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IMPACT OF CRUDE OIL PRICE FLUCTUATIONS ON ECONOMIC GROWTH IN NIGERIA

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Abstract: *This study examined the impact of crude oil price fluctuations on economic growth in Nigeria using annual secondary data from the Central Bank of Nigeria statistical bulletins covering the period 1981 to 2018. The error correction mechanism of the ordinary least squares was utilized to model for oil price volatility in line with the long run price determination theory. The generalized autoregressive conditional heteroscedasticity (GARCH) was also utilized as the main technique of analysis. The study revealed that 9.1000237 of oil price and -7.436407 of OPEC supply have significant impact on economic growth in Nigeria whereas 5.248408 of oil demand, 4.385210 of non OPEC supply and 0.009432 of exchange rate are statistically insignificant. The study further revealed that 9.100237 of oil price, 5.248408 of oil demand, 4.385210 of non OPEC supply and 0.009432 of exchange rate have a positive relationship with economic growth in Nigeria whereas -7.436407 of OPEC supply has a negative relationship with economic growth in Nigeria. The study recommends the building of federal government owned mechanized farm settlements in all the states of the federation in order to promote agricultural production thereby reducing the overdependence on oil.*

Introduction

Oil being the mainstay of the Nigerian economy plays a vital role in shaping the economic and political destiny of the country (Okonkwo & Mojekwu, 2018). Although Nigeria's oil industry was founded at the beginning of the century, it was not until the end of the Nigerian civil war (1967-1970) that the oil industry began to play a prominent role in the economic life of the country. In the period between 1960 and 1966, agriculture contributed about 58 percent to the country's gross domestic product (GDP) and employed over 60 percent of her work force (Akpan, 2017). But in the 1970s, agriculture lost its prominent position to mining and particularly to petroleum due to the occurrence of oil boom in the period (that is1970s).

The term oil price fluctuation refers to the instability, sudden changes, a rise or fall, in the supply or demand side of oil prices in the

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international oil market. The rise or fall in the prices of oil can be termed positive (i.e. a rise) or negative (i.e. a fall). The instability in the price of oil in the global oil market is attributable mainly to the supply side disruptions such as OPEC supply quotas (Akpan, 2009). Crude oil price is a key variable in the global oil market and fluctuations in crude oil price could have huge impacts on oil-importing and exporting countries alike at both the macro and micro levels. At the macro-level, sudden changes in oil price affect macroeconomic variables such as exchange rate, interest rate and inflation and could lead to fluctuations in current account balance and net foreign assets position, leading to a recession or economic growth. While at the micro-level, the macroeconomic outcomes of a sudden oil price change could have far-reaching distributional impacts on individuals, households and various segments of the population via three major effects. These include the endowment effect (which reflects changes in the quantum of resources available to the individual), price effect (reflecting changes in the reward of the resource endowments) and occupational effects (which are linked to changes in resource allocation) (Essama-Nssah et al, 2007; Thomas et al, 2010 and Nkang, 2018).The recent change in oil price is partly due to increased demand of oil by China and India. However, the current global economic meltdown suddenly counteracted the skyrocketing oil price. At the beginning of the crisis, oil price crashed below $40/b in the world market which had serious consequences on Nigeria's fiscal budget, which led to the downward review of the budget. Today, oil price is oscillating between $60/b and $75/b (Berument, 2016). This rapid change has become a great concern to everybody including academics and policy makers.

Nigeria uniquely qualifies as an oil exporting and importing nation as she exports crude oil and imports refined petroleum products. However, Nigeria is widely regarded as a net producer/exporter of crude oil since the value of export is higher than the value of import. In fact, Nigeria's resource endowment is not disputable as the country is ranked as the largest oil producer in Africa and occupies the 13th position in the world (Ogboru, 2017). Despite the huge resource endowment of crude oil and other minerals, the country still grapples with myriads of economic problems. This is not far-fetched. This is the direct effect of over reliance on oil proceed for economic survival. Interestingly, crude oil revenue constitutes about 70 per cent of Nigeria's total export earnings; over 70 per cent of government revenue and 10.45 per cent of GDP (OPEC, 2015; NBS, 2015a; NBS, 2015b). Given this huge reliance on the proceeds from oil exports, the Nigerian economy is highly vulnerable to oil price shocks. Consequently, a small change in oil price, be it a rise or fall, can have a huge impact on the economy. Umar and Abdulhakeem (2010) observed that a US$1 increase in oil price in early 1990s increased Nigeria's foreign exchange earnings by about US$650 million (2 per cent of GDP at that time)

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and its public revenues by US$320 million a year. The oil price shock of 2014 saw crude oil prices plummeting almost 50 per cent from average of about US$115 in June 2014 to about US$57.47 in April 2015, and even as low as US$30.66 in January, 2016. This led to a lower export earnings and low accumulation of external reserves; substantial capital outflows particularly from portfolio investments; depreciation of the exchange rate from an average of N157.29/US$ in June2014 to an all-time high of N525/US$ in September 2016, leading to a loss in real incomes and purchasing power, especially for imported goods and services (Nkang, 2018).

Statement of the Problem

Crude oil as an energy source since its discovery in the 1800's has been vitally important to the economy of the world. In Nigeria, oil was discovered in a commercial quantity in 1958 and since then, oil has remained the life wire of all economic activities and the pivot for government budgets and subsidies as well as the major source of foreign exchange earnings and the dominant source of revenue for the Nigerian government. Thus, the upward or downward movement of oil price has an attendant effect on economic growth in Nigeria (Hathaway, 2009; Nwanna & Eyedayi, 2016).

Oil prices have witnessed profound fluctuations and these have had serious implications on the performance of Nigeria's macroeconomic variables such as real gross domestic product, government expenditure, investment expenditure, consumption expenditure, inflation rate, interest rate etc. The Dutch Disease syndrome has also been confirmed in Nigeria where the non-oil sector is totally neglected due to the booming oil sector thereby causing an economic structural imbalance. The fluctuations in the price of oil pose great challenges for policy making in an oil dependent economy (Gummi, 2017).

Oil price shock has been found to have a more direct effect on the exchange rate of the Naira vis-à-vis the US dollar than probably any other economic variable evidenced in 2015 through 2017, where $1 exchanged over N450 due to a fall in oil price in the international oil market. This is because crude oil export earnings accounts for a large chunk of Nigeria's foreign exchange (about 90%) and thus ultimately determines the amount of foreign reserves of the country which is alarmingly low (about $30billion from over $60billion in 2008) and continuously depleting (Oriakhi and Iyohah, 2013). Apart from that, in Nigeria, annual budgets are usually prepared and tied to a given expected price and production level of crude oil. Consequently, oil price shock will result in the distortions of government budgetary operations, distortions of federal and state government allocations, delay in the payment of salaries of civil servants and the demise of infrastructural projects (Okonkwo and Mojekwu, 2018). For example, in 2008 when oil price fell from a peak of $147 to about $37.81 per barrel, the budget witnessed significant cuts in budgeted revenue and expenditure. These cuts

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had adverse effect on all aspects of the Nigerian economy (Oriakhi and Iyoha, 2013).

Nigerian government at all levels has tried to mitigate the negative impact of such exposure on the Nigerian economy. The Obasanjo administration in 2004 introduced the Excess Crude Account (ECA) to protect planned budgets against shortfalls caused by the volatility of crude oil prices. Although this initiative helped to cushion the effects of falling oil prices, however, during the global financial crisis of the 2007-2009 when the price of crude oil dropped drastically, the package could not be sustained. Despite such government efforts and Nigeria's richness in both human and natural resources, the country still grapples with myriad of economic challenges that have continued to impede her journey on the path of economic growth.

More so, there is a consensus in literature on the impact of crude oil price fluctuations on the Nigerian economy, however, there seem to be some sort of divergence in their policy recommendations. Previous studies such as Wilson et al. (2014), Unwene et al. (2018), Alkapher and Nuhu (2018) and Aigheyisi (2018) have stressed the need for economic and export diversification in order to curb the effect of oil price shocks on the Nigerian economy, authors such as Okonkwo and Mojekwu (2018), Nkang (2018), Henry (2019) and Omolade et al. (2019) empathized the need for infrastructural development, targeted intervention, fiscal prudence, and formulation of policies to promote investment in the tradable and non-tradable sectors of the Nigerian economy, respectively. Despite these laudable recommendations and policy measures already implemented, the country is still backward economically, consequent upon her reliance on crude oil revenue for economic survival. It is therefore on this premise that the current study seeks to examine the impact of crude oil price fluctuations on economic growth in Nigeria.

Research Questions

i. What is the impact of crude oil price fluctuations on economic growth in Nigeria?
ii. What is the causality relationship between crude oil price fluctuations and economic growth in Nigeria?

Objectives of the Study

The main objective of the study is to examine the impact of crude oil price fluctuations on economic growth in Nigeria. Specifically, the study intends to:

i. To examine how crude oil price fluctuations impacts economic growth in Nigeria.
ii. Determine the causality relationship between crude oil price fluctuations and economic growth in Nigeria.

Hypotheses of the Study

This research study will be conducted with a view to testing the following hypotheses:

i. Crude oil price fluctuations have no significant impact on economic growth in Nigeria
ii. There is no causality relationship between crude oil price fluctuations and economic growth in Nigeria.

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Scope and Limitations of the Study

This work focuses on the impact of crude oil price fluctuations on economic growth in Nigeria starting from 1981-2018, which represents the period with the most boom and bust movements in crude oil prices.

The variables adopted for the study are limited to real gross domestic product growth rate, crude oil price, oil demand, OPEC supply, non-OPEC supply and exchange rate, which may not be robust enough to fully explain the impact of crude oil price fluctuations on economic growth in Nigeria. While Gross National Product (GNP) may prove a better proxy for economic growth, it is not reported in the CBN statistical bulletin and therefore, real gross domestic product growth rate is used instead. Furthermore, terms of trade, domestic interest rate and global interest rate, inflation rate and trade openness are also factors that influence both oil revenue and economic growth but including them may change the features of this paper; it may also result to over specification of the model. Therefore, the study is limited to these explanatory variables such as crude oil price, oil demand, OPEC supply, non-OPEC supply and exchange rate, and one independent variable such as real gross domestic product growth rate.

LITERATURE REVIEW

Crude Oil Price Fluctuations

Crude oil price fluctuations also known as oil price volatility (OPV) refers to the unexpected changes (rising and falling) in the price of crude oil over a period of time. However, changes may of course be negative (a fall) or positive (a rise) with each of them having either a positive or a negative effect on the economy (Ayadi, 2005). Crude oil price fluctuations can also be defined as the standard deviation of oil prices in a given period (Ebrahim et al. 2014). It is fair to argue that oil remains one of the biggest drivers of the global economy. Crude oil demand-supply dynamics critically influence price - a concern for global investors as well as importing and exporting countries.

History presents numerous instances of crude oil price fluctuations and whenever such fluctuations occurred, both oil rich and oil deficient countries faced challenges. Organization of Petroleum Exporting Countries (OPEC) among others, is the main influencer of fluctuations in oil price. OPEC is a consortium made up of 14 countries including Algeria, Angola, Ecuador, Equatorial Guinea, Gabon, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates and Venezuela. OPEC controls 40% of the world's supply of oil. The consortium sets production levels to meet global demand and can influence the price of oil and gas by increasing or decreasing production.

Crude Oil Production and Economic Growth in Nigeria

Crude oil was discovered in commercial quantity in Nigeria in 1956 and since then, oil has remained the mainstay of the country‘s economy, accounting for more than 90 percent of its exports, 25 percent of its Gross Domestic Product (GDP) and 80 percent of government

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total revenues (Adeniyi et al, 2011). Nigeria's proven oil reserves are estimated at between 16 and 22 billion barrels but other sources claim there could be as much as 35.3 billion barrels (US Energy Information Administration). The EIA also noted that Nigeria's petroleum is classified mostly as "light" and "sweet", as the oil is largely free of sulphur, and the country is also the largest producer of sweet oil in OPEC.

Despite being richly endowed with enormous oil reserves, and gaining extra US$390 billion in oil-related fiscal revenue over the period 1971 – 2005, Nigeria has an increasing proportion of impoverished population and experienced continued stagnation of the economy largely due to a long history of corrupt military regimes and complicity of multinational corporations. The country, like many other oil-rich countries (ORCs) economically underperforms. Her oil wealth has not been tapped to launch her onto economic heights; rather, she suffers from what economists describe as a resource curse – a paradox of poverty amidst plenty resources (Okonjo-Iweala and Osafo-Kwaako, 2007; Adeniran, 2014).

Past studies have confirmed the 'Dutch Disease Syndrome' (DDS) in Nigeria. This is the structural economic imbalance resulting from poor management of oil revenue, and perhaps its shocks. Windfalls that result from volatile oil price surges/shocks overwhelmingly flow through the economy; expand the oil sector and penalize the non-oil sector (Mieiro and Ramos, 2010). The resulting decline in the non-oil sector reinforces sharp decline in the economic growth rate when the price of crude oil falls. However, the DDS alone is not responsible for Nigeria's poor economic performance. Other socio-cultural factors such as corruption, tribal, religious and ethnic sentiments etc have continued to militate against government policies aimed at achieving a sustainable economic growth.

The overdependence of Nigeria's economy on the crude oil sector has tended to retard the growth of the economy as the price of crude oil in the international crude oil market is highly volatile. Nigeria's economy being driven by the crude oil sector is adversely affected by the volatility in oil price. Oil price volatility engenders uncertainty and macroeconomic volatility. Macroeconomic volatility adversely affects investment, economic growth and other key macroeconomic variables (Aigheyisi, 2018). The volatility in oil price has persisted since World War II more than other commodity prices. Nnanna and Masha (2003) stated that changes in global oil market price will bring about a tremendous effect on economic growth, especially in the real sector via several transmission channels. The increase in oil price increases the value of the currency of an oil exporting country and causes the value of the currency of an oil importing country to weaken. This assertion is true since exchange rate is a price determined by the forces of supply and demand, with the strongest factor on the supply side being the foreign exchange inflow from crude oil. Therefore, a downward trend in oil

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price would naturally result in exchange rate depreciation. Interestingly, the economy of Nigeria is estimated to be over 80% dependent on imports. Thus, exchange rate depreciation resulting from a fall in oil price would mean new pressures on production and operating costs in the economy, which would generate new inflationary pressures. Exchange rate is the most important price variable in an economy and performs the twin role of maintaining international competitiveness and serving as nominal anchor to domestic price (Siddiqui, 2014).

Ademakinwa and Omokanmi (2017) noted that the main source of revenue for Nigerian government is oil exports revenue, which it has no control of because crude oil is a publicly traded commodity by OPEC and its price is determined by the forces of demand and supply worldwide. Consequently, when the government is faced with abrupt fluctuations in oil prices, her budget becomes complicated and often imprecise. The volatility and uncertainty that now plague oil earnings have resulted in unpredictable investment climate in the country. This uncertainty has even affected the risk that investors face in non-oil activities. World Bank report has also confirmed that oil price shocks are one of the main factors limiting private investment in developing economies. With high oil prices and high revenues, project selection criteria became very lax. Belief in the oil boom encouraged Nigeria to finance large public expenditure programs, of which the qualities of most of the investments were so poor that they did not pay for themselves. Some projects that might have become viable had oil prices remained high turned non-viable when oil prices fell. Despite being endowed with enormous oil reserves, the country still grapples with myriad of economic challenges that have continued to impede her on path to economic growth

Causes of Oil Price Fluctuations

There are several factors, both economic and political, that can cause fluctuations in oil price. OPEC is widely seen as the most influential player in oil price fluctuations, but basic supply and demand factors, production costs, political turmoil and even interest rates can play a significant role in determining the price of oil.

OPEC and Non-OPEC Influences on Oil Prices

OPEC, or the Organization of Petroleum Exporting Countries, is the main influencer of fluctuations in oil prices. OPEC is a consortium made up of 14 countries: Algeria, Angola, Ecuador, Equatorial Guinea, Gabon, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates and Venezuela. OPEC controls 40% of the world's supply of oil. The consortium sets production levels to meet global demand and can influence the price of oil and gas by increasing or decreasing production. OPEC is in many ways a cartel, a group of producers that attempts to restrict output in order to raise prices above the competitive level (Zycker, 2008).

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More specifically, OPEC and 10 non-OPEC countries agreed in December, 2018 to cut oil production by 1.2 million bpd effective from January, 2019 for an initial period of six months to shore up what many expect to be weakening market fundamentals ahead. OPEC would shoulder 812,000 bpd of those cuts, while the non-OPEC participants would cut 383,000 bpd. Consequently, Nigeria is expected to cut its crude oil production by 3.04 per cent to 1.685 million barrels per day for the first half of 2019, Saudi Arabia will lower its crude oil output to 10.311 million bpd, that is, a 322,000 bpd cut from its October, 2018 level, while Iraq, OPEC's second highest producer, will cut 141,000 bpd to reach an output level of 4.512 million bpd. The UAE will also cut 96,000 bpd to average 3.072 million bpd (PUNCH, December 21, 2018). All these cuts will have serious implications on the price of the commodity, sooner or later.

Theoretical Framework

The 'Dutch Disease' Theory of Economic Growth

The "Dutch Disease" is a phenomenon whereby a boom in one traded goods sector squeezes profitability in other traded goods sectors, both by directly bidding resources away from them and by placing upward pressure on the exchange rate. It is the coexistence within the traded goods sector of progressing and declining, or booming and lagging, sub-sectors. The Dutch disease theory of economic growth states that higher oil prices, generally, change the industrial structure of the oil-exporting country making it more concentrated on oil industry and non-traded sectors. The higher oil revenues lead to the appreciation of local currency, which consequently causes the increase of imports of consumer goods. Thus, the high concentration on imports tends to reduce the competitiveness of the local producers. It follows according to the Dutch disease theory that an increase in oil prices is not a beneficial situation for the economy of an oil-exporting country (Corden and Neary, 1982).

Empirical literature

Henry (2019) empirically examined the impact of oil price volatility on exchange rate in Nigeria using annual time series data from 1986 to 2015. The variables of interest were analyzed using the Autoregressive Distributed Lag (ARDL) Bounds testing procedures. Some insightful findings emanated from the study. The study indicated a negative but significant relationship between volatility of crude oil prices and exchange rates in Nigeria in the long-run; however, this relationship was negative and statistically insignificant in the short run. The study recommended urgent shift in the Nigerian economy from crude oil export to non-oil exports through the exploration of other solid minerals and even agricultural produce. It also recommended a swift effort towards increasing Nigeria's foreign exchange reserve in the short run so that it can serve as a shock absorber against crude oil price volatility that negatively affect the Naira exchange rate in the long run.

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Omolade, Ngalawa and Kutu (2019) empirically investigated the influence of crude oil price shocks on the macroeconomic performance of Africa's oil-producing countries using annual secondary data covering the period between 1980 and 2016 and applying a panel structural vector autoregressive model. The results revealed that output reacted to sharp increases and declines in oil prices differently. The result also revealed the existence of Dutch Disease in Africa's oil-producing countries. It was also observed that structural inflation accompanied sharp declines in oil prices more than monetary inflation, since both outputs and investment declined significantly.

Aigheyisi (2018) empirically examined the relationship between oil price volatility and business cycles (measured as fluctuations in real GDP) in Nigeria, while controlling for effects of other variables such as inflation, exchange rate, money supply, trade openness and foreign direct investment. The ARDL approach was used in the analysis of data covering 1970 and 2015, while the volatility in real GDP and oil price was generated through the EGARCH process. The study found a positive and significant short-run effect of oil price volatility on real GDP volatility, but there was no significant long-run effect. The short-run and long-run effects of other variables on business cycle (real GDP volatility) in Nigeria are not statistically significant, suggesting that short-run fluctuations in real GDP are engendered mainly by oil price volatility that could be attributed to the precarious dependence of the country on oil export. The paper recommended that Nigerian government should intensify efforts towards economic and exports diversification so as to enhance and stabilize its export earnings and real income.

Nkang (2018) conducted a study to investigate the impact of oil price shocks on agriculture and household welfare in Nigeria using a computable general equilibrium (CGE) model and 2006 data from a social accounting matrix (SAM) for Nigeria. The study revealed that GDP recorded a significant increase, while aggregate government income, households' income and total savings all recorded a decline. The sectoral results showed that gross domestic output and supply of composites in the food and other agriculture sectors increased substantially forcing prices in the two agriculture sectors to decline. Moreover, while there was an increase in capital demand in the agricultural sector following the shock, there was however a fall in labour demand in the food sector although same went up in the other agriculture sector. The shock also caused imports in food and other agriculture sectors to fall substantially, while there was a dramatic rise in exports in the two sectors. The study recommended the diversification of the export base in order to boost output from other sectors in the event of negative oil price shocks, as well as reduce government's reliance on oil revenue.

Research Design

The study adopts Ex Post Facto research design because it is a quasi-experimental study examining how independent variables affect a

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dependent variable. The analysis will be based on data of the Bonny Light crude oil price shocks on economic growth in Nigeria for the period 1981-2018, which will enable the study incorporate all the periods of major international oil price changes and also capture the structural changes that took place in the economy.

Model Specification

This study adopts GARCH model and makes use of econometrics procedures in estimating the relationship among the economic variables.

The functional form of the model is specified as follows.

$$RGDPGR = F(OP, OD, OS, NOS, EXR) \quad 3.2$$

The econometric form of the model is as follows:

$$RGDPGR_t = \beta_o + \beta_1 OP_t + \beta_2 OD_t + \beta_3 OS_t + \beta_4 NOS_t + \beta_5 EXR_t + \mu_t \quad 3.3$$

Where,

RGDPGR= real gross domestic product growth rate

OP = Oil price

OD= Oil demand

OS = OPEC Supply

NOS = Non OPEC Supply

EXR = Exchange rate

β_o= Benchmark (RGDP Intercept)

β_1, β_2, β_3, β_4 and β_5 = Slope coefficients

μ= unpredictable random variable

t = Time period.

Mean equation:

$$OPV_t = \beta_o + \beta_1 OD_t + \beta_2 OS_t + \beta_3 NOS_t + \beta_4 EXR_t + \mu_t \quad 3.4$$

Variance equation:

$$\mu_t = \alpha_0 + \alpha_1 \mu_{t-1} + \alpha_2 \mu_{t-1} + \alpha_3 \mu_{t-1} + \alpha_4 OPV \quad 3.5$$

Data Required and Sources

The data required for this study are secondary time series data on real gross domestic product growth rate (RGDPGR),oil price (OP), oil demand (OD), OPEC supply (OS), non-OPEC supply (NOS) and exchange rate (EXR) for the period starting 1981-2018. The data are extracted from the 2017 editions of the central bank of Nigeria (CBN) statistical bulletins, and OPEC monthly oil market reports. Oil price volatility will be estimated using E-views, version 8.0.

RESULTS AND DISCUSSION

Unit Root Test Result

The order of integration and stationarity of all the series using the Augmented Dickey-Fuller (ADF) principle of establishing unit root was conducted. The ADF test was conducted on variables in order to determine their stationary nature and those found non stationary were differenced to get rid of the stochastic trend, a phenomenon associated with time series data. The test was conducted based on the following hypotheses:

H_o: Variable is non-stationary

H_1**:** Variable is stationary

Tables 4.1 presents the summary of the unit root test results for the series in levels and in first differences.

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Table 4.1 Unit root test for the series in levels and first difference

Variables	ADF test Statistics	5% critical Value	Order of Integration
RGDPGR	-2.849597	-1.950394	I(0)
OP	-5.415476	-1.950394	I(1)
OD	-4.995778	-1.951332	I(1)
OS	-4.500597	-3.540328	I(1)
NOS	-5.654740	-3.574244	I(0)
EXCHR	-5.012270	-3.540328	I(1)

Source: Authors computation using Eviews 9

The result indicates that real gross domestic product growth rate (RGDPGR) and non-OPEC supply (NOS) are stationary at level form whereas oil price (OP), oil demand (OD), OPEC supply (OS) and exchange rate (EXCHR) are stationary at first difference. Therefore, it is imperative to conduct a co-integration test since some variables are stationary at first difference.

Cointegration Test Result

The cointegration test result is summarized as follows:

ADF Test Result for Cointegration

Null Hypothesis: ECT has a unit root				
Exogenous: None				
Lag Length: 0 (Automatic - based on SIC, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-6.653948	0.0000
Test critical values:	1% level		-2.630762	
	5% level		-1.950394	
	10% level		-1.611202	

Source: Authors computation using Eviews 9

The result indicates that the ADF test statistics (-6.653948) is greater than the 5% critical value (-1.950394) in absolute terms. This implies that the residuals are stationary (i.e. the variables are co-integrated or that the linear influence of the independent variables cancels out).

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Error Correction Mechanism Result

ECM Test Result

Dependent Variable: RGDPGR				
Method: Least Squares				
Date: 11/13/19 Time: 10:29				
Sample (adjusted): 1983 2018				
Included observations: 36 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.828669	0.333392	2.485567	0.0189
D(OP)	9.100237	0.015399	3.015387	0.0078
D(OD)	5.248408	2.033407	0.258576	0.7978
D(OS)	-7.436407	4.285607	-2.204258	0.0356
NOS	4.385210	3.199809	0.137412	0.8917
D(EXCHR)	0.009432	0.015052	0.626589	0.5358
ECT(-1)	-0.722344	0.190528	-0.642135	0.5258
R-squared	0.869476	Mean dependent var		0.845944
Adjusted R-squared	0.842356	S.D. dependent var		1.395186
S.E. of regression	1.396829	Akaike info criterion		3.678952
Sum squared resid	56.58278	Schwarz criterion		3.986858
Log likelihood	-59.22113	Hannan-Quinn criter.		3.786419
F-statistic	0.986289	Durbin-Watson stat		2.000257
Prob(F-statistic)	0.452595			

Source: Authors computation using Eviews 9

The result indicates that the magnitude of the short run disparity is -0.722344, which means that the degree of the short run dynamics is 72.2344%. This shows a very low speed of adjustment to equilibrium after a shock.

Regression Result

The variables under consideration are real gross domestic product as the dependent variable whereas oil price, oil demand, OPEC supply, non-OPEC supply and exchange rate as the independent variables. The result indicates that the estimated coefficient value of b_0, b_1,b_2, b_3, b_4 and b_5,are 0.828669, 9.100237, 5.248408, -7.436407, 4.385210 and 0.009432, respectively.

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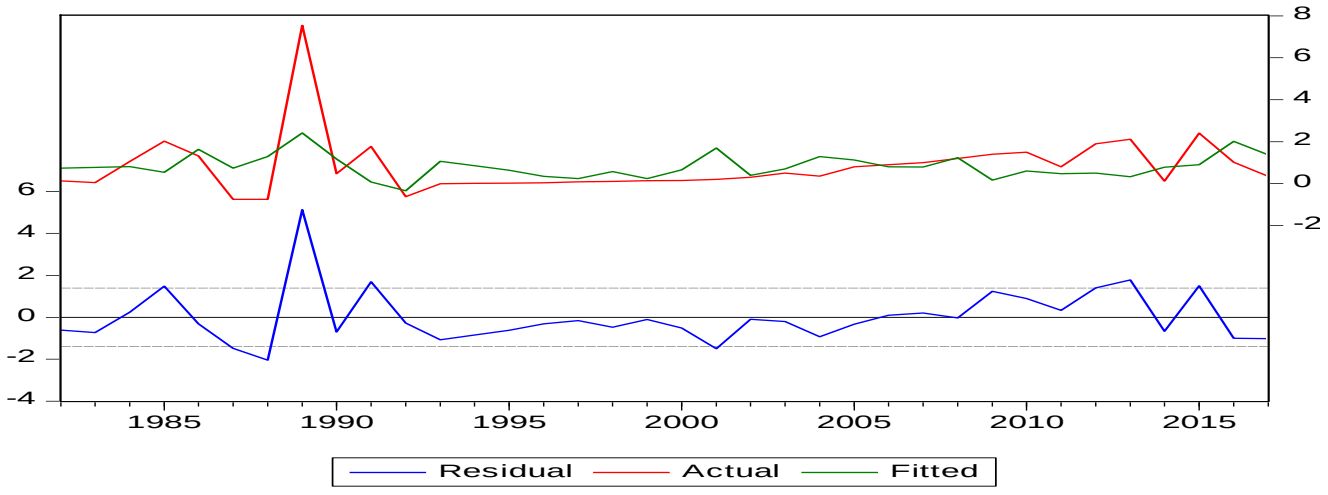
Parsimonious Regression Test Result from ECM

Dependent Variable: RGDPGR				
Method: Least Squares				
Date: 11/13/19 Time: 10:29				
Sample (adjusted): 1983 2018				
Included observations: 36 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.828669	0.333392	2.485567	0.0189
D(OP)	9.100237	0.015399	3.015387	0.0078
D(OD)	5.248408	2.033407	0.258576	0.7978
D(OS)	-7.436407	4.285607	-2.204258	0.0356
NOS	4.385210	3.199809	0.137412	0.8917
D(EXCHR)	0.009432	0.015052	0.626589	0.5358
ECT(-1)	-0.722344	0.190528	-0.642135	0.5258
R-squared	0.869476	Mean dependent var		0.845944
Adjusted R-squared	0.842356	S.D. dependent var		1.395186
S.E. of regression	1.396829	Akaike info criterion		3.678952
Sum squared resid	56.58278	Schwarz criterion		3.986858
Log likelihood	-59.22113	Hannan-Quinn criter.		3.786419
F-statistic	0.986289	Durbin-Watson stat		2.000257
Prob(F-statistic)	0.452595			

Source: Authors computation using Eviews 9

GRAPH OF VOLATILITY TEST



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Looking at the volatility graph above, we can observe that high period of volatile nature is being followed by a prolonged period of high volatile nature (1983-1993), again a period of low volatile nature is followed by a prolonged period of low volatile nature (1994-2008).

ARCH TEST

Table 4.10 ARCH Test Result

Heteroskedasticity Test: ARCH

F-statistic	0.238517	Prob. F(1,33)	0.6285
Obs*R-squared	0.251157	Prob. Chi-Square(1)	0.6163

In testing the ARCH family model in order to examine the presence of ARCH effect in the model, we adopted the heteroskedastic test of ARCH model. From the result, the probability value of the observed R-Square is 0.6163 which is above 5% level of confidence, hence, we accept the null hypothesis and conclude that there is no ARCH effect in the model. Since there is no ARCH effect, there won't be a need to run GARCH test.

Discussion of Findings

The explanatory variables have long run relationship with economic growth in Nigeria for the period under review. In other words, the variables are co-integrated.

Oil price, oil demand, non-OPEC supply and exchange rate have a positive relationship with economic growth in Nigeria. This implies that one percent increase in oil price, oil demand, non-OPEC supply and exchange rate, will lead to a 9.100237 percent, 5.248408 percent, 4.385210 percent and 0.009432 percent increase, respectively, in economic growth in Nigeria.

OPEC supply has a negative relationship with economic growth in Nigeria. This implies that one percent increase in OPEC supply will lead to a 7.436407 decrease in economic growth in Nigeria.

Oil price and OPEC supply have significant impact on economic growth in Nigeria, which implies that oil price and OPEC supply are significant variables in determining economic growth in Nigeria.

Oil demand, non-OPEC supply and exchange rate have no significant impact on economic growth in Nigeria, which also implies that oil demand, non-OPEC supply and exchange rate are not significant variables in determining economic growth in Nigeria.

Conclusion

From the foregoing, we therefore conclude that oil price, oil demand, non-OPEC supply and exchange rate have a positive relationship with economic growth in Nigeria whereas OPEC supply has a negative relationship with economic growth in Nigeria.

Furthermore, oil price and OPEC supply have significant impact on economic growth in Nigeria whereas oil demand, non-OPEC supply and exchange rate have no significant impact on economic growth in Nigeria.

Recommendations

Owing to the findings of this study, the following recommendations have been proffered by the researcher;

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1. From the findings of this study, oil price and OPEC supply are seen to have significant impact on economic growth in Nigeria. Therefore, OPEC as a regulating body should be more proactive in monitoring the trends of the market dynamics in the international oil markets in order to maintain a stable market environment. Also, OPEC should strive to maintain political stability in all the member countries in order to reduce market uncertainty which can also lead to fluctuations. This can be achieved through direct involvement of OPEC in peace keeping mission in member countries.
2. Owing to the fact that oil price has significant impact on economic growth in Nigeria, there is a need for government to diversify the export base of the economy to agriculture and solid minerals in order to reduce overdependence on oil revenue. Specifically, the study recommends the building of a federal government owned mechanized farm settlements across all the states of the federation as this will boost agricultural production and increase its contribution to GDP; it will also create employment opportunity and ultimately put the Nigerian economy on the path of economic growth.

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