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AN EVALUATION OF THE IMPACT OF CRUDE OIL REVENUE ON THE NIGERIAN ECONOMY

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ABSTRACT:*The study adds to the debate and existing literature about crude oil sales and the Nigerian economy. Evidence reveals that all the data series in the model were stationary with a unique longrun relationship between gross domestic product (GDP), oil revenue (OREV), non-oil revenue (NOREV) and exchange rate (EXR) which was included as a control variable. The convergence level from longrun to shortrun revealed that less than 7 percent departure from long run equilibrium is corrected in the short run. It is instructive to note however that the adjustment speed of 7% is very low and sluggish in its effect on the Nigerian economy. It was further revealed that GDP was positively related to oil and non-oil revenue within the study period. On average, for every one billion naira increases in oil and non-oil earnings, the GDP increased by 84 and 37 billion naira respectively. This suggests that oil and non-oil earnings support economic growth in Nigeria. Arising from the findings, the study thus concludes that oil revenue had a significant positive impact on the growth of the Nigerian economy. It was also concluded that oil revenue granger causes gross domestic product, vice-versa. Based on the findings in the foregoing paragraph, the researcher has proffered the following recommendations for policy implementation: the Nigerian government should focus on the diversification of the economy into other sources of revenue in order not to be affected by negative shocks in the international market as it has often been the case; tax concessions and incentives should be given to other sectors of the economy such as agricultural sector, and industrial sector by the government in order to boost more production; finally, the various anti-corruption agencies such as EFCC and ICPC should be strengthened to perform their statutory role of checkmating corrupt politicians and bureaucrats in the industry so as to enjoy the gains in the industry.*
Key words: Oil revenue, Non-oil revenue, Gross Domestic Product, ECM, Granger Causality

INTRODUCTION

The country Nigeria, the most populous black nation situated in Sub-Saharan Africa is popularly known for her dominance source of revenue, crude oil. Thus, Nigeria became increasingly dependent on oil revenue, which according to the Central Bank of Nigeria (CBN), (2010) experienced fluctuations in its price per barrel and production. With oil revenue as the

main stay of the Nigerian economy, fluctuations in oil prices are definitely and certainly of great concern to economists in order to predict the effect of a drastic change-rise or fall in oil price on the Nigerian economy as a whole.

Evidence from the past decades shows that oil per barrel rose from US$25 in 2002 to US$55 in 2005 and an outrageous US$147 in mid-2008 (Akpan, 2009), declining sharply to US$46 in 2014 and US$36 in 2015 (Wikipedia, 2015). Such persistent fluctuations no doubt have extensive effects on the macro economy, thus including challenges for policy making- fiscal and monetary in both oil exporting and importing countries of the world. (Mork, 1994; Hooker, 1996; Hamilton, 1996; and Olomola, 2006).

Empirical research from previous studies shows that while increases in oil price have a negative impact on oil importing economies, they have a positive impact on oil exporting economies although the impact of the oil price increase in the oil exporting country is mitigated by a reduction in demand as a result of price increase. This is so because the increase in oil price would increase revenue for exporting country, the importing economies would naturally reduce the quantity demanded of crude oil which follows the law of demand which states that an increase in price would lead to a decrease in quantity demanded and vice-versa. Thus the reduction in quantity demanded would reduce the total revenue earned from oil exportation.

The medium through which these shocks are felt in the economy can be classified under demand and supply indexes. The supply side effects considers oil as a production input, thus an oil price increase would lead to an increase in the cost of production, which would result in reduction of output, hence reducing aggregate supply. This lowers economic activity and growth. The demand side effects however focus on the effect of oil price shock on consumption and investment. An increase in oil price leads to reduction in real disposable income since consumption and investment are positively related to income, a reduction in income would lead to a reduction in consumption and investment in the economy. This reduces aggregate demand hence slowing down the growth rate of an economy.

In the case of Nigeria which is an oil exporting and dependent country, an increase in oil price per barrel combined with supply quota fixed by the Organization of Petroleum Exporting Countries (OPEC), results in a boom in the oil revenue making available more funds for consumption and investment in the exporting country. This enhances economic performance that could translate to economic growth and development.

Problem Statement, Objectives, Research Questions / Hypothesis

Issues of oil revenue fluctuations and how it affects economic growth have continued to generate controversies among economic researchers and policy makers. While some like Olomola (2006), Aliyu (2009) and Akpan (2009) have argued that it can promote economic growth or has the potential of doing so, others like Darby (1982) and Cerralo (2005) are of the view that it can inhibit or retard growth. The former argued that for net-oil exporting countries, a price increase directly increase real national income through higher export earnings whereas, the latter cited the case of net-oil importing countries where even though crude oil is exported but refine petroleum is imported in advancing their argument.

The impact of oil revenue fluctuation whether positive or negative on an economy depends on what part of the divide such an economy falls into and of course the nature of such

revenue fluctuations. However, the Nigerian economy qualifies as both an oil exporting and oil importing economy, by reason of the fact that she export crude and in turn import refined petroleum products (Aliyu, 2009; and CBN, 2013). It is therefore more relevant to estimate on empirical ground the consequences of oil revenue fluctuation on the Nigerian economy considering that the country is a relatively small open economy and has no real influence on the world oil prices, whereas, it is greatly influenced by the effect of oil revenue fluctuations as an exporter and as an importer of refined petroleum products (CBN, 2013). It therefore implies that oil revenue fluctuation of whatever nature can be of both benefit and hurt the economy at the same time.

The continued underdevelopment of Nigeria despite the accumulated increase in oil revenue over the years is shocking. Even in relating the Nigerian economy on the demand – supply effects of oil shock, Nigeria should be operating as an oil exporting country with minimal shocks. What then is the major problem of the Nigerian economy in the 21st century as far as oil revenue is concerned? This may be traceable to the mono-cultural nature of the economy and inability of the economy to manage revenue fluctuations. Basically, the crux of the problem lies in the fact that the Nigerian economy has extremely relied on this commodity over the years, making the economy a mono- product economy and this according to Akpan (2009) has triggered severe structural imbalances for the economy. The Nigerian economy is highly dependent on revenue from crude oil exports and as such the economy is highly susceptible to changes in oil prices. For instance, when oil price fall from US$147 to US$37.81 per barrel in 2008, the budget witnessed significant cuts in budgeted revenue and expenditure (Aliyu, 2009). These cuts had attendant consequences on all aspects of the national economy as budgetary operations in Nigeria are strongly linked to happenings in the international oil market. It is in line with the above argument that this study seeks to empirically examine the impact of oil revenue on the Nigerian economy between 1981 to 2016.

The cardinal or main objective of this study is to investigate the impact of oil revenue on economic growth in Nigeria. Specifically, the study is designed to (i) examine the effect of oil revenue on economic growth in Nigeria; (ii) determine the causal relationship between oil revenue and economic growth in Nigeria and (iii) examine the relationship between oil revenue and economic growth in Nigeria.

The study is further guided by the following hypothetical statements:

Ho_1: Oil revenue has no significant impact on economic growth in Nigeria

Ho_2: Oil revenue has no significant causal relationship on economic growth in Nigeria

LITERATURE REVIEW

Conceptual Framework

Concept of Oil and Gas

Oil refers to crude oil and natural gas or simply put oil gas. Dennis (2000) defines oil as the mixture of various shapes and sizes, of hydrogen and carbon atoms found in the small connected pure space of some underground rock formations. These oil reservoirs are generally thousands of feet below the surface; crude oil is believed to be the remains of plants and animals, mostly small marine life, that lived many millions of years ago. Oil is discovered and produced through wells drilled down to the reservoirs. Experts such as Dennis (2000) agreed

that from oil we can get numerous useful products such as transportation fuel, gasoline, diesel fuel, jet fuel etc. This definition has formed the basis for the understanding of oil and gas as a working definition for this work.

Ugochukwu (2008) defined oil spillage as an introduction of substances into the environment that alters its physical, chemical and biological properties in such a way that it becomes harmful to living organisms and soil. It is observed that whenever oil spill occurs, the soil, living organisms and plants within the spill region suffers. This implies that both oil extraction and spillage can cause adverse effect to the livelihood of the people if not properly and effectively conducted.

The Concept of Oil Revenue in Nigeria

Oil revenue refers to the monetary benefits that accrue to Nigeria for the sale of oil and oil related products. Nigeria is endowed with over 30 different minerals which include gold, limestone, iron ore, coal etc. Being resource rich, has Nigeria is endowed with about 37.2 billion barrels of proven oil reserves, 187 trillion cubic feet of proven natural gas and produces about 2.3 million barrels of oil per day (Omo and Bashir, 2015). This makes Nigeria the largest oil producer in Africa and the tenth largest in the world. Despite the statistics, the country import about 85% of its refined petroleum products due to the low capacity utilization and frequent breakdowns of its refineries (Oriakhi and Iyoha, 2013).

Over the years, Nigeria relied on revenue from oil to finance its budget. Following weaker prices and declining output which resulted from regional unrest, the consolidated overall budget surpluses of 2008 was substantially reversed to deficit amounting to 10.4% of the GDP in 2009 and to about 6.8% of GDP in 2010 (Omo and Bashir, 2015). Thus, in 2009, about #20 billion was utilized to finance the budget. The Nigerian economy slowed from 7.4% growth in 2011to 6.6% in 2012 (Oriakhi and Iyoha, 2013). During this period the oil sector continued to drive the economy, with an average growth of about 8% compared to -0.35% for the non-oil sector. This implies that the oil and gas sectors continue to dominate economic activities in Nigeria. Furthermore, the share of capital expenditure on social community services in the total rose from 10% in 2011 to 11.1% in 2012 while economic services declined from 42.1% to 36.7% respectively (Omo and Bashir, 2015). In consequence, the ratio of capital expenditure to total expenditure reduced from 24.3% in 2012 to an estimated 23.9% in 2013 (Adedokun, 2013).

It is however worthy of note that despite the observed persistent decline in oil revenues and total revenue since the last two or more decades, non-oil revenues were relatively rising over the same period, thereby compensating marginally for the shortfall in oil revenues. In this regard, the government has resulted to expenditure adjustments in order to accommodate the revenue shortfall. Nevertheless, capital expenditures suffer huge downward adjustments because recurrent expenditures, which are mainly salaries and overhead, could hardly be adjusted automatically. Meanwhile, the downward adjustments in capital expenditure may necessarily slowdown total economic activities and growth.

The Concept of Economic Growth and Development

According to Gordon (1984) and Todaro (2000), Economic growth is generally defined in terms of increase in the GDP to distinguish growth from development. Even though, these

concepts are sometimes used interchangeably, one can still make an attempt to distinguish them. Economic growth according to Todaro (2000) refers to an increase in a country's national output of goods and services or increase in the volume of output of goods and services within a specific period. Growth is usually taken to mean economic progress which is the rate at which the annual output of goods and services grow in real terms but economic development on the other hand is a less precise and more complex term which cannot be easily reduced to quantitative measurement in monetary terms alone. It involves a multitude of variables all of them dealing with man's existence.

In the view of Jhingan (2006), economic growth is related to quantitative sustained increase in a country's per capital output or income accompanied by expansion in its labour force, consumption, capital and volume of trade, while economic development is a wider concept than economic growth. It relates to qualitative change in economic wants, goods, incentives, institutions, productivity and knowledge. It is the upward movement of the entire social system. This implies that an economy can grow but cannot develop because poverty, unemployment and inequalities may continue to persist. Thus, while economic growth is the increase in the total output of an economy over a certain period of time, economic development means growth plus change.

In the end however, economic development would said to have taken place if the totality of changes in these variables ends up in improving the living conditions of the people. This explains why many economists believed that while economic growth is about things economic development is about persons. In the context of this work therefore, economic growth refers to increase in the value of GDP or increase in the GDP growth rate.

Channels of oil Revenue Fluctuations in the Economy

There are four channels of oil revenue fluctuations on the economy. These channels are: real balance channel; income transfer channel; endogenous monetary policy response and sectorial shifts hypothesis. These theories all reflect how oil revenue fluctuations affect the macro economy. The real balance channel put forward that oil revenue increase lead to higher inflation and with a given money supply, it results to amount of real balances being lowered in the economy that is, the real value of money is devalued. The lower real balances then produce recessions through the familiar monetary channel-increased interest rate leading to depressed investment spending, reduced aggregate demand and a resultant fall in output (see Chijioke, 2011).

Income transfer channel explains that oil revenue increases lead to a transfer of income from net oil importing economies to net oil exporting countries. This result in a reduction in consumption expenditure in the importing countries since the purchasing power of consumers has been eroded by the oil price hike. This income transfer from the importing economy to the exporting economy reduces aggregate demand. On the other hand, some scholars like Darby (1982) and Hamilton, (1988) opined that endogenous monetary policy responses are very important. Hence, real output declines which usually characterize oil price increases are vied as a result of counter inflationary responses of monetary policy. Responses of regulatory monetary authority such as buying back government bonds and raising interest rates; reduce money supply thus lowering aggregate output. The argument is that the oil revenue increases

do not entirely account for the observed recessions but it is the reaction of the monetary policy that reinforces output declines (Adeniyi, 2010).

The sectoral shifts hypothesis posits that changes in oil revenues perform better in explaining observed variations in output growth (Loungani, 1986). Within this framework, revenue shocks lead to a temporary surge in aggregate unemployment pending improvement in conditions in their sector rather than outright movement into positively affected sectors within the economy (Hamilton, 1988 and Adeniyi, 2010). Thus an increase in unemployment reduces the income available to the economy as a whole, therefore, reducing private investment and aggregate investment.

Other channels through which oil revenue fluctuations affect the economy include: Dutch-Disease channel, Hotelling rule and Irreversibility and Uncertainty channel. Dutch disease can be defined as an adverse effect of natural resource boom on other sectors of the economy such as industrial, manufacturing and agricultural sector. Positive oil revenue shocks lead to an appreciation of real exchange rates of the exporting country, thereby squeezing the non-tradable sector (Olomola, 2006 and Akpan, 2009). This means that positive shocks for an exporting economy like Nigeria, results in appreciation of real exchange rates, thus drawing resources from other sectors to the mining sector. Hotelling rule states that the most socially and economically profitable extraction path of a non-renewable resource is one along which the price of the resource, determined by the marginal net revenue from the sale of the resource, increases at the rate of interest. It describes the time path of natural resources extraction which maximizes the value of resource stock (Loungani, 1986). The rule was derived from the work of Harold Hotelling in his work "The Economics of Exhaustible Resources" published in 1931).

Theoretical Framework: The Keynesian Aggregate Expenditure Model

John Meynard Keynes developed the aggregate expenditure model in response to the Great Depression of the 1930s. Keynes believed that the cause of the depression was low aggregate spending in the economy. In order to fully understand the effect of investment expenditures on the economy, a two-sector simplified model will be examined in this section. The two-sector model comprises households and firms. There is no government sector, therefore income earned by the households is equal to their disposal income (income after tax), which is either consumed or saved. The fraction of household's income that is saved s invested by the firms, that is, savings equal investment in a two-sector economy. This is algebraically represented as:

$$Y = C+S \quad \text{----------} \quad (2.1)$$

If $S=I$

Then

$$Y = C+I \quad \text{----------} \quad (2.2)$$

According to Keynes, the consumption function is relatively stable, thus changes in income earnings of the households affect their savings and in turn, investment. An increase in income will result in households spending only a fraction of the increase (marginal propensity to consume, MPC) and save the rest and vice- versa. This would in turn result in higher or lower investment respectively, as a result of the increase and decrease in savings. Determinants of

investment spending include: profit expectation, interest rates, uncertainty about future costs and revenue etc. Thus, investment is the most volatile component of aggregate expenditure. This therefore means that in order to change expenditure level, it is more effective to effect these changes through investment rather than through consumption.

Equilibrium is reached when aggregate expenditure equals aggregate output. It is important to note however that equilibrium output does necessarily mean full employment in the economy. Keynes said that during periods of recessions, it is possible for equilibrium output to fall below the full employment level, and if this persists, would lead to depression in the economy. The amount by which equilibrium output exceeds full employment is known as inflationary gap. To correct a recessionary or inflationary gap, Keynes believed that aggregate spending must increase or decrease so that full employment is attained. Oil revenue fluctuations increases uncertainty in the economy thus, reducing investment hence growth rate of the economy. Through the multiplier effect, the change in investment leads to a magnified effect on the economy. Thus, oil revenue fluctuations have negative effect on growth by raising uncertainty about the entire macro-economic aggregates.

STUDY METHODOLOGY

Types and Sources of Data

This study essentially relied on annual times series data of secondary nature sourced from the publications of the CBN, NBS and World Bank Development Indicators (WBDI). It would rely only on time series data on all the variables in the model from 1981-2016.

Estimation Procedure

The model of the study would be estimated with the aid of the E-view Econometrics package with Ordinary Least Squares (OLS) technique. The estimation procedures that would be adopted in this study are in the following steps:

1. Establish the order of integration of the employed variables using the Augmented Dickey–Fuller (ADF) unit root test. This is a stationarity test.
2. After ascertaining the stationarity properties of series in the model, their longrun status shall be tested using Johansen Cointegration test.
3. If the variables are confirmed to be stationary, i.e if the variables are found to be integrated of order *I*(1), then the long-run estimates would be obtained through the OLS method.
5. The adjustment of the short-run to long-run equilibrium would be sought through the Vector Error Correction Model (VECM).
6. The causal relationship between variables of interest would be established through Pairwise Granger Causality testing.

Specification of the Model

The primary model showing the technical relationship with oil revenue and economic growth in Nigeria is specified thus:

GDP = F (OREV) ---------- (1)

Equation (1) is a non-stochastic model which implies that all the changes in GDP are caused by oil revenue (OREV). But GDP can grow as a result of several other factors. We can therefore expand the equation to cover other variables affecting GDP growth rate in Nigeria as follows:

GDP = f (OREV + NOREV + EXR)---------- (2)
where
GDP = Growth rate of Gross Domestic Product.
OREV = Oil Revenue
NOREV = Non-oil revenue
EXR = Exchange rate
Equation (2) can be explicitly specified to cover the stochastic element as follows;
$GDP = b_0 + b_1OREV + b_2NOREV + b_3EXR + U_t$ ----------(3)
The model in equation 2 can be specified in its log-linear form thus:
$LnGDP = \alpha_0 + \alpha_1Ln(Orev) + \alpha_2Ln(Norev) + \alpha_3Ln(Exr) + U_t$ …(3)
Where
b_o = Intercept
b_1-b_3 = Coefficients to be estimated.
Ln = Natural logarithm
U_t = Stochastic random error term

Definitions of the Variables

Gross Domestic Product

Implies the market value of all officially recognized final goods and services produced within a country in a given period. GDP per capita is often considered as an indicator of a country's standard of living. GDP is related to national account, a subject in macro-economics. It is customarily reported on an annual basis. It is defined to include all final goods and services, that is, those that are produced by economic resources located in that nation regardless of their ownership and are not resold in form.

Oil Revenue

These include the revenue generated from the export of all crude oil exploited within the Nigeria territory by the various oil multi-nationals like AGIP, Exxon-Mobil, Shell, Chevron, Texaco etc. It is measured in barrels while its monetary value is measured in United States of America Dollar.

Non-oil Revenue

These include the revenue generated from the export of the non-oil produces among which are agricultural, industrial and manufacturing outputs.

Exchange rate:

An exchange rate (also known as foreign exchange rate) between two currencies is the rate at which one currency will be exchanged for another. It is regarded as the value of one country's currency in terms of another currency. Exchange rates are determined in the foreign exchange market, which is open to a wide range of different types of buyers and sellers where currency trading is continuous.

A Priori Expectation

All the variables would be taken on annual basis and used in their log form. On a priori expectation, it was expected that all the independent variables except EXR would be positively related to gross domestic product (GDP). In consonance with economic theory, an increase in

all the explanatory variables (OREV and NOREV) with the exception of exchange rate is expected to produce a positive change in output and hence economic growth in Nigeria. Similarly, a favourable exchange rate policy by the Central Bank of Nigeria is expected to increase output in the sector and hence gross domestic product overall.

ANALYSIS AND INTERPRETATION OF DATA

Pre-Cointegration test using ADF Unit Root Test

Augmented Dickey Fuller (ADF) unit root test is employed to check for the presence of a unit root i.e. none stationarity of the variables. This is the first test carried out in the cointegration analysis and is known as the pre-cointegration test. The time series properties of the variables as evaluated are presented below:

Table 4.1.1 Time Series Properties

Log(GDP)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.486109	0.0001
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Log(OREV)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.454722	0.0000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Log(NOREV)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.734865	0.0000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Log(EXCR)

	t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-5.026540	0.0002
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Source: Author's computation from Eviews 8.0

Table 1(a-d) above shows the stationarity test statistics for all the variables using ADF unit root testing technique. From our results, the result shows that we cannot reject the null hypothesis of unit roots for any of the variables at their level form. Since there was no stationarity for the series at level, the variables were differenced once to become stationary; implying that all variables (GDP, OREV, NOREV and EXR) were of first difference stationarity, that is, integrated of order one I(1). Since *p-values* for all series were significant either at 1% or 5% significant level, we hasten to reject the null hypothesis of unit roots and conclude that they were all stationary series. Base on the fact all the variables are stationary series, the study proceeded to test their longrun relationships.

Cointegration Test using Johansen Approach

The Johansen Co-integration test by Johansen 1988; Johansen and Juselius1990 was used to carry out the co-integration test. The result is displayed in table 4.3 below:

Table 4.3: Johansen Cointegration Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.837719	95.29335	47.85613	0.0000
At most 1 *	0.506206	33.46694	29.79707	0.0181
At most 2	0.181793	9.475274	15.49471	0.3232
At most 3	0.075077	2.653513	3.841466	0.1033

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.837719	61.82641	27.58434	0.0000
At most 1 *	0.506206	23.99166	21.13162	0.0192
At most 2	0.181793	6.821760	14.26460	0.5104
At most 3	0.075077	2.653513	3.841466	0.1033

Max-eigenvalue test indicates 2 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 E-views 8.0

The estimated results indicated that the series had two cointegrating relationships. This was because the null hypothesis (there is no co-integration, r=0), was clearly rejected since the trace statistics and Maximum eigen value exceeded the critical values at 5% level. This implies that all variables, namely GDP, OREV, NOREV and EXR were cointegrated and follow a common long run path. Hence, the superiority of Johansen's approach compared to Engle Granger's residual based approach which lies in the fact that Johansen's technique is capable of detecting multiple cointegrating relationships among the variables (Asafu-Adjaye, 2000 and Pradhan 2010). These results confirmed that there was long run equilibrium relationship among variables specified in the model in Nigeria between 1981 and 2016.

Error Correction Mechanism

To check for the speed of adjustment of the model from the short run to the long run equilibrium state, we also consider the error correcting term (ECM). The greater the coefficient of the error correction term, the faster the speed of adjustment of the model from the short run to the long run. Below is an extract of ECM from the VECM result.

Table 4.4: Error Correction Mechanism (ECM) output

Error Correction:	D(LOG(GDP))	D(LOG(OREV))	D(LOG(NOREV))	D(LOG(EXR))
CointEq1	0.067156	0.187187	**-0.067068**	0.004066
	(0.03718)	(0.04365)	(0.06817)	(0.05279)
	[1.80646]	[4.28884]	[-0.98388]	[0.07702]

Source: Author's computation using E-views 8.0

In the model, the error correction term ECM(-1) is well specified and correctly signed. Theoretically, the estimated coefficient of the error correction term should be negative and lie within an interval of zero and one. The negative sign in the ECM(-1) confirms the existence of co-integrating relationship. The coefficient of the ECM(-1) is approximately seven percent (-0.067068). This implies that less than 7 percent of the departure from long run equilibrium is corrected in the short run. It is noteworthy that, the larger the magnitude of the coefficient of ECM, the faster the speed of adjustment toward long-run equilibrium path. It is however instructive to note that the adjustment speed of 7% is very low and sluggish in its effect on the Nigerian economy.

OLS Regression Output

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.27908	1.339973	9.909960	0.0000

LOG(OREV)	0.842471	0.231690	3.636207	0.0010
LOG(NOREV)	0.375903	0.188959	1.989338	0.0553
LOG(EXR)	-1.128934	0.194487	-5.804677	0.0000

R-squared (0.818213); Adjusted R-squared (0.801171)
Source: Author's computation from E-views 8.0

This is ascertained by the r-squared (R^2), adjusted R^2, t-statistic and F-statistic tests. The regression result shows that the coefficient of determination R^2 is 0.818213, while the adjusted R^2 is 0.801171. Thus, our estimated model achieved a strong goodness of fit. Accordingly, we conclude that the mix of regressors in this model on the average account for about 82% of the changes in the gross domestic product in Nigeria, while the remaining 17% variation is accounted for by the error term. The statistical significance of the estimated parameters in the model as revealed by the R-square of 82% and adjusted R^2 of 80% indicated that 82% of the total variation in the dependent variable (gross domestic product) is jointly explained by the explanatory variables (oil revenue, non-oil revenue and exchange rate) with 18% of deviations captured by the stochastic error term. From the regression estimates it can be further observed that the calculated F-statistic is 48.01013. The probability of the calculated F-statistic being 0.0000 and of course less than the level of significance, as well further affirms the overall significance of the model.

The t-test is used in determining the statistical reliability and significance of the individual parameters used in the model. From the regression results in table 4.3 above, all the explanatory variables (oil revenue fluctuation, non-oil revenue and exchange rate) were statistically significant in relation to the dependent variable (GDP) because their t-statistic values are greater than the tabulated t-value of 2, thus they are all significant determinants of economic growth in Nigeria. To determine the reliability of the statistical criteria, and establish whether or not the estimates have desirable properties of no bias, consistency, and no auto correlation, the Durbin Watson (DW) statistic was used. From the results, DW statistic was 0.535601, implying there was the problem of serial auto correlation in the model.

In terms of the signs and magnitude of the coefficients which signify the effect of oil revenue fluctuation on economic growth, it was observed from the model that all the variables came out in line with established *a priori* expectation. In the same vein, the intercept was found to be consistent with the a priori expectation as it assumed a positive sign. The positive response reported by the result of the intercept signifies that there will be positive growth in the economy when all the explanatory variables (oil revenue, non-oil revenue and exchange rate) are held constant. This indicates that there is an autonomous component of growth in the Nigerian economy not explained by the independent variables, which supports the theory as there are several variables that explain output growth in the economy of Nigeria besides those captured in the model above.

The OLS result above shows that GDP is positively related to the oil and non-oil revenue. For every one billion naira increases in oil and non-oil earnings, the GDP will increase by 84 and 37 billion naira respectively. This suggests that oil and non-oil earnings support economic growth in Nigeria. An increase in oil and non-oil earnings provides the government with revenue and foreign currency to import the required machineries and equipment needed for

development, in addition to providing funds that can be used to improve infrastructure, and for creating an attractive investments climate, which help in supporting the Nigeria economy. This finding agrees with the results obtained by Agodi (2014) and Esfahani *et al*. (2014). The implication of the regression result above is a confirmation of the dominance of the oil sector in Nigeria; the mono-cultural nature of production in Nigeria has made the allocation of resources to be skewed in favour of the oil sector at the expense of the non-oil sector. This is largely due to the fact that the Nigerian economy depends largely on proceeds from the oil sector upon which the sustenance of the economy hangs.

Empirical evidence revealed that exchange rate is inversely related to economic growth, indicating that a 1% increase in exchange rate will reduce economic growth by 1.128934%. This is in conformity to the a priori expectation that exhibits negative relationship between exchange rate and gross domestic product because increase in the exchange rate of Naira in relation to US $ causes devaluation to the naira, thus, this leads to the reduction in investment, which in turns reduces the productive capacity of goods and services.

Granger Causality Test Result

To achieve the second objective of this study i.e. to determine the causal relationship between oil revenue fluctuation and economic growth in Nigeria, Pairwise granger causality test is used.

Null Hypothesis:	Obs	F-Statistic	Prob.
OREV does not Granger Cause GDP	34	15.2019	3.E-05
GDP does not Granger Cause OREV		4.69002	0.0172

Source: Author's computation from Eviews 8.0

The result above indicated a bidirectional causality between oil revenue to gross domestic product (economic growth) in Nigeria during the period of study. The implication of this outcome is that the growth of the Nigerian economy to a very large extent is dependent on the contribution from the oil industry. This finding is of course very correct as the survival or growth of the Nigerian economy since late 1970s have depended largely on oil revenue earnings. Similarly, it was revealed that the Nigerian economy through other sectors such as the non-oil and services sector serves as a fuel for the growth of the oil industry within the study period.

Test of Hypothesis

To test the three hypotheses earlier formulated, the study used the three basic techniques of Johansen cointegration testing, ordinary least square technique and pairwise granger causality testing respectively. The hypotheses are restated for clarity and ease of understanding

Ho_1: Oil revenue has no significant impact on economic growth in Nigeria

Ho_2: Oil revenue has no significant causal relationship on economic growth in Nigeria

On hypothesis one above, the null hypothesis is rejected due to the high t-statistic and low probability values of the coefficient of oil revenue (OREV) hence it is concluded that oil revenue had a significant positive impact on economic growth in Nigeria between 1981 to 2016.

In the same vein, evidence from pairwise granger causality test revealed the existence of bidirectional causality from OREV to GDP and vice-versa, leading to the rejection of the null hypothesis and thereby concluding that there is a causal link between oil revenue and economic growth in Nigeria within the period examined. Similarly, judging from Johansen cointegration result above, the third hypothesis is rejected, hence it is concluded that there is a unique long-run equilibrium relationship between oil revenue and economic growth in Nigeria.

Post-Estimation Test

Heteroscedasticity Test

In order to ensure that the residuals are randomly dispersed throughout the range of the dependent variable, we are going to use the heteroscedasticity test. The variance of the error should therefore be constant for all values of the dependent variable. In the presence of heteroscedasticity, the distributions of the OLS parameters are no longer normal. Heteroscedasticity is tested in this study using the Breusch-Pagan-Godfrey test. The test results are shown hereunder.

Heteroskedasticity Test: Breusch-Pagan-Godfrey

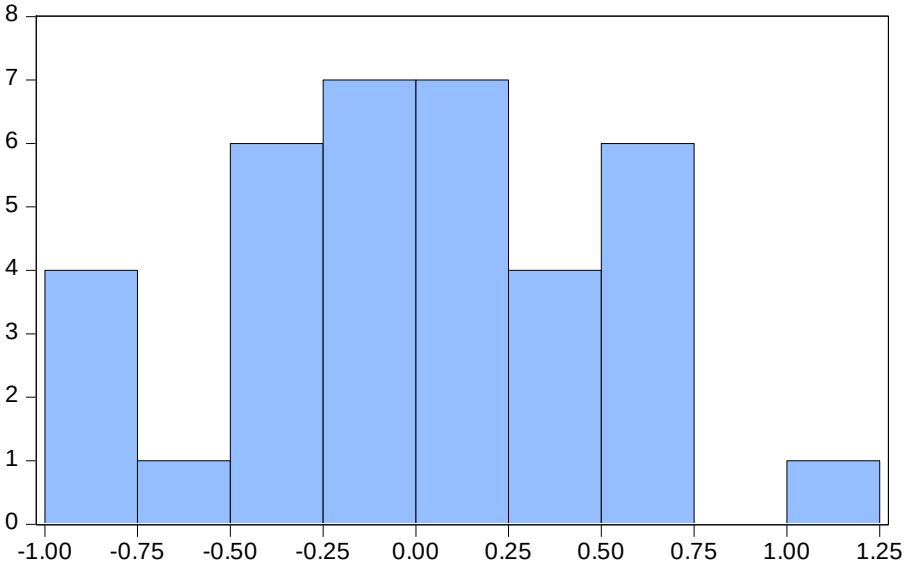
F-statistic	1.554965	Prob. F(3,32)	0.2194
Obs*R-squared	4.580301	Prob. Chi-Square(3)	0.2052
Scaled explained SS	2.914840	Prob. Chi-Square(3)	0.4049

Source: Author's computation using E-views 8.0

From the test results presented in the table above, both the probabilities of F-statistic (0.2194) and the observed R-squared (0.2052) are higher than 0.05 indicating the absence of heteroscedasticity. Implying that the errors are homoscedastic and therefore the long run results succeed all major tests and thus useful for analysis and forecasting.

Normality Test

The Jarque-Bera test result of normality is as shown below. The result revealed that the residuals of the data are normally distributed. The null hypothesis of normality of the residuals of the data is accepted as indicated by the probability value of 0.78 and Jarque-Bera value of 0.479257 which is greater than zero.



Series: Residuals
Sample 1981 2016
Observations 36

Mean	-5.18e-15
Median	0.037134
Maximum	1.063277
Minimum	-0.933769
Std. Dev.	0.482597
Skewness	-0.204981
Kurtosis	2.610853
Jarque-Bera	0.479257
Probability	0.786920

Summary of Major Findings

The study makes contributions to the impact of oil revenue on economic growth in Nigeria. It adds to the debate and existing literature about crude oil sales and the Nigerian economy. The stationarity and long-run relationship of properties of the data were investigated

using the Augmented Dickey-Fuller (ADF) and Johansen Cointegration tests. Evidence reveals that all the data series in the model were stationary with a unique longrun relationship between gross domestic product (GDP), oil revenue (OREV), non-oil revenue (NOREV) and exchange rate (EXR) which was included as a control variable. The convergence level from longrun to shortrun revealed that less than 7 percent departure from long run equilibrium is yearly being corrected. It is instructive to note however that the adjustment speed of 7% is very low and sluggish in its effect on the Nigerian economy.

Empirical findings from the OLS estimation showed the model as being jointly significant in explaining the effect of crude oil revenue on economic growth in Nigeria within the period of study. It was further revealed that GDP was positively related to oil and non-oil revenue within the study period. On average, for every one billion naira increases in oil and non-oil earnings, the GDP increased by 84 and 37 billion naira respectively. This suggests that oil and non-oil earnings support economic growth in Nigeria. The regression result however revealed the dominance of the oil sector in Nigeria as the mono-cultural nature of production in Nigeria has made the allocation of resources to be skewed in favour of the oil sector at the expense of the non-oil sector. This is largely due to the fact that the Nigerian economy depends largely on proceeds from the oil sector upon which the sustenance of the economy hangs. Furthermore, findings from pairwise granger causality testing indicated a bidirectional causality between oil revenue (proxy for crude oil revenue) to gross domestic product (economic growth). The implication of this outcome is that the growth of the Nigerian economy to a very large extent is dependent on the contribution from the oil industry in Nigeria during the period of study.

CONCLUSION REMARKS

Following the above findings, the study thus concludes that oil revenue had a significant positive impact on the growth of the Nigerian economy during the period under reference.
Based on the findings in the foregoing paragraph, the study thus recommends that:

(i) The Nigerian government should focus on the need for diversification into other sources of revenue in order not to be affected by fall of oil price in the international market as it has often been the case.

(ii) It is common knowledge that revenue earned from oil exports over the decades have been mismanaged due to corruption, rent-seeking, wastage, inefficiency and poor governance as demonstrated by lack of accountability and transparency in the affairs of government. As a result, the bulk of the oil wealth has leaked out of the formal system instead of being channeled to productive activities that could create jobs, boost income, improve living standards, eradicate poverty, and promote overall economic growth and development. So long as these phenomena continue to exist in Nigeria, the country's oil wealth will continue to be squandered by the few individuals (politicians, policy makers, oil marketers and their international collaborators) to the detriment of the majority of the population. Efforts must therefore be made to introduce and implement genuine reforms possibly by passing the Petroleum Industry Bill (PIB) into law to allow oil to play a key beneficial role in the economic development process of Nigeria. Similarly, the various anti-corruption agencies such as EFCC and ICPC should be strengthened to

perform their statutory role of checkmating corrupt politicians and bureaucrats in the industry.

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