knowledge, going by the existing studies, most of the works rely on Ordinary Least Squares (OLS) estimation and there is only one study that used Fully Modified OLS (FMOLS) technique which has unique properties and its estimates were super–consistent relative to Ordinary Least Squares (OLS) technique (Tule *et al.*, 2015). Though the study is up-to-date but it did not estimate the speed of adjustment of the model and despite the author logged the data, instead to interpret the long run coefficients in form of elasticities as they are, but mistakenly multiplied them by hundred before interpreting them which lead to a wrong conclusion in the study. Hence, the current paper will fill that gap by adopting the same technique while taking care with the lapses identified in the previous study.

However, the specific objectives of this paper include: to evaluate the impact of Nigeria's nonoil export as to whether it has been effective in diversifying the productive base of Nigerian economy? To investigate between export-led-growth and growth-led-export hypotheses which one or both or nether is valid in Nigeria context?

Moreover, the research is expected to test three null hypotheses as follows: there is no long run relationship between the variables; the nonoil export is not effective in diversifying the productive base of Nigerian economy and there is no causality between nonoil export and Nigerian economy.

The rest of the paper is organized into four sections. Section 1: review the related literature. Section 2: discussed the methodology to which the objectives of the paper could be achieved. Section 3: is the discussion of the findings while section 4: gives a concluding remarks to the paper.

2. Literature Review

Export means sending of goods or services from a country to another or other countries for exchange. Categorically export divided into two forms,

namely visible and invisible exports. The visible export consists of material products that can visibly be seen or touched which appeared in a country balance of trade and this include crude oil, natural gas, coal, tin, columbite, palm oil, cotton, grains, rubber, cocoa, coffee, tubers, palm kernel, textiles and garments, gallstone, honey, garlic, cash nuts, etc. while invisible export include nonmaterial products that cannot be seen or touched and they include services such as insurance, civil aviation, banking services, tourism, audio-visual services, etc. In furthermore division, we have oil and nonoil exports. Oil export as the implied, is the export of oil while the nonoil export is the export of any commodity other than oil.

However, theoretically export is believed to be a source of growth in the sense that through export a country can sale what it has in abundance and earn more foreign exchange and at the same time importing what might cost it less than to produce it domestically. This has consequently classified economists into two i.e. those support export-led-growth (ELG) and growth-led-export(GLE) hypotheses. The debate dates back to the classical and neo-classical economic theories that centers on the role of exports as one of the main determinants of economic growth (Afolabi, 2011). Adam Smith, James Stuart Mill and David Ricardo, posited that in international trade there could be a strong positive force in nations development that participated in it and that there are economic gains from specialization. Therefore, promoting exports encourages production of goods which in turn provides foreign exchange that may further enable importation of capital inputs that cannot be produced domestically. Kravis (1970) dubbed trade to be the "handmaiden of growth". It has, therefore, become imperative for every Government to pay keen attention to matters relating to trade especially how to attain a higher real productivity in export sector. An increase in foreign demand for domestic exportable products can cause an overall growth in output via an increase in employment and income (Awokuse, 2008). Singh (2010) is in the view that trade is one of the several catalysts of productivity and growth and hence its contribution is contingent on its weight in the aggregate economic activity and the knowledge of this has helped many nations achieve economic growth and development. Emmanuel (2016) argued that the study of economic growth cannot be properly discussed without mentioning trade as an engine of economic growth, be it domestic trade or trade with other countries. Likewise, Neo-classical economists from the part of Krueger(1978), Kavoussi(1984), and Ram (1985)postulated that exports make a significant contribution to economic growth. Enhanced specialization, full capacity utilization of the plant size, getting benefits of the greater economies of scale, increasing the rate of investment and technological change are some of the benefits which can be reaped through exports. On the other hand, the proponents of growth-led-export hypothesis (GLE) like (Krugman, 1984) and Lancaster (1980)hold the contrary view that economic growth leads to enhancement of skills and technology, and with this, increased efficiency, thereby creating a comparative advantage for the country that facilitates exports.

Moreover, the contribution of nonoil export to economic growth has been empirically tested by different economists using different econometric techniques. Adenugba and Dipo (2013) examined the relationship between nonoil export and economic growth in Nigeria: a study of agricultural and mineral resources from 1981 to 2010 using real gross domestic product, nonoil export, and exchange rate. Ordinary Least Squares (OLS) technique was used and findings from the study revealed that nonoil export has a positive and significant impact on Nigerian economy. Ugwuegbe and Uruakpa (2013) examine the impact of export trading on economic growth in

Nigeria from 1986 to 2011 using oil export, nonoil export, and foreign reserve, and real GDP. Ordinal Least Squares (OLS), correlation analysis, and Granger causality test were used. The results show that nonoil export is positively related with Nigerian economy and the impact is statistically significant and there is positive high correlation between nonoil export and the economy and there is evidence of growth-led-export hypothesis in Nigeria. Adeniyi and Saidi (2014) investigate the determinants of nonoil export and economic growth in Nigeria from 1970 to 2012 using nonoil export value, exchange rate, consumer price index, real interest rate and real GDP. Autoregressive Distributed Lag (ARDL) model was employed and the results reveal a significant effect of nonoil export on economic growth in Nigeria for both in the short and long runs. Christopher *et al*. (2014) investigates the effect of non-oil export on the economic development of Nigeria from 1980 to 2012 using non-oil export, trade openness, exchange rate, capital formation, inflation rate and per capita income. The study applied Ordinary Least Square (OLS) estimation technique and the result shows that nonoil export exhibits a significant positive relationship with per capita income and thus, if nonoil export increased, it is going to lead to a significant improvement in the Nigerian level of economic development. Abogan *et al.* (2015) investigates the impact of non-oil export on economic growth in Nigeria between 1980 and 2010 using nonoil export, exchange rate, inflation rate, and gross domestic product. Ordinary Least Square (OLS) methods involving Error Correction Mechanism (ECM) and Johansen cointegration test, over-parametization and parsimonious were used. The study reveals that both in the short run and long run nonoil export has no significant impact on economic growth and therefore export diversification strategies do not sufficiently encourage nonoil export in Nigeria.Godwin and Ubong (2015) analyse the economic diversification and economic growth in Nigeria from 1980-2011 using nonoil trade, oil trade, trade openness, nonoil FDI, oil FDI, exchange rate, inflation rate and gross domestic product. Employing the Johansen cointegration test and error correction mechanism (ECM), the result points to the fact that both in the short and long run nonoil trade is negatively related with GDP and the evidence is statistically significant and therefore, the diversification is not yet achieved. Igwe (2015) tries to examine the impact of nonoil export on economic growth in Nigeria from 1980 to 2010 usingreal GDP, nonoil export, interest rate, and real exchange rate. Ordinary Least Squares (OLS) technique was employed and it was discovered that nonoil export has a significant and positive impact on economic growth in Nigeria.Nwankwo (2015) carries a research on diversification of nonoil export product as a precondition for acceraleted real economic growth in Nigeria from 1981 to 2014 using gross domestic product, agricultural component of nonoil export, manufacturing component of nonoil export, and solid minerals component of nonoil export. Ordinary Least Square (OLS) and Johansen cointegration test were adopted. The study reveals that diversification of nonoil export product has been relatively high over the years and has significant positive impact on the growth of Nigerian economy. Riti *et al.* (2016) investigate the growth of nonoil sectors: a key to diversification and economic performance in Nigeria from 1982 to 2014 using real GDP, agricultural component of non-oil, manufacturing component of non-oil, and solid telecommunication component of non-oil. Autoregressive Distributed Lag (ARDL) model and Granger causality model were employed. The results show that agriculture and telecommunication components are positively contributing to Nigerian economy, manufacturing components turned out negative though significant with unidirectional causality running from agricultural, manufacturing and telecommunication components to economic growth. Kawai (2017) analyse the impact of nonoil

export and economic growth in Nigeria from 1980 to 2016 using nonoil export, exchange rate and real GDP. Fully Modified OLS (FMOLS) and Angel-Granger 2-Step coitegration test were the tools employed. From the results, nonoil export was found to be positively related with economic growth and the impact is statistically significant and thus, non-oil export has the potential significant contribution to the growth of economy in Nigeria. Matthew *et al.* (2017) studies the contribution of nonoil export to economic growth in Nigeria from 1985 to 2015 using nonoil export, exchange rate and gross domestic Product. Auto-regressive distributed lag (ARDL) model was employed and the results indicate a positive and significant relationship between nonoil exports and Nigerian economy both in the short and long run.

3. Methodology

To conduct any research work in a scientific way, it is necessary to have a method through which the data or information can be collected, verified, measured, and analysed. In this research work the study set up econometric techniques to achieve its objectives.

3.1 Source of Data

The choosing variables include real GDP as dependent variable and nonoil export as independent variable. However, to avoid the problem of bivariate model the paper adds import and exchange rate to the independent variable as control variables. The data for all the variables is an annual time series data from 1981 to 2016 obtained from the Central Bank of Nigeria (CBN) statistical bulletin (2016).

3.2 Model Specification

The modeladopted in this paper is based on the augmented production function where Nigerian economy depends on the receipts from nonoil export, import and the exchange rate. The functional form of the model is represented by equation as:

$$\mathrm{RGDP}_t = f(\mathrm{NOEXP}_t, \mathrm{IMP}_t, EXR_t) \quad (1)$$

Where:

RGDP_t = Real GDP (a proxy to capture the Nigerian economy) at time t

NOEXP_t = Nonoil Export at time t

IMP_t= Import at time t

EXR_t = Exchange Rate at time t

Rewriting the above model in linear form we will come up with a modified model equation (2)

$$RGDP_t = \alpha + \beta_1 \mathrm{NOEXP}_t + \beta_2 \mathrm{IMP}_t + \beta_3 EXR_t + \mu_t \quad (2)$$

where a is the intercept, β_1, β_2 are the coefficients of nonoil export and import respectively while μ_t is the error term.

According to Cameron (1994) and Ehrlich (1996) a log-linear form is more likely to find evidence of a deterrent effect than a linear form, hence the research model is explicitly specified in double-logarithmic form which can be log-linearize as in equation (3).

$$lnRGDP_t = \alpha + \beta_1 ln\mathrm{NOEXP}_t + \beta_1 ln\mathrm{IMP}_t + lnEXR_t + \mu_t \quad (3)$$

Theoretically, we expect the coefficient of nonoil export to be positive while import and the exchange rate coefficients to be negative i.e. $\beta_1 > 0$, $\beta_2 < 0$, and $\beta_3 < 0$.

3.3 Model Estimation Procedure

The methods employed in analyzing the data include Descriptive Statistics, Unit Root Test, Cointegration test, Engel-Granger 2-Step cointegration test, and Error Correction Model (ECM).

3.4 Unit Root Test

To test for the properties of the time series variables the paper employed Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1981) and the non-parametric adjustment Phillip-Perron test (Phillip and Perron, (1988) unit root tests.

The tests were conducted with and without a deterministic trend (t) for each of the series. The general form of (ADF) test is estimated by equation (4) regression.

$$\Delta y_t = a_0 + a_1 y_{t-1} + \sum a \Delta y_i + \mu$$
(4)

The Philip-Perron (PP) unit root test is implemented to justify the results of ADF test. The test is estimated by equation (5) regression.

$$\Delta y_t = a_0 + a_1 y_{t-1} + \mu_t$$
(5)

3.5 Co–Integration Test

Cointegration test is used to test for the long run relationship among variables. After stationarity test the next thing is to conduct cointegration test so as to know whether if the variables are related in the long run (cointegrated) and thereby having both the short and long run information and also, to avoid spurious regression Granger (1986). In cointegration analysis if the variables are stationary at level I(0), then the Ordinary Least Square (OLS) method is used and the coefficients in this case will serve as both the long run and short run coefficients. For the variables that were found to be I(1) as in this paper, then the cointegration techniques such as Engel-Granger 2-Step cointegration test or Johansen Cointegration test is used. But there is an argument that the former should be used for two variables only whiles the latter for multiple variables. That is why, though the paper selects the former but the latter also employed as supplementary for justification since there are three variables and therefore multiple. While if the series were found to be integrated of different order i.e. I(0) and I(1), then look for cointegration between subsets such as ARDL bond test.

3.6 Engel-Granger 2-Step Cointegration Test

The Engel-Granger 2-Step (1987) procedure is a residual based cointegration tests. Given the two variables i.e. *X* and *Y*, test each time series for unit root via a unit root test. Secondly, assuming both have unit roots i.e. I(1), regress the series *X* on *Y* i.e. $y = c + \beta x + \mu$ and then save the residuals of the model. Thirdly, test the residuals for unit root via Augmented Dickey Fuller (ADF) based on the null hypothesis that the residuals are stationary at level (cointegration) against the alternative hypothesis that the residuals are nonstationary at level (no cointegration). It shown that the critical values of Dickey Fuller (DF) or Augmented Dickey Fuller (ADF) do not apply and the correct critical values should be obtained from Engle and Yoo (1987), Phillips Perron (1988), Phillips and Ouliaris (1990). So, the Dickey-Fuller or Mikinnon critical values are valid when you test for unit root on actual variables you observe.

3.7 Error Correction Model (ECM)

Given the presence of cointegration among the series an Error Correction Model (ECM) first used by Sargan (1964) and later popularized by Engel and Granger (1969) can be employed. In ECM, the dynamics of both short-run and long-run are modeled simultaneously, thereby offering information about both the short-run and long-run relationships by estimating the short run coefficients and the speed of adjustment of the model towards the long run equilibrium through the error correction term (ECT) which is believed to measure the rate of change to which the short-run errors will automatically correct themselves towards the long run equilibrium. Usually, the value of ECT is should be significant and between -1 to 0. However, Narayan and Smyth (2006) opined that if the ECT is between -1 and -2, then the model produces dampened fluctuations about the equilibrium path and therefore, the error correction process fluctuates around the long run value in a dampening manner and once this process is complete, convergence to the equilibrium path is rapid.

The regression equation form for the error correction model (ECM) is presented in equation 4.

$$\Delta \ln RGDP_t = \alpha + \sum_{i=1}^{n} \theta_{1i} \Delta \ln RGDP_{t-i} + \sum_{i=1}^{n} \lambda_{1i} \Delta \ln NOEXP_{t-i}$$
$$+ \sum_{i=1}^{n} \gamma_{1i} \Delta \ln IMP_{t-i} + \sum_{i=1}^{n} \phi_{1i} \Delta \ln EXR_{t-i} + \varphi ECT_{t-1} + \mu_t \quad (6)$$

From the ECM equation above, Δ is the difference operator, $\alpha$is the constant, θ, λ, γ, and ϕ are the short run coefficients of real GDP, nonoil export, import, and exchange rate while φ is the coefficient of the error correction term (ECT) which measure the speed of adjustment from the short-run state of disequilibrium to the long run steady equilibrium state.

3.8 Pairwise Granger Causality Test

In Granger (1969), the question was to determine the direction of the causality between two variables (*X*, *Y*) which used the lagged values of *X* and that of *Y* to test for evidence and direction of causality between *X* and *Y* and vice-versa. *X* is said to be Granger-caused by *Y* if *Y* helps in the prediction of *X*, or equivalently if the coefficients on the lagged Y's are statistically significant in the prediction of *X*. If *X* Granger causes *Y* and vice-versa then we have two-way causation known as bidirectional / feedback hypothesis but if either *X* Granger causes *Y* only or vice-versa then we have on-way causation known as unidirectional causality while if neither *X* Granger causes *Y* and vice-versa then we have neutral causality. Moreover, it is important to note that the statement "*X* Granger causes *Y*" does not imply that *Y* is the effect or the result of *X* (Muhammad and Benedict, 2015).

To determine the direction of the causality among the variables in this analysis the following Granger causality test was conducted and this is in line with Adeolu (2007), Khan (2007), Egbo (2010), and Ugwuegbe and Uruakpa (2013).

$$\ln RGDP_t = a_1 + \sum \beta_i \ln RGDP_{t-1} + \sum \beta_1 \ln NOEXP_{t-1} + \sum \beta_2 \ln IMP_{t-1} + \sum \beta_3 \ln EXR_{t-1} + \mu_{1t} \quad (7)$$

$$\ln NOEXP_t = a_2 + \sum \phi_i \ln NOEXP_{t-1} + \sum \phi_1 \ln RGDP_{t-1} + \sum \phi_2 \ln IMP_{t-1} + \sum \phi_3 \ln EXR_{t-1} + \mu_{2t} \quad (8)$$

$$\ln IMP_t = a_3 + \sum \psi_i \ln IMP_{t-1} + \sum \psi_1 \ln RGDP_{t-1} + \sum \psi_2 \ln NOEXP_{t-1} + \sum \psi_3 \ln EXR_{t-1} + \mu_{3t} \quad (9)$$

$$\ln EXR_t = a_4 + \sum \delta_i \ln EXR_{t-1} + \sum \delta_1 \ln RGDP_{t-1} + \sum \delta_2 \ln NOEXP_{t-1} + \sum \delta_3 \ln IMP_{t-1} + \mu_{4t} \quad (10)$$

where a_1, a_2, a_3 and a_4 are constants while μ_{1t}, μ_{2t}, μ_{3t} and μ_{4t} are the stochastic terms.

4. Analysis of the Result

4.1 Descriptive Statistics

The descriptive statistics estimation has been conducted in order to analyze the characteristics of the variables as shown in Table 1.

Table 1: Descriptive Statistics Result

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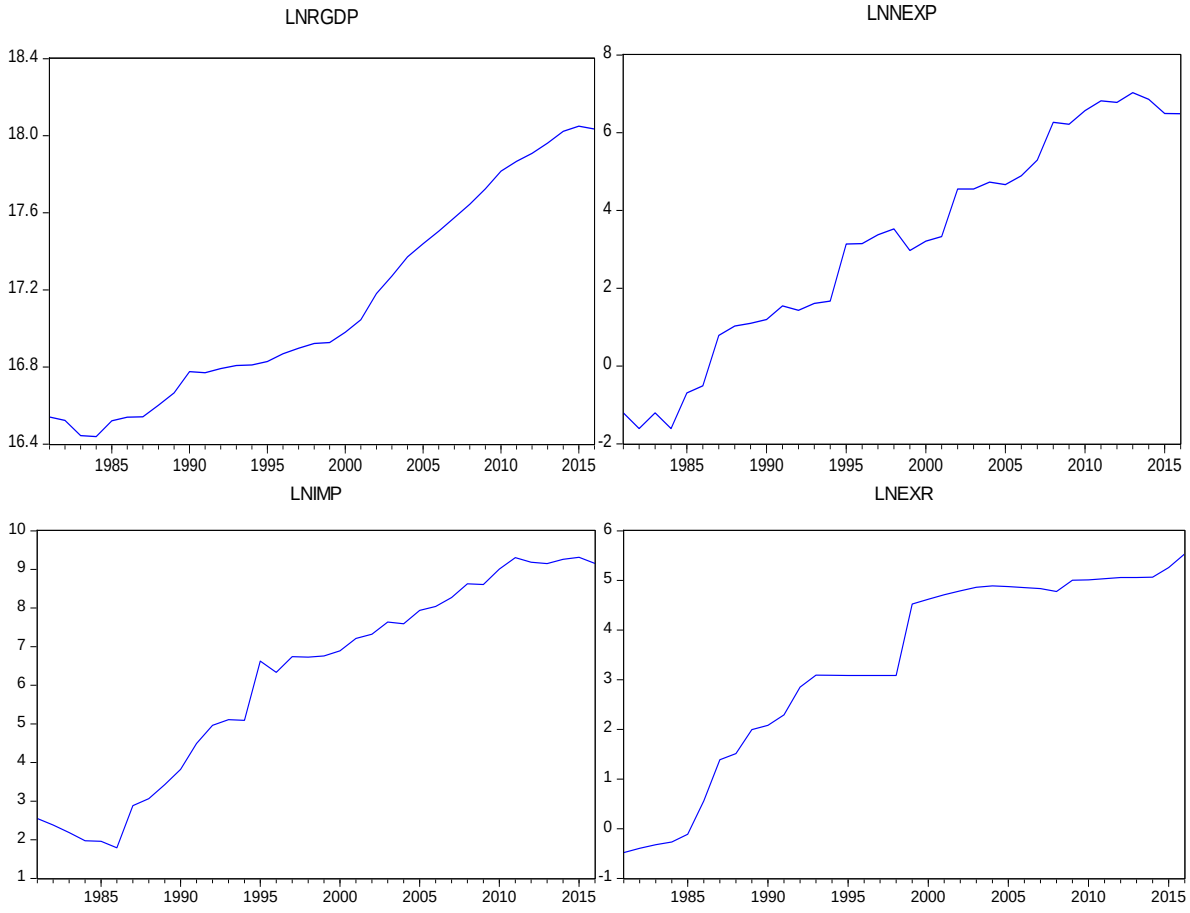
	LNRGDP	LNNEXP	LNIMP	LNEXR
Mean	17.12810	3.179056	6.150814	3.289401
Median	16.92417	3.271524	6.750000	3.809734
Maximum	18.04996	7.030150	9.312545	5.535364
Minimum	16.43867	-1.609438	1.791759	-0.481739
Std. Dev.	0.535522	2.750090	2.582772	1.951585
Skewness	0.443564	-0.217665	-0.397782	-0.734350
Kurtosis	1.775060	1.878855	1.736848	2.191681
Jarque-Bera	3.431215	2.169717	3.342711	4.215692
Probability	0.179854	0.337950	0.187992	0.121499
Sum	616.6116	114.4460	221.4293	118.4185
Sum Sq. Dev.	10.03744	264.7047	233.4749	133.3039
Observations	36	36	36	36

Source: Author's Computation (E-view 10)

4.2 Time series Plot of the Variables

Figure 1: Time Series Plot of the Variables



Source: Author's Depiction (E-view 10)

Figure 1 shows the trend of all the variables used in the study from 1981 – 2016 at level. A visual

inspection of the series graphs indicates that the series were not stationary at level and thus, they do not appear to be constant logarithmic.

Unit Root Analysis

To test for the presence of unit root in the variables as earlier stipulated, the variables in the model were subject to stationarity test using both the Augmented Dickey Fuller (ADF) and Phillips-Perron test (PP) and the summary of the tests is reported in Table 2.

Table 2: Unit Root Test at both Level & First Difference

		Level	
		Constant	Constant &Trend
LnRGDP	ADF	0.058828(0)[0.9576]	-1.450363(0)[0.8269]
	PP	0.129002(2)[0.9634]	-1.450312(1)[0.8269]
lnNOEXP	ADF	-0.904175(0)[0.7747]	-2.917969(0)[0.1697]
	PP	-0.998075(12)[0.7428]	-3.057758(3)[0.1324]
LnIMP	ADF	-1.011758(1)[0.7379]	-0.778403(2)[0.8128]
	PP	-0.778403(2)[0.8128]	-1.615380(3)[0.7663]
	ADF	-1.073320(0)[0.7153]	-2.401690(0)[0.3724]
lnEXR	PP	-1.279851(12)[0.6279]	-2.553771(3)[0.3023]
		First Difference	
		Constant	Constant &Trend
lnRGDP	ADF	5.700435(0)[0.0000]*	-5.923744(0)[0.0001]*
	PP	-5.700372(1)[0.0000]*	-6.295696(1)[0.0001]*
lnNOEXP	ADF	-6.792092(0)[0.0000]*	-6.833623(0)[0.0000]*
	PP	-7.651386(9)[0.0000]*	-10.75930(14)[0.0000]*
lnIMP	ADF	-6.657414(0)[0.0000]*	-6.660028 (0)[0.000]*
	PP	-6.630388(2)[0.0000]*	-6.644135(2)[0.0000]*
	ADF	-6.888499(0)[0.0000]*	-7.047715(0)[0.0000]*
lnEXR	PP	-7.414192(7)[0.0000]*	-9.231292(12)[0.0000]*

Source: Researcher's computation (E-views 10)

Note: Lag length in ( ), *p*-values in [ ], Asterisks (*) denotes 1% significance levels.

At level, both the Augmented Dickey-Fuller test and Phillips Perron test results indicate that in each of the series we do accept the null hypothesis that the series has a unit root (not stationary) but after taking the first difference of the variables they have turned to stationary at 1% significance level and therefore, all the variables are I(1).

Lag Length Selection Criteria

Appropriate lag length is important, in that selecting too few lags may adversely affect the size of the test by over-rejecting the null hypothesis when it is true; using too many lags on the other hand may reduce the power of the test by truncating the degree of freedom (Banerjee *et al.*, 1993). To select for lag length the unrestricted VAR model consisting of six (6) different lag selection criteria was used for this study, this is shown in the Table 3.

Table 3: Lag Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-128.5639	NA	11.99551	8.160246	8.251855	8.190612
1	-52.61656	137.6546*	0.133839*	3.663535*	3.938361*	3.754632*
2	-51.21911	2.358207	0.158120	3.826194	4.284237	3.978022
3	-50.24931	1.515299	0.192858	4.015582	4.656842	4.228142

Source: Researcher's computation (E-views 10)

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Table 3 reports the lag-order selection statistics. All the lag-order selection criteria suggest lags order at one. So, the paper precedes further tests with lag (1).

Angle-Granger 2-Step Co-integration Analysis

Given that all the variables were I(1), the paper proceed to adopt the Engle-Granger (1987) 2-step approach to test for co-integration among the variables. The long run / static model was estimated using Fully Modified OLS (FMOLS), and the obtained residuals were saved and tested for stationarity at level to confirm the presence of co-integration in order to ascertain the existence of long run equilibrium among the variables. However, the reason why the paper adopts FMOLS instead of ordinary least square (OLS) is that the FMOLS has unique properties and its estimates were super–consistent relative to OLS (Tule *et al.*, 2015). The result is presented in Table 5.

Table 5: Cointegration Test – Engle-Granger

Variable	ADF test statistic	Critical Value	Order of integration
ECT	- 5.253274	4.73	I(0)*

Source: Researcher's computation (E-views 10)

* indicates significance at 1% level

From Table 5, at 1% level the ADF statistic is greater than the critical value i.e. -5.253274>-4.73. Therefore, the series are cointegrated as the residuals of the single regression are stationary at level. Hence, there is linear combination of the four variables that does not have a stochastic trend.

The Johansen co-integration test has been employed as a supplementary test to check for the robustness of the result obtained from the Engle-Granger 2-Step co-integration test and the results are presented in Table 6.

Table 6: **Result of Johansen Cointegration Test**

Hypothesis	Trace Statistic	Max-Eigen Statistic
None	60.39948*	42.62401*
At most 1	17.77547	9.498675
At most 2	8.276799	7.434176
At most 3	0.842623	0.842623

Source: Researcher's computation (E-views 10)

Note: * represent significance at 5% level.

From Table 6, both the trace test and the maximum eigenvalues test revealed one co-integrating vector. This confirms the Engle-Granger 2-Step co-integration test that there exists a long run relationship among the variables. Moreover, since there is evidence of co-integration then it is possible to estimate the short run dynamics and long run impact of non-oil export in diversifying the productive base of Nigerian economy as shown in Table 7 and 8.

Table 7: Short Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNRGDP(-1))	0.287398	0.159237	1.804851	0.0819***
D(LNNEXP)	0.043610	0.018374	2.373487	0.0247**
D(LNIMP)	-0.034152	0.021237	-1.608148	0.1190
D(LNEXR)	-0.028297	0.019722	-1.434794	0.1624
ECT(-1)	-0.101399	0.036180	-2.802590	0.0091*
C	0.038918	0.011053	3.521003	0.0015*
R^2	0.488025			
Adjusted R^2	0.396601			
F-statistic	5.338036			
Prob(F-statistic)	0.001438			
$x^2{}_{LM}$	0.89672(0.6387)			
x^2_{Heteros}	10.5726(0.0605)			
JB $x^2_{\text{Normality(2df)}}$	0.139407(0.9326)			

Source: Researcher's computation (Eviews 10)

*, ** and *** denote level of significance at 1%, 5% and 10% level respectively

From Table 7 it can be seen that in the short run the signs of all the variables complied with the a-priori expectation. It reports that the link between real GDP and its lagged is positive and significant at 10% level while that of import and exchange rate is negative and neither is significant but the impact of all the variables in the short run is less compared to that in the long run. The speed of adjustment from short run disequilibrium to long run equilibrium is –0.10 and is significant at 1% level which means that in the event of disequilibrium in the short run, the model will automatically adjust / correct the disequilibrium towards the long run equilibrium annually at the rate of 10% and the divergence will completely converged in approximately 9.9years. The R^2 shows that the independent variables jointly explained the variation in the dependent variable by 49% in the short runand the *p*-value of the *F*-statistic which is significant at 1% shows that the model is significant and we can further said that the independent variables jointly explained the dependent variable. Moreover, the model passes the entire diagnostic tests as all the *p*-values of the respective statistics are greater than 5%.

The implication of the estimates is that in the short run, nonoil export has the potential of causing economic growth in Nigeria while import negatively affect the economy while exchange rate has no significant impact on it.

Table 8: Long Run Coefficients

Variables	Coefficients	Std. Error	T-ratio	Prob
LNNEXP	0.440305	0.050471	8.723884	0.0000*
LNIMP	-0.190321	0.065520	-2.904794	0.0067*
LNEXR	-0.052803	0.053589	-0.985346	0.3321
C	16.99746	0.183836	92.46002	0.0000*
R^2	0.834152			
Adjusted R^2	0.818102			

Source: Researcher's computation (Eviews 10)
* and ** denote significance at 1% and 5% level respectively

As in the short run, the result in Table 8 shows that all the signs of the explanatory variables complied with the a-priori expectation. It indicates that in the long run nonoil export is positively related to real GDP where a 1% increase in nonoil export will lead to 0.44% increase in real GDP and is statistically significant at 1% level. On the other hand, import and exchange rate are negatively related where a 1% increase in import and exchange rate bring 0.19% and 0.05% decrease in real GDP respectively and is statistically significant at 1% level except that of exchange rate. The R^2 shows that the explanatory variables explain the variation in the dependent variable by 83%in the long run. However, as in FMOLS technique; the designed diagnostic tests, namely serial correlation and normality tests were all satisfied.The implication of the result is that nonoil export in Nigeria engenders growth while import seems to hamper it but exchange rate does not seem to have significant impact on the economy.

The finding is consistent with that of Adenugba and Dipo (2013), Ugwuegbe and Uruakpa (2013), Adeniyi and saidi (2014), Christopher *et al*. (2014), Igwe (2015), Nwankwo (2015), Riti *et al.* (2016) support, Kawai (2017), and Matthew *et al.* (2017) but opposed that of Abogan *et al.* (2015), and Godwin and Ubong (2015).

Table 9: Pairwise Granger Causality Test

Null Hypothesis:		Obs	F-Statistic	Prob.
LNNEXP does not Granger Cause	LNRGDP	35	9.45690	0.0043
LNRGDP does not Granger Cause	LNNEXP		0.06608	0.7988
LNIMP does not Granger Cause	LNRGDP	35	3.77817	0.0608
LNRGDP does not Granger Cause	LNIMP		0.00464	0.9461
LNEXR does not Granger Cause	LNRGDP	35	12.0196	0.0015
LNRGDP does not Granger Cause	LNEXR		0.01167	0.9147
LNIMP does not Granger Cause	LNNEXP	35	0.22161	0.6410
LNNEXP does not Granger Cause	LNIMP		1.86851	0.1812
LNEXR does not Granger Cause	LNNEXP	35	5.02665	0.0320
LNNEXP does not Granger Cause	LNEXR		0.58763	0.4490
LNEXR does not Granger Cause	LNIMP	35	13.9326	0.0007
LNIMP does not Granger Cause	LNEXR		0.00482	0.9451

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Source: Researcher's computation (E-views 10)

Table 9 reports the causality test result which shows that the null hypothesis that nonoil export, import, and exchange rate does not granger cause real GDP can be rejected at 1%, 10% and 1% level respectively while that of real GDP does not granger cause nonoil export, import, and exchange rate cannot be rejected even at 10% level. The implication of the results is that export-led-growth (ELG) hypothesis is valid in Nigeria context and that Nigerian policy makers can use nonoil export to make future real GDP prediction.

The finding is consistent with that of Riti *et al.* (2016) but opposed Ugwuegbe and Uruakpa (2013).

Concluding Remarks

This paper, as one of the empirical investigations on the relationship between nonoil export and economic growth in Nigeria has provided a good understanding of the impact that nonoil export has on the growth of Nigeria's economy. The paper covered the period of 1981 to 2016 and time series data obtained from CBN statistical bulletin were used. The econometric tools used in this study include; Fully Modified OLS (FMOLS), Angel-Granger 2-Step cointegration test, and Pairwise Granger causality test. The result arising from our findings revealed that nonoil export is positively and significantly related with Nigerian economy where a 1% increase in nonoil export induce the economy to grow by 0.04% and 0.44% in the short run and long run respectively and there is evidence of unidirectional causality running from nonoil export to Nigerian economy. The implication of the result is that nonoil export is effective in diversifying the productive base of Nigerian economy and that export-led-growth hypothesis is valid in Nigeria context. The paper recommends that Nigerian government should enlighten and orient members of the public on ways, benefits, and ethics associated with nonoil export as well as reviewing Nigerian nonoil export policies and strategies.

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