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AN EVALUATION OF THE IMPACT OF FLUCTUATING OIL REVENUE AND THE PERFORMANCE OF THE NIGERIAN ECONOMY: AN ECONOMETRIC ANALYSIS

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ABSTRACT

The up and down movement in the price of crude oil in recent years has led to increasing concern about its macroeconomic implications for the Nigerian economy as economic planning has become very uncertain given the fact that the economy is highly vulnerable to oil price fluctuations. It is with this view in mind that this paper empirically analyses the impact of fluctuating oil revenue and the performance of the Nigerian economy between 1999 to 2016 (a seventeen years period of democratic governance), using secondary data sourced from Central Bank of Nigeria Statistical Bulletin and World Bank Development Indicators with VAR econometric tools of analysis. After appropriate stationary and robustness checks, the study finds out that oil price shocks (proxy for oil revenue) retards economic growth as it has a negative relationship with economic growth. An interesting outcome from the VAR Block Exogeneity Test is the unidirectional causality running from Oil Revenue to Real Gross Domestic Product (economic growth) which reveals the fact that during the years under reference, proceeds from oil export were mainly responsible for the level of

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ice fluctuation paints an unstable future for the Nigerian economy because macroeconomic variables like employment, interest rate and price stability become victims. Both fiscal and monetary tools are frequently revised to keep the system afloat during price shocks. Nigeria remains a victim of these policy shocks because of overdependence on oil export earnings. A major policy recommendation is the need for policy makers to concentrate on policies that will strengthen and stabilize the macroeconomic structure of the Nigerian economy with specific focus on alternative sources of government revenue (reduction of dependence on oil proceeds) and reduction in monetization of crude oil receipts (fiscal discipline).

KEYWORDS

Oil shocks, Economic Growth, VAR, ECM, Granger Causality.

1. INTRODUCTION

Oil revenue refers to the income earned from the sale of crude oil. According to Budina and Van Wijnbergen (2008) cited in Ogbonna (2012), oil is the dominant source of government revenue, accounting for about 90 percent of total exports, and this approximates to 80% of total government revenues. Since 1970's the petroleum industry has continue to play a dominant role in the socio-economic development of the Nigerian society. Crude oil export provides the bulk of government revenue and most of the foreign exchange earnings. Oil revenue has been and still is the mainstay of the national economy and is likely to remain so for a long time to come. Figures from the central bank of Nigeria revealed that in 2006 out of the total revenue of #5,965.1 billion that accrued to the country, crude oil contributed #5,287.6 billion. This is equivalent to 88.6% of the total revenue (Odularu, 2009). More importantly, crude oil for the last three decades has been the major source of revenue, energy and the foreign exchange for the Nigerian economy. In 2000 oil and gas export earnings accounted for about 98% and about 83% of federal government revenue (Ibegbu, 2008).

However due to the ongoing global fall in oil price, crude oil price in the international market has been oscillating (upward and downward). It is noticeable that while crude oil earnings for Nigeria in 1999 was 724.42 billion naira, it more than doubled to 1,591.68 billion naira in the preceding years of 2000 and 2001 before dropping to 1,230.85 billion in 2002. Prices again skyrocketed to 2,074.28 in 2003 and remain on an upward trend till 2007 during the administration of Alhaji Umar Yar'adua when it again crashed to 4,462.91 billion naira. There was a big leap in prices by 2008 owing to favourable oil prices in the international market before falling to 3,191.94 billion naira in 2009. By 2010 there was an appreciable increase in prices as the country again reaped 5,396.09 and 8,878.97, 8,025.97, 6,809.23, 6,793.82 billion naira from crude oil exports for 2011, 2012, 2013 and 2014 respectively before the bubble finally burst in 2015 and 2016 with a sharp fall in oil prices which nearly brought governance to a halt in Nigeria and consequently plunged the economy into a deep recession with resultant lost in jobs and uncontrollable rise in commodity prices across the country (CBN, 2015). Oil prices in the global market fell significantly from the all-time high at $141 per barrel by the end of July 2008 to $45 per barrel by the end of January 2009 and fell to its lowest of $36 per barrel sometimes in April, 2016.

2. STATEMENT OF THE PROBLEM

These upward and downward trends in commodity price are a function of both supply and demand shocks. The oil price volatility threw the country's public finance into disarray thereby forcing the Nigerian government to review the budget bench mark down ward from $65 to $38 (Yakubu, 2008). As expected, the oil price volatility makes government budgeting uncertain and therefore leads to a reduction in government expenditure and in turn affect the provisions of goods and services to the Nigerian citizenry. The fluctuation in oil prices comes with a lot of cost to government as implementation of yearly budget suffers severe setback. Another school of thought holds the belief that a fall in the price of crude oil could be a blessing in disguise for Nigeria as it will propel her to explore other sectors of the economy it has long neglected because of the flow of

petro-dollars. Moreover, it is hoped that government would be forced to look inwards and be more judicious and prudent in spending. This is why the above study becomes timely. It attempts to contribute to the ongoing debate on the likely impact of the global fall in crude oil prices on the performance of the Nigerian economy between 1999 to 2016 (a 17 years period). The main objective of this study is to empirically evaluate the impact of fluctuating oil revenue on the performance of the Nigerian economy. A null hypothesis of no significance impact of fluctuating oil prices on economic growth shall be tested. The rest of the paper is organized as follows. In the next section, we examine the theoretical literature and review of empirical studies. Section three is dedicated to study methodology while section four is data presentation, analysis and discussion of empirical results. Finally, in section five, provided concluding remarks and some policy recommendations.

3. LITERATURE / EMPIRICAL REVIEW

The Nigerian economy for the past four decades has relied heavily on crude oil as the major source of revenue, energy and foreign exchange. This resource has continue to play a dominant role in the socio-economic development of Nigeria and has remained the bedrock upon which major economic planning indices relied on since 1970 when oil was first discovered, displacing agriculture and thus becoming the major foreign exchange earner for the country (Odularu, 2009 cited in Adamu, 2015). Crude oil export provides the bulk of government revenue with which the other sectors of the economy rely on for sustainability and growth. Figures from the central bank of Nigeria revealed that in 2006 out of the total revenue of #5,965.1 billion accrued to the country, crude oil contributed #5,287.6 billion. This is equivalent to 88.6% of the total revenue. In 2000 oil and gas export earnings accounted for about 98% and about 83% of federal government revenue respectively (Ibegbu 2008).

According to Ajie (2012) oil was discovered in Nigeria in 1956 at Oloibiri, Bayelsa State, South-South region in the Niger Delta area of Nigeria after half a century of exploration. The discovery was made by Shell-BP, at the time the sole concessionaire. Nigeria joined the ranks of oil producers in 1958 when its first oil field came on stream producing 5,100 bpd. After 1960, exploration rights in onshore and offshore areas adjoining the Niger-Delta were extended to other foreign companies. In 1965 the EA field was discovered by Shell in shallow water Southeast of Warri. In 1970, the end of the Biafran war coincided with the rise in the world oil price, and Nigeria was able to reap instant riches from its oil production. Nigeria joined the Organization of Petroleum Exporting Countries (OPEC) in 1971 and established the Nigerian National Petroleum Company (NNPC) in 1977; a state owned and controlled company which is a major player in both the upstream and downstream sectors (Blair 1976). Following the discovery of crude oil by Shell D'Arcy Petroleum, pioneer production began in 1958 from the company's oil field in Oloibiri in the Eastern Niger Delta. By the late sixties and early seventies, Nigeria had attained a production level of over 2 million barrels of crude oil per day.

Ajie (2012) further posits that although production figures dropped in the eighties due to economic slump, 2004 saw a total rejuvenation of oil production to a record level of 2.5 million barrels per day. Current development strategies are aimed at increasing production to 3 million barrels per day by the year 2016. This production quota was disrupted because of unrest in the Niger-Delta region of the country by Niger-Delta Avengers and other youths agitating for a greater share of oil wealth

from the Nigerian government. Petroleum production and export play a dominant role in Nigeria's economy and account for about 90% of her gross earnings. This dominant role has pushed agriculture, the traditional mainstay of the economy, from the early fifties and sixties, to the background. While the discovery of oil in the eastern and mid-western regions of the Niger-Delta was a welcome news to many Nigerians, it at the same time signaled a danger of grave consequence as oil revenues fueled already existing ethnic and political tension and actually "burned" the country. This tension reached its peak with the civil war between the majority Igbos and some other minority tribes from Eastern Nigeria and the Northern and Western part of the country that lasted from 1967 to 1970.

In the view of Ikein (2008), Nigeria survived the war, and was able to recover courtesy of the huge revenues from oil in the 1970s. For some three years an oil boom followed, and the country was awash with petro-dollars. Indeed, there was money for virtually all the items in its development plan. The literature of the postwar years shifted to the analysis of the world oil boom and bust, collectively known as the "oil shock." Starting in 1973 the world experienced an oil shock that rippled through Nigeria until the mid - 1980s. This oil shock was initially positive for the country, but with mismanagement and military rule, it became an economic disaster. The larger middle class produced by the oil boom of the 1970s gradually became disenchanted in the 1980s, and rebellious in the 1990s owing to widespread corruption and economic mismanagement on the part of leaders. The enormous impact of the oil shock could not escape scholarly attention. For almost twenty years (1970s - 1990s), the virtual obsession was to analyze the consequences of oil on Nigeria, using different models and theories.

A set of radical-oriented writers were concerned with the nationalization that took place during the oil shock as well as the linkages between oil and an activist foreign policy. Regarding the latter, the emphasis was on OPEC, Nigeria's strategic alliance formation within Africa, the vigorous efforts to establish the Economic Community of West African States (ECOWAS), and the country's attempts to use oil as a political weapon, especially in the liberation of South Africa from apartheid rule. If many had hoped that oil would turn Nigeria into an industrial power and a prosperous country based on a large middle class, they were to be disappointed when a formally rich country became a debtor nation by the 1980s. The suddenness of the economic difficulties of the 1980s "bust years" had an adverse effect on class relations and the oil workers who understood the dynamics of the industry (OPEC Annual Report 1983).

4. OIL SECTOR AND THE NIGERIAN ECONOMY

The volatility and instability in crude oil production in Nigeria and fluctuations in international oil price has again brought to the front burner anxieties about the future of the oil sector in the Nigerian economy. In the first quarter of 2014, the contribution of the oil sector as a percentage of the nation’s real Gross Domestic Product (GDP) was put at about 14.75%, compared to 15.80% in the corresponding period in 2013, according to the National Bureau of Statistics (NBS, 2014). Again, average daily production of crude oil was 2.29 million barrels per day (mbpd) in the first quarter, as against 2.35 mbpd in the corresponding quarter in 2013, based on data from the Nigerian National Petroleum Corporation (NNPC, 2014). Average daily crude oil production is less than the projected 2.53 mbpd on which the 2014 federal government budget estimates are based. In terms of growth, oil sector GDP (with associated gas components) grew at 0.74 in the first quarter

of 2014. The non-oil sector on the other hand continued to be a major driver of the economy, recording 7.89% growth in real terms in the same period (NBS, 2014).

The oil sector in Nigeria has witnessed disruptions in recent times due to pipeline vandalization, incidents of illegal bunkering and theft of crude. These have resulted in incessant declarations of force majeure by some International Oil Companies (IOCs) such as Agip, Total and Royal Dutch Shell. Estimates of revenue loss due to oil theft and vandalization are about $1.23billion in the first quarter of 2013 alone (NNPC, 2014). The federal government has in several global meetings sought global clampdown and actions on illicit trade in stolen crude as an antidote to oil theft. Nigeria has consistently argued that stolen crude oil ought to and should be treated globally in the same manner as stolen diamonds because they both generate blood money, aids corruption and violence and can provoke war (Ahmad and Mottu, 2003; Collier and Hoeffler, 2005; Brough and Elliot, 2008; Sampson, 2013). As a result of these ugly developments, the Federation Accounts Allocation Committee (FAAC) on several occasions has had to resort to the Excess Crude Account (ECA) to shore up monthly allocations to the three tiers of government. There is also apparent lethargy on the part of international oil companies in embarking on new investments in the country, especially in deepwater exploration as a result of uncertainties and the delayed enactment of the Petroleum Industry Bill (PIB). These somewhat unsavoury and gloomy scenarios together with the energy policies of the United States and China have reinforced concerns about the long-term future of the oil sector in Nigeria and the country's near-total reliance on proceeds from oil (Uzor, 2013).

The Nigerian economy's near total dependence on oil has dire implications for the economy (Emmanuel, 2004, Gary and Karl, 2003; Karl, 1997, Sampson, 2003). To buttress this point in 2013, the stock of the nation's external reserves and Excess Crude Account experienced severe decline as a result of fluctuations in the price and quantity of oil. The CBN report (2014) reveals that the gross external reserves as at December 31, 2013 stood at US$42.85 billion, representing a decrease of US$0.98 billion or 2.23% compared with US$43.83 billion at end-December, 2012. The excess crude account (ECA) also declined within the period. Earlier in the first quarter of 2013, external reserves had climbed to its highest level in more than four years, hitting around US$48.57 billion in May (CBN, 2014). The drop in both the stock of external reserves and the ECA are as a result of a number of factors. First was the slowdown in Portfolio and Direct Foreign Investments (FDIs) flows in the fourth quarter 2013, which prompted increased funding of the foreign exchange market by the CBN to stabilize the nation's currency. Secondly, there was a drop in oil revenue inflow owing to decline in oil output – due to oil theft and pipelines vandalism at various times in 2013 which resulted in the loss of about 300,000 – 400,000 barrels per day (NNPC, 2014). Thus, the 'quantity shock' led to depletion in both accounts – the external reserves and the ECA. While the ECA and external reserves were getting depleted, the nation's stock of public debt was on the increase all through 2013. Indeed, according to the Debt Management Office (DMO, 2014), Nigeria's total public debt stood at N10.04 trillion which is the equivalent to US$64.51 billion as at end December, 2013 – with the domestic debt standing at N8.67 trillion (US$55.69billion) – representing 86.32 % of the total debt.

It should also be noted that the Nigerian economy has for the most times been unstable, a consequence of the heavy dependence on oil revenue, and the attendant volatility in prices. The oil boom of the 1970s led to the neglect of agriculture and other non-oil sectors, expansion of the public sector, and deterioration in financial discipline and accountability. Furthermore, oil-

dependence exposed Nigeria to oil price volatility which threw the country's public finance into disarray (Adebayo, 1993; Adesina, 1998, Ahmed and Singh, 2003). According to Sala-Martin and Subramanian (2013), waste and 'Dutch disease' manifesting in rapid capital accumulation and negative Total Factor Productivity (TFP) characterized Nigeria's 54 year post-independence development experience. While capacity utilization averaged about 77 % in 1975, it had gone down to about 50 % in 1983 and until very recently has languished at about 35 % since the mid 1980s till date. That the Nigerian economy is intricately interlinked with the oil sector is obvious. Crude oil receipts account for about 80 % of total government revenue accruable to the federation account, 95 % of foreign exchange earnings, about 15 % to the country's GDP (14.85 % in the first quarter of 2014), and 4 % of total employment – thus making Nigeria one of the most oil-dependent economies in the world (Sampson, 2013). Consequently, any major shock in the international commodities market negatively affects the Nigerian economy as was evident during the global economic and financial meltdown when crude oil prices crashed from its record high of $147.50 per barrel in July 2008 to a paltry $40 per barrel in December 2008.

Certainly, but for the Excess Crude Account (ECA) that became handy as a fiscal buffer for the economy, the consequences of total dependence on oil earnings would have been devastating. The upside of the oil sector notwithstanding, the emphasis of the sector at the expense of other critical sectors of the Nigerian economy has been blamed for the abysmal performance and retarded growth of other sectors of the economy notably manufacturing and agriculture (Obo, 1998; Fearon, 2005; Ehwarieme, 1999; DFID, 1999, 2001). Before the advent of the discovery of crude oil in commercial quantity in the country, agriculture was the major source of foreign exchange. The groundnut pyramids of the Northern region, cocoa farms of the Western region and palm plantations of Eastern Nigeria were the major sources of foreign exchange that sustained these respective regions (Taiwo, 1999; Vincent, 2001; Teriba, 1999; Sala-Martin and Subramanian, 2013).

The story of Malaysian farmers learning the rudiments of palm cultivation in Nigeria but now exporting palm produce to Nigeria underscores the neglect that Agriculture has suffered. It is unfortunate that Malaysia, a nation which got its seedlings of palm production from Nigeria has become the envy of the world in palm produce exports. Records have it that Malaysia for now is the world's largest producer of oil palm and the commodity is currently the country's leading agricultural export. Nigeria is still a net importer of food, including staples, despite having about 75 % arable land of which over 50 % is not cultivated, primarily due to the neglect and the non-challant attitude the populace has given to the sector (World Bank, 2005, 2006).

The manufacturing sector has neither fared better since Nigeria joined the 'elite league' of petro-dollar countries. The sector has been performing sub-optimally in spite of the preponderance of incentive packages and government policies geared towards growing it. Several studies have established a correlation between the decline in manufacturing and the discovery of crude oil in the country since the late 1950s (Ekundare, 1973, Danjuma, 1994, Mbanefoh, 1997, Obi, 1998; Colier et al, 2003; Emmanuel, 2004, Ramey and Ramey, 2005). It has been argued that the manufacturing sector has been ensnarled by the infamous resource curse or Dutch disease with attendant under-capacity utilization (Gravin and Hausmann, 1998; Goodhand, 2003; DFID, 2001, 2003). The oil sector has not broadened the productive base of the economy and has not alleviated the unemployment situation in the country because it is not a labour-intensive industry. Furthermore,

the oil sector has not contributed much to alleviating unemployment in the country because of the inefficiency and lack of transparency that has characterized its operations over the years. For instance, the various by-products that comes from processing the crude which ordinarly should have served as input for other industries is not accounted for. This is not unconnected with the fact that the refining process most times takes place beyond the shores of this country, hence no proper accountability is rendered. Although Nigeria's export trade is still tilted in favour of crude oil, recent trade figures indicate improvement in non-oil exports.

The 12-member OPEC cartel cited on-going bottlenecks and challenges to the world economic recovery, especially in Europe, as posing considerable uncertainties for product demand. In March 2014, OPEC, which produces more than one in three barrels of global crude oil consumption each day reduced its overall demand numbers for crude oil by 10,000bpd. In a similar vein, the International Energy Agency (IEA) and the US Energy Informational Administration (EIA, 2013) have also reduced their forecasts for global oil demand for a third consecutive month, predicting the weakest consumption in Europe in almost three decades. The IEA cut its estimate by 45,000bpd, hoping that world crude oil consumption will increase by a subdued 795,000 barrels a day, or 0.9 % to 90.58 million barrels a day in 2014. On its part, the US Energy Information Administration (EIA) cuts its world oil demand forecast for 2014 by 50,000 bpd to 960,000 bpd.

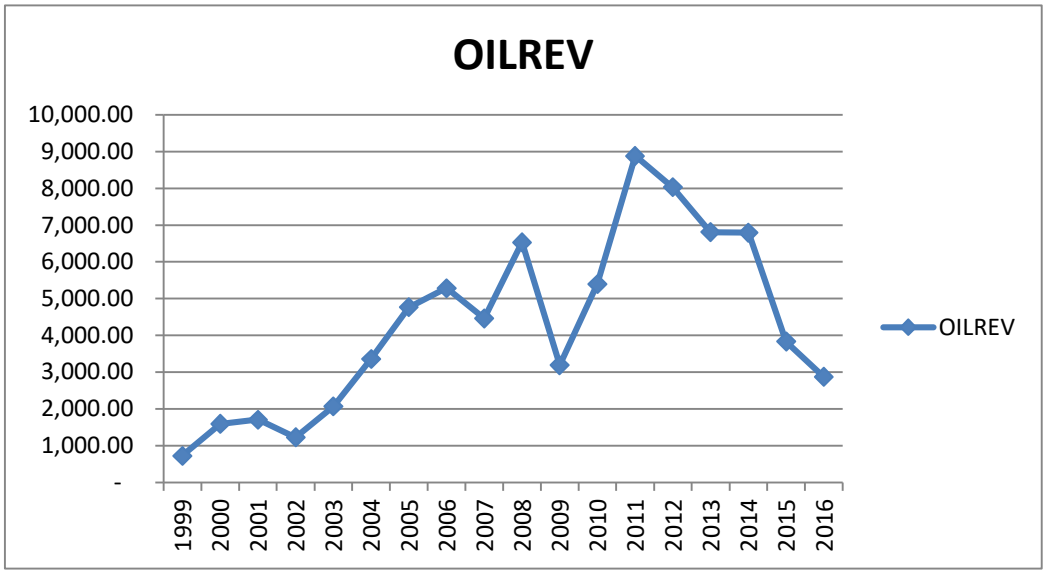
The reduction in forecast for oil demand for 2014 is a worrisome development for Nigeria. Nigeria's crude oil production has declined consistently since December 2013 and was 1,940 bpd in April 2013 according to OPEC data, less than 2.53 mbpd estimated in the 2014 federal government budget. Although crude oil price is still well above the $79 per barrel budget benchmark, continuous weaker-than-expected crude oil demand could culminate in sharp decline in price. If this pessimistic scenario crystallizes, implementation of the 2014 budget will be in serious jeopardy with far reaching implication for the budget of the three tiers of government in Nigeria which depends largely on proceeds from the Federation Account.

Furthermore, to reinforce our call for quick diversification of the Nigerian economy away from oil, it is important to review emerging threats arising from impending paradigm shifts in energy policies of two of the world most strongest and largest economies-the United States and China. Indeed, development in energy policies of these two giants is of strategic importance to Nigeria as discountenancing them is to our peril as a nation because of the large volume of crude oil consumption these two nations take. The United States was until recently the largest importer of the country's crude oil- a position that China has currently taken. Therefore, any major shift in energy consumption by any of these countries could have catastrophic economic consequences for Nigeria and other oil producing countries in the continent and beyond.

5. Oil Price Shocks and Economic Activity: Exporting countries Vs Importing Countries

Changes in oil price affect different countries differently, depending on whether the country in question is an exporter of crude oil or an importer. For an importer or a consumer nation, rise in price of oil, an input of production, raises the cost of production, and hence can lead to (cost-push) inflation, lower economic growth, and even lead to recession (Sauter and Awerbuch, 2003; Barsky and Kilian, 2004; Mordi and Adebiyi, 2010 cited in Alley, et al 2014). This was the case in the US between 1948 and 1981 (Hamilton, 1983). On the other hand, rise in oil price is beneficial to oil

exporting countries as export receipt from a given quantity of oil increases (Deaton, 1999). On the other hand, decline in oil price may hurt them in terms of decline in foreign revenue, economic recession, and sometimes political instability (Zhang, Lai Wang, 2007). Are oil-exporting countries excluded from negative effects of oil price rise? It is evident that countries may benefit from additional income from commodity price booms; yet, the benefit may be limited due to the Dutch Disease Syndrome plague. Besides, removal of subsidies on petroleum products by many governments in net oil-exporting countries in pursuit of market-based efficiency is tying domestic prices of petroleum products to international crude oil prices (Baig et al, 2007). This implies that oil price rise / shocks filters into their economies via domestic fuel prices. Thus, their economies may also be affected by oil price increase in a fashion similar to that of net oil importers. Oil price rise is costly for an oil-importing economy like Nigeria as price decline does not significantly improve the economy; whereas, oil price rise negatively impacts on the economy (Sauter and Awerbuch, 2003). This asymmetry is due to constraints placed on firms' adjustment to oil price shocks by resource reallocation effect. When oil price rises, sectors that use oil-intensive production processes incur more cost in production hence decline in output and job loss while sectors that are less dependent on oil relatively expand. The engendered reallocation of resources, coupled with market imperfection constrains reverse adjustment when oil price falls. Factors of production do not readily move between sectors, despite falling oil price and declining costs of production; and consequent expansion in the energy-intensive sector. The sector could thus not fully expand in response to a unit fall in oil price - as much as they shrank when oil price had risen by a unit. This shows that oil price changes (rise and fall in price) lead to overall output loss for oil-importing countries (Jimenez-Rodriquez and Sanchez, 2003). Oil price movements are not beneficial to exporting countries either, due to similar asymmetric effect. Effects similar to those faced by oil importing replicate themselves in oil-exporting countries given transmission of international price movement into domestic market (Baig et al, 2007). Price shocks are even worse when considered in the light of uncertainty effect on consumption and investment expenditures, and ultimately, the consequential output loss.



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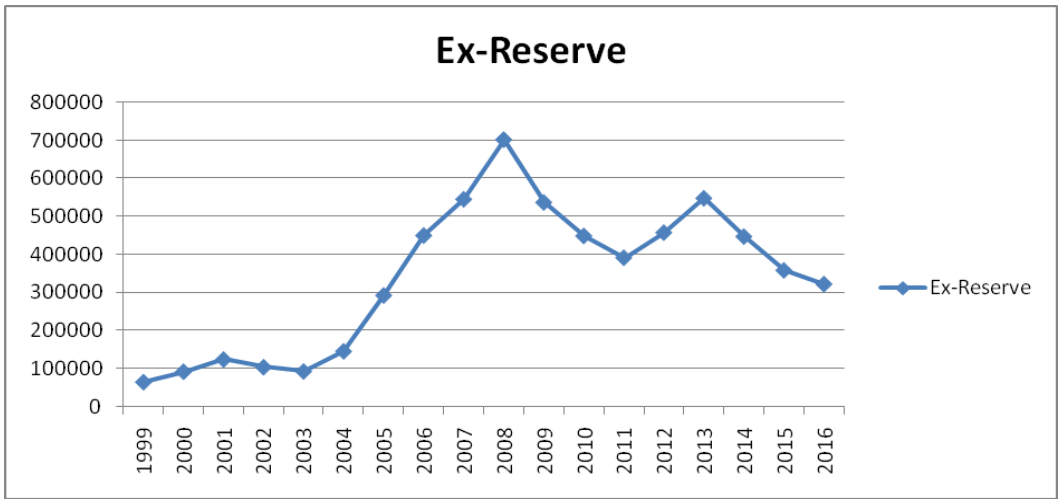

Source: Author's computation Ms-Excel 2007

6. The Dutch Disease Syndrome

One of the impacts of oil price shocks on economic growth and performance of an oil exporting country like Nigeria is the Dutch Disease Syndrome. Windfalls from sharp surge in oil price cannot sweep through a developing economy that is yet to be diversified and large enough to absorb the inflow without causing inflation. Resource pull effect and spending effect result when large inflow from oil export hits a less diversified economy (Mieiro and Ramos, 2010 cited in Alley, et al 2008). The booming export sector (trading internationally) experiences rise in marginal productivity and thus pay factors employed relatively more than other sectors do. As a result, factor inputs/resources are pulled to the booming sector (oil/export sector) at the expense of other tradable sectors (agriculture and manufacturing) and the non-tradable sector. This results in direct de-industrialization of the economy.

7. Empirical Review

Apere & Eniekezimene (2016) conducted a research on Crude Oil Price Fluctuation and the Nigerian Economy using VAR approach between 1981–2013. Based on the empirical results and the review of literature the study concludes that Crude Oil Price has remarkable effects on the Nigerian Economy; a negative relationship exists between crude oil price fluctuations and the Nigerian economic growth and that exchange rate has a significant impact on both oil prices and economic growth. The study recommends that: diversification of Nigerian economy, prudent government spending and proper investment of excess crude oil funds can put the economy on a better path to economic growth and development.

Adamu (2015) studied the impact of Global Fall in Oil Prices on the Nigerian Crude Oil Revenue and its Prices. The study is historical in nature, where secondary data were collected from the use of statistical records maintained by the Nigerian National Petroleum Corporation (NNPC) and Central Bank of Nigeria (CBN) between 2007 to 2009, the data were analyzed using T-test, which was used to determine whether significant difference exist between oil revenue generated by Nigeria prior to the fall and during the fall of crude oil price in the global market. The finding revealed that the global fall in oil prices has a significant impact on the crude oil revenue and prices in Nigeria and recommended amongst others that the revenue and foreign exchange contributed by

the oil industry should be channelled towards the growth and development of other sectors of the economy so that the danger faced by the country because of the total overdependence on oil would be reduced.

Odularu (2008) analysed the relationship between crude oil sector and the Nigerian economic performance between 1970 to 2005. Using the Ordinary Least Square regression method, the study reveals that crude oil consumption and export have contributed to the improvement of the Nigerian economy. However, one of the recommendations of the study is that government should implement policies that would encourage the private sector to participate actively in the crude oil sector for maximum gain.

Jin (2008), in a comparative analysis, discovered that oil price increases, exert a negative effects on economic growth in Japan and China and a positive effect on Russia. Specifically, a 10 percent increase in international oil prices is associated with a 5.16 percent growth in Russian GDP and a 1.07 percent decrease in Japanese GDP.

Akpan (2007) analyses the dynamic relationship between oil price shocks and major macroeconomic variables in Nigeria. Using annual time series data from 1970 - 2007 the study employed a VAR approach and points out the asymmetric effects of oil price shocks. For instance, positive as well as negative oil price shocks significantly increase inflation and also directly increases real national income through higher export earnings, though part of this gain is seen to be offset by losses from lower demand for exports generally due to the economic recession suffered by trading partners. The findings of the study show a strong positive relationship between positive oil price changes and real government expenditures.

Ayadi et al. (2000) studied the effects of oil production shocks on Nigeria, as a net exporter of oil for the period 1975-1992 using the VAR approach, and found that output respond positively to positive oil production shock, while inflation response was negative after a positive oil production shock to the extent that an oil price increase leads to an oil production increase. The authors' results thus suggest that as output increases; inflation decreases and the national currency depreciate following a positive oil-price shock in Nigeria.

8. THEORETICAL FRAMEWORK

Dominant theories of economic growth have suggested that significant relationship exist between national income and economic growth. That is, when income is invested in an economy, it results in the growth of that economy. For example, Harrod (1939) and Domar (1946) models state that growth is directly related to savings (unspent income). Similarly Yakubu (2008) suggests that income from a nation's natural resources (e.g. petroleum) has a positive influence on economic growth and development. Contrary to this opinion expressed above, other studies on this subject matter found that natural resources income influences growth negatively. That is, an increase in income from natural resources does not necessarily result in an increase in economic growth. For example, Sachs and Warner (1997) using a sample of 95 developing countries that included Indonesia, Venezuela, Malaysia, Ivory Coast and Nigeria, found that countries that have a high ratio of natural resource exports to GDP appears to have shown slower economic growth than countries with low ratio of natural resource export to GDP. Similarly, Collier and Hoeffler (2002), is of the opinion that increase in natural resources income does not result in increase in economic

growth. This is so because they found that 23.0 per cent of countries that are dependent on oil exports are likely to experience civil war in any five-year period compared to 0.6 percent for countries without natural resources. During each of these periods, there was no economic growth. Yakub, (2008) also supports the argument that increase natural resources income does not result in increases in economic growth but result in vicious development cycle (i.e. violent and adverse development).

According to him, increase in natural resources income encourages rent-seeking in the economy whereby all economic units, whether public and private, domestic and foreign have overwhelming incentives to seek links with the state in order to share in the resource pie. This incentive for rent-seeking penalizes productive activities, distorts the entire economy and hinders economic growth. In theory, proponent of oil-led development (for example Yakubu (2008) and Hoffman (1999)) believes that countries lucky enough to have petroleum, can base their development on this resource. They point to the potential benefits of enhanced economic growth and the creation of jobs, increased government revenues to finance poverty alleviation, the transfer of technology, the improvement of infrastructure and the encouragement of related industries. But the experience of almost all oil-exporting countries to date, especially Nigeria illustrates few of these benefits (Terry, 2000). To say the least, Nafziger (1984) says that Nigeria's case is increasingly degenerating to a state of chaos as petroleum income is brazenly mismanaged while the basic national institutions such as electricity, energy, road, transportation, political, financial systems, and investment environment have been decreasing and inefficient in Nigeria, the infrastructure is still poor; talent is scarce. Poverty, famine, and disease afflict many nations, including Nigeria (Chironga, et al, 2011). It is evident from the opinions expressed in the foregoing theories that petroleum income can cause a shock or an increase or a decrease in economic growth and development of a nation, depending on the type of theory, policy and practical implementation the government in power adopts, this is an assertion this study hopes to test in the preceding sections.

9. METHODOLOGY

9.1. Variables and Sources

To undertake this study, a number of variables have been captured in the model. These variables are: Economic Growth (proxied by Gross Domestic Product (GDP)), Oil Revenue (Oil-Rev) (proxy for Oil price fluctuation), External Reserves (Ex-RSV), Total Government Expenditure (TGEXP) and Exchange Rate (EXCR) respectively. The data used for this study is mainly secondary data sourced from the Central Bank of Nigeria Statistical Bulletin and World Bank database.

9.2. Method and Data Analysis

In any econometric research, pre-testing for stationarity among time series data is a necessity. To empirically examine the Impact of Fluctuating Oil Revenue and the Performance of the Nigerian Economy, the study adopts diagnostic tests to ascertain the stationary properties of the series in the model since most time series are prone to unit root problem(s). Therefore, before carrying out cointegration test and ECM analysis, the unit root test is conducted on the series using Augmented Dickey-Fuller(ADF) and Philips Perron test. This enables us test for stationarity of the variables included in the model. Vector Autoregressive (VAR) (Impulse response functions and Variance Decompositions) is also employed. This is because the vital information contain in cointegrating

variables is made clearer through variance decomposition and impulse response analysis. Also, multivariate granger causality test (block exogeneity test) is conducted through the Vector Autoregressive (VAR) technique. The rational for this test is to determine how the variables enter the model. It enables us know how granger causality runs from these variables to economic growth. It is in fulfillment of the above techniques that the following models have been designed.

9.3. Model Specification

VAR Equation

This research used time series technique of econometric simulations for its analysis and employed the VAR method of estimation. Vector Autoregressive Model was developed by Sims (1980) in response to the problem of simultaneity among variables in a system. Following Sims (1980) seminal paper, the vector autoregressive (VAR) model has become one of the leading approaches employed in the analysis of dynamic economic interaction (Adrangi and Allender, 1998, and Palm, 1983), especially in investigations of the oil price fluctuation and its macroeconomic relationship.

This research follows suit by employing the VAR model to examine the short and long-run impact of oil price fluctuation on the Nigerian economy. The VAR approach is founded on Granger's (1969) specification of causality. Causality in Granger's sense is inferred when values of variables say (X_t), has explanatory power in a regression of Y_t on lagged values of X_t and Y_t. Though this study employs the use of Vector Error Correction Model (VECM), the VAR model which is the platform upon which the ECM model is built is hereunder specified as follows:

$$\Delta RGDP_t = \alpha_0 + a_i\Delta Oil\text{-}Rev_{t-1} + a_2\Delta Ex\text{-}RSV_{t-1} + a_3\Delta TGEXP_{t-1} + a_4\Delta EXCR_{t-1} + \mu_{t1} \quad \text{.... (equ. 1)}$$

$$\Delta Oil\text{-}Rev_t = \beta_0 + a_i\Delta Ex\text{-}RSV_{t-1} + a_2\Delta TGEXP_{t-1} + a_3\Delta EXCR_{t-1} + a_4\Delta RGDP_{t-1} + \mu_{t2} \quad \text{.... (equ. 2)}$$

$$\Delta Ex\text{-}RSV_t = \alpha_0 + a_i\Delta TGEXP_{t-1} + a_2\Delta EXCR_{t-1} + a_3\Delta RGDP_{t-1} + a_4\Delta Oil\text{-}Rev_{t-1} + \mu_{t3} \quad \text{.... (equ. 3)}$$

$$\Delta TGEXP_t = \beta_0 + a_i\Delta EXCR_{t-1} + a_2\Delta RGDP_{t-1} + a_3\Delta Oil\text{-}Rev_{t-1} + a_4\Delta Ex\text{-}RSV_{t-1} + \mu_{t4} \quad \text{.... (equ. 4)}$$

$$\Delta EXCR_t = \alpha_0 + a_i\Delta RGDP_{t-1} + a_2\Delta Oil\text{-}Rev_{t-1} + a_3\Delta Ex\text{-}RSV_{t-1} + a_4\Delta TGEXP_{t-1} + \mu_{t5} \quad \text{.... (equ. 5)}$$

Where α0 and α1, βo and ßi are coefficients and μt is the residual and □ is the operator for change.

9.4. Vector Error Correction Model

Since the evaluation considered both the short-run and long-run simultaneously, the econometric methodology of the Vector Error Correction Mechanism (VECM) was employed. In order to undertake the empirical analysis using the VECM technique, the variables involved in the model must be stationary, integrated of the same order and as well cointegrated. Thus, both the Augmented Dickey-Fuller (ADF) (Dickey & Fuller, 1979, 1981) and Phillips-Perron (PP) (1988) unit root tests were utilized to test for the order of integration of the variables. VECM is a dynamic system with the characteristics that the deviation of the current state from its longrun relationship will be fed into its shortun dynamics. Error Correction Models are a category of multiple time series models that directly estimate the speed at which a dependent variable 'Y' returns to equilibrium after a change in an independent variable 'X'. ECMs are a theoretically driven approach useful for estimating both short term and long term effects of one time series on another. ECMs are useful model when dealing with cointegrated data but can also be used with stationary data.

It should be noted that we can determine the long run and short run causality from the VECM. If φ is statistically significant and different from zero, it implies the existence of long run causality. Therefore, we can estimate both unrestricted VAR and VECM to obtain long-run and short-run causal relationships respectively in addition to other useful diagnostics. From the discussion above, if cointegration is established then, RGDP, Oil-Rev, Ex-RSV, TGEXP and EXCR may be considered to be generated by error correction models of the form:

$$\Delta RGDP_t = \alpha_1 + \sum_{i=1}^{p=5} a_i \Delta \text{Oil-Rev}_{t-i} + \sum_{i=1}^{p=5} \beta_j \Delta \text{Ex-RSV}_{t-j} + \sum_{k=1}^{p=5} \gamma_k \Delta TGEXP_{t-k} + \sum_{i=1}^{p=5} \beta_j \Delta EXCR_{t-j} + \varphi_1 ECM_{1t-1} + e_{1t} \quad \text{(eq.6)}$$

$$\Delta \text{Oil-Rev}_t = \alpha_1 + \sum_{i=1}^{p=5} a_i \Delta \text{Ex-RSV}_{t-i} + \sum_{i=1}^{p=5} \beta_j \Delta TGEXP_{t-j} + \sum_{k=1}^{p=5} \gamma_k \Delta EXCR_{t-k} + \sum_{i=1}^{p=5} \beta_j \Delta RGDP_{t-j} + \varphi_1 ECM_{2t-1} + e_{2t} \quad \text{(eq.7)}$$

$$\Delta \text{Ex-RSV}_t = \alpha_1 + \sum_{i=1}^{p=5} a_i \Delta TGEXP_{t-i} + \sum_{i=1}^{p=5} \beta_j \Delta EXCR_{t-j} + \sum_{k=1}^{p=5} \gamma_k \Delta RGDP_{t-k} + \sum_{i=1}^{p=5} \beta_j \Delta \text{Oil-Rev}_{t-j} + \varphi_1 ECM_{3t-1} + e_{3t} \quad \text{(eq.8)}$$

$$\Delta TGEXP_t = \alpha_1 + \sum_{i=1}^{p=5} a_i \Delta EXCR_{t-i} + \sum_{i=1}^{p=5} \beta_j \Delta RGDP_{t-j} + \sum_{k=1}^{p=5} \gamma_k \Delta \text{Oil-Rev}_{t-k} + \sum_{i=1}^{p=5} \beta_j \Delta \text{Ex-RSV}_{t-j} + \varphi_1 ECM_{4t-1} + e_{4t} \quad \text{(eq.9)}$$

$$\Delta EXCR_t = \alpha_1 + \sum_{i=1}^{p=5} a_i \Delta RGDP_{t-i} + \sum_{i=1}^{p=5} \beta_j \Delta \text{Oil-Rev}_{t-j} + \sum_{k=1}^{p=5} \gamma_k \Delta \text{Ex-RSV}_{t-k} + \sum_{i=1}^{p=5} \beta_j \Delta TGEXP_{t-j} + \varphi_1 ECM_{5t-1} + e_{5t} \quad \text{(eq.10)}$$

Whereas:
Δ = Difference operator
α = Constant term
φ = Speed or rate of adjustment
p = optimal lag length
ECM_{1t-1}, ECM_{2t-1}, ECM_{3t-1}, ECM_{4t-1} and ECM_{5t-1} are the error correction terms respectively, while e_{1t}, e_{2t}, e_{3t}, e_{4t}, and e_{5t}, = are error terms which are identically and independently normally distributed with mean zero and constant variance, β and γ are the error correction coefficients and are expected to capture the adjustment of ΔRGDP, ΔOil-Rev, ΔEx-RSV, ΔTGEXP and ΔEXCR towards long run equilibrium, while $\Delta RGDP_{t-1}$, $\Delta \text{Oil-Rev}_{t-1}$, $\Delta \text{Ex-RSV}_{t-1}$, $\Delta TGEXP_{t-1}$ and $\Delta EXCR_{t-1}$ are expected to capture the short run dynamics of the model..

10. Empirical Results

10.1. ADF and Phillips–Perron (PP) Unit Roots Tests

The Augmented Dickey Fuller (ADF) and the Phillips Perron (PP) tests of stationarity will be employed to determine the underlying properties of the time series data, that is, whether the variables of interest have unit root or not. The unit root test below reveals the result of stationarity for Real Gross Domestic Product (RGDP), Oil Revenue (Oil_Rev), External Reserve (Ex-RSV), Total Government Expenditure (TGEXP) and Exchange Rate (EXCR). Below are the tabulated results:

Table 1: Augmented Dickey Fuller and Philip-Perron Unit Root Test with Intercept

Variable		Level t-statistic value	1st Difference t-statistic value	5% Critical Value	Order of Integration
Log(RGDP)	*ADF*	No stationarity	-4.531945	-3.828975	I(1)
	P-P	No stationarity	-4.151377	-3.065585	I(1)
Log(Oil-Rev)	*ADF*	No stationarity	-4.656406	-3.733200	I(1)
	P-P	No stationarity	-1.922597	-1.605603	I(1)
Log(Ex-RSV)	*ADF*	No stationarity	-2.150462	-1.964418	I(1)
	P-P	No stationarity	-2.250870	-1.964418	I(1)
Log(TGEXP)	*ADF*	No stationarity	-7.800206	-3.733200	I(1)
	P-P	No stationarity	-3.458551	1.964418	I(1)
Log(EXCR)	*ADF*	No stationarity	-2.284029	-1.964418	I(1)
	P-P	No stationarity	-2.284029	1.964418	I(1)

Source: Author's computation from E-views 8.0

Table 1 above shows the results of unit root test using both Augmented Dickey-Fuller (ADF) and Phillips-Perron (P-P) at level and first difference. The unit root test indicates that all the variables are integrated of order one I(1) i.e. first difference stationary. A variable is assumed to be stationary (has no unit root problem), if the critical value in absolute term is less than test statistic. After ascertaining the stationarity properties of the variables in the model, their long run relationship will be determined through Johansen Cointegration test.

Table 2: VAR Lag Length Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1100.467	NA	2.09e+50	130.0550	130.3000	130.0793
1	-1017.293	107.6369*	2.61e+47*	123.2110*	124.6813*	123.3571*

** indicates lag order selected by the criterion*

The result of the VAR lag order selection indicates that the maximum lag length is 1 using both AIC, SIC, FPE and HQ information criteria. Based on this result, the optimum lag length is 1 (k=1).

10.2. Cointegration Test

A cointegration test is one sure way of establishing the presence or absence of a long-run relationship among series in a model. Economically speaking, two or more variables will be cointegrated if they have a long-run or an equilibrium relationship between or among them (Gujarati, 2004:822). That is, if they can walk together for a long time without deviating from an established path. The Johansen (1991) likelihood ratio test statistics, the trace and maximal eigenvalue test statistics, will be utilized to determine the number of cointegrating vectors since all the variables are I(1). The variables considered include real gross domestic product (RGDP), oil revenue (proxy for oil price fluctuation) (Oil-Rev), external reserve (Ex-RSV), total government expenditure (TGEXP) and exchange rate (EXCR).

Table 3a: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.999999	290.4911	69.81889	0.0001
At most 1 *	0.889709	68.90765	47.85613	0.0002
At most 2 *	0.738242	33.63356	29.79707	0.0172
At most 3	0.531968	12.18821	15.49471	0.1481
At most 4	0.002542	0.040729	3.841466	0.8400

Source: Author's computation using E-views 8.0

Table 3b: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.999999	221.5835	33.87687	0.0001
At most 1 *	0.889709	35.27409	27.58434	0.0042
At most 2 *	0.738242	21.44535	21.13162	0.0452
At most 3	0.531968	12.14748	14.26460	0.1052
At most 4	0.002542	0.040729	3.841466	0.8400

Source: Author's computation using E-views 8.0

The above illustrate Johansen's co-integration test under both trace and maximal eigenvalue. The trace and maximum eigenvalue test indicates three co-integrating relationship thus revealing the presence of a unique longrun economic relationship among the variables RGDP, Oil-Rev, Ex-RSV, TGEXP and EXCR within the study period. Since there is at least one co-integrating vector, an economic interpretation of the relationship between real gross domestic product and the independent variables can be obtained by normalizing the estimates of the unconstrained co-integrating vector.

Panel 1: Normalizing the Estimates of the Unconstrained Co-integrating Vector.

RGDP =1.0000 **- 2.04E+10**(Oil-Rev) + **1.17E+08**(Ex-RSV)+ **2.63E+10**(TGEXP) + **4.33E+11**(EXCR)

(7035650) (61216.0) (1.4E+07) (6.3E+08)

Note: Standard errors are in parenthesis

An economic interpretation of the long-run function of the model is obtained by normalizing the estimates of the unconstrained cointegrating vector on the real GDP. The parameters (i.e., long-run estimates) of the cointegrating vector for the long-run equation are presented in Panel 1. The results in Panel 1 above show a negative and statistically significant relationship between RGDP and oil revenue (proxy for oil price fluctuation). This is not consistent with economic theories of a positive relationship, all things being equal. The result reveals that in the longrun there is a statistically significant positive link between economic growth (proxy for real gross domestic product), external reserve, total government expenditure and exchange rate. From the equation (RGDP)=∫ (Oil-Rev, Ex-RSV, TGEXP, EXCR) above, the RGDP coefficient of 1.00000 indicates that the level of

economic growth (RGDP) in Nigeria is 1 when other variables are zero. This shows that a unit increase in external reserve (Ex-RSV), total government expenditure (TGEXP) and exchange rate (EXCR) on average will lead to increase of 1.17E+08, 2.63E+10 and and 4.33E+11 in RGDP respectively, while the coefficient of oil revenue (proxy for oil price fluctuation) appeared negative, implying that a unit increase in oil revenue (Oil_Rev) would lead to a decrease of 2.04E+10 in real gross domestic product (economic growth) of Nigeria. The negative contribution from oil export earnings to economic growth is a confirmation of the fact that over the years, oil revenue earnings has displayed adverse effects on the growth prospects of the Nigerian economy, due primarily to fluctuations (ups and downs) movement in prices of the commodity.

10.3. Error Correction Mechanism

In the short-run, deviations from the long-run relationship established in table 3 could occur due to shocks to any of the variables. In addition, the dynamics governing the short-run behavior of the model are different from those in the long-run. Due to this difference, the short-run interactions and the adjustments to long-run equilibrium are important because of the policy implications. The error-correction model arises from the long-run co-integration relationship. To check for the speed of adjustment of the model from the short run to the long run equilibrium state, then 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 the parsimonious regression output for the ECM result.

Table 4: Parsimonious Regression Output with ECM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECM(-1)	-0.579748	0.447736	-1.294844	0.2245

Source: Author's computation using E-views 8.0

The estimated coefficient of the ECM term which is also the speed of adjustment to equilibrium is negative as required by economic theory. Judging from the parsimonious result above, the ECM coefficient -0.579748 is rightly signed but not statistically significant at 5% level of significance. The coefficient of -0.579748 indicates that about 58% of the disequilibrium or distortion in the Nigerian economy is yearly being corrected for. This suggests that the present value in RGDP adjusts rapidly to previous changes in Oil-Rev, Ex-RSV, TGEXP and EXCR.

10.4. Granger Causality / Block Exogeneity Test

The existence of cointegration relationships indicates that there are long-run relationships among the variables, and therefore Granger causality among them in at least one direction.

Table 5: Block Exogeneity Test

Description	Decision	Prob. Value
Oil_Rev Does not Granger Cause RGDP	Reject	0.0767
Oil_Rev Does not Granger Cause Ex-RSV	Reject	0.0083
TGEXP Does not Granger Cause Ex-RSV	Reject	0.0266
Oil_Rev Does not Granger Cause TGEXP	Reject	0.0037
Ex_RSV Does not Granger Cause TGEXP	Reject	0.0450
EXCR Does not Granger Cause TGEXP	Reject	0.0599
Oil_Rev Does not Granger Cause EXCR	Reject	0.0911

Source: Author's computation using E-views 8.0

The result in the first section of the table shows unidirectional causality running from Oil Revenue to Real Gross Domestic Product (economic growth) at the 10% significant level. This reveals the truism that during the years under reference, proceeds from oil export were mainly responsible for the level of astronomical growth recorded in the economy. It was during this time that the Nigerian economy was rated top as the biggest economy on the continent. Conversely, a reverse trend in oil revenue has the potential of whittling down growth in the economy as seen recently in the negative growth in GDP which eventually plunged the nation into an economic recession.

In the second section of the table, there appears not to be any variable that is causing oil revenue in Nigeria. However, the third section still reveals a unidirectional causality from oil revenue to external reserve at 1% significant level. The implication of this result is that, oil revenue fluctuation whether up or down causes a rise or decline in the nation's foreign reserves. Similarly, it is also revealed that, government expenditure (TGEXP) granger causes external reserve at 1% significant level. This outcome is instructive as often times government in a quest to finance its capital projects draws from its external reserves thus depleting it. Empirical evidence shows that oil revenue is causing government expenditure in Nigeria. This implies that proceeds from oil revenue goes into funding government expenditure and vice-versa. Other results show that Ex_RSV granger causes TGEXP, EXCR granger causes TGEXP and Oil_Rev granger causes EXCR respectively. Major findings from these results is that oil revenue (proxy for oil price fluctuation) has a strong effect on other macroeconomic variables in an economy like Nigeria that is 80% dependent on proceeds from oil export to sustain the economy.

10.5. Impulse Response Functions (IRF) Test Results

Impulse response functions (IRF) allow us to study the dynamic effects of a particular variable's shock on the other variable(s) that are included in the same model. Besides, we can examine the dynamic behaviour of the times series over ten-year forecast horizon. The response of oil revenue (Oil_Rev) to the shock in real gross domestic product was positive in the first quarter but became negative from second quarter to fourth quarter. It remained positive till the ninth quarter when it became negative again. The response of oil revenue to the shocks in itself was positive in both the first and second quarters but became negative from third to sixth quarter horizon before becoming positive again from seventh quarter to ninth quarter horizon.

The response of oil revenue to a shock in external reserve was positive in the first quarter but infinitesimal and up to the third. From seventh to tenth it remained positive. The response of oil revenue to shock in total government expenditure was negative in fifth and sixth quarter but

became positive in the remaining quarter horizons. Similarly, the response of oil revenue to shock in exchange rate was negative in the sixth and seven quarter but remained positive in the remaining quarter horizons.

Table 6: Impulse-Response Functions for Oil Revenue

Period	RGDP	OIL_REV	EX_RSV	TGEXP	EXCR
1	614.5416	1677.417	0.000000	0.000000	0.000000
2	-653.9580	727.6343	100.2886	431.6810	285.1228
3	-855.5539	-657.4520	14.24388	466.9138	368.8800
4	-215.5247	-1257.111	-99.19587	222.3677	219.7137
5	481.6023	-874.4168	-117.6611	-18.51708	16.27192
6	699.7158	-109.6268	-41.77686	-82.49431	-72.75109
7	456.8093	378.7661	49.39399	7.490853	-17.70472
8	98.86822	374.6458	87.72186	125.6161	97.22431
9	-80.54393	88.27529	64.36443	175.6858	175.5837
10	-32.68860	-162.5407	15.91515	149.3737	181.6883

Source: Author's computation using E-views

10.6. Decomposition of Variance Analysis

The variance decomposition for 1-year to 10-year forecast horizons will be applied in this study. The Variance Decomposition concerns to the extent to which variables are dependent on each other, and it provides information about the relative importance of each random innovation in affecting the variables in the model during the forecast horizon. In other words, the variance decomposition indicates the amount of information each variable contributes to the other variables in the autoregression. It determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables. Under variance analysis, the sensitivity of the variables are considered. In doing this we employ a ten year forecasting time horizon and observed the relevance of the variable over time horizon. However, only variance decomposition of oil revenue (Oil_Rev).

Table 7: Variance Decomposition for Oil revenue

Period	S.E.	RGDP	OIL_REV	EX_RSV	TGEXP	EXCR
1	3.18E+12	11.83376	88.16624	0.000000	0.000000	0.000000
2	4.11E+12	18.19443	75.53153	0.227233	4.210121	1.836676
3	4.51E+12	25.85992	63.50902	0.172602	6.801972	3.656491
4	4.75E+12	20.62426	69.74503	0.261758	5.909648	3.459306
5	5.03E+12	20.89388	70.42954	0.390615	5.226066	3.059898
6	5.33E+12	25.04251	66.61638	0.387702	5.007359	2.946054
7	5.58E+12	26.29545	65.64373	0.398828	4.822039	2.839955
8	5.76E+12	25.90173	65.85096	0.470311	4.893390	2.883612
9	5.91E+12	25.75652	65.39323	0.508647	5.167678	3.173925
10	6.04E+12	25.55135	65.11161	0.506939	5.349575	3.480529

Source: Author's computation using E-views 8.0

Table above gives the fraction of the forecast error variance for each variable that is attributed to its own innovation and to innovations in another variable. The own shocks of the oil revenue constitute a significant source of variation in revenue forecast error in the time horizon, ranging from 88% to 65%. Ten years after, variation in oil revenue are accounted by economic growth (25%), exchange rate (3.4%) and government expenditure (5.3%) while that of external reserve (0.50%) is relatively small in Nigeria over the sample period.

10.7. Diagnostic Test

Having presented the results from the empirical analysis, it is also necessary to examine the statistical properties of the estimated model. Diagnostic checks are crucial in this analysis, because if there is a problem in the residuals from the estimation of a model, it is an indication that the model is not efficient, such that parameter estimates from such model may be biased. The model was tested for normality, serial correlation, heteroscedasticity and stability.

Table 8: Residual Diagnostic Tests

Type of Tests	P-Value
VAR Residual Normality Tests	0.3503
VAR Residual Heteroskedasticity Tests	0.2732
VAR Residual Serial Correlation LM Tests	0.3807

The results as presented in Table 6 suggest that the model is well specified. The diagnostics indicates that the residuals are normally distributed, homoskedastic and serially uncorrelated and the parameters appears to be stable. This is attested to by the insignificant probability values. The result of both the CUSUM and CUSUMQ stability test indicates that the model is stable. This is because both the CUSUM and CUSUMQ lines fall in-between the two 5% lines. Having presented the results from the empirical analysis, it is also necessary to examine the statistical properties of the estimated model. Diagnostic checks are crucial in this analysis, because if there is a problem in the residuals from the estimation of a model, it is an indication that the model is not efficient, such that parameter estimates from such model may be biased. The model was tested for normality, serial correlation, heteroscedasticity and stability.

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11. CONCLUDING REMARKS

The Nigerian economy has remained very vulnerable to oil price shocks. In the process the real effective exchange rate falls significantly as the other major world currencies appreciates

dramatically against the naira during these periods of price fluctuations. This is worrisome, a serious threat to economic sustainability and therefore calls for concern by policy-makers. The implication of this finding is that there is a tendency for potential currency crisis after a shock occurs especially when it is a negative shock in the international oil market as result of either occurrences that dictates OPEC output and prices. This depreciation increases the price of imports as the naira become weaken against the dollar. Empirical evidence from granger causality test indicates that oil price shocks has adverse effect on economic growth of Nigeria within the period of study. This adverse effect culminated in the recession still ravaging the country. Again, evidence reveals a unidirectional causality from oil revenue to external reserve at 1% significant level. The implication of this result is that, oil revenue fluctuation whether up or down causes a rise or decline in the nation's foreign reserves. In the same vein, government expenditure granger causes external reserve. This occurs as government in a quest to finance its capital projects sometimes draws from its external reserves thus depleting it

In conclusion, an oil price fluctuation paints an unstable future for the Nigerian economy because macroeconomic variables like employment, interest rate and price stability become victims. Both fiscal and monetary tools are frequently revised to keep the system afloat during price shocks. Nigeria remains a victim of these policy shocks because of overdependence on oil export earnings. In view of the foregoing conclusion, the following are recommended for policy implementation.

a) There is a strong need for policy makers to focus on policy that will strengthen and stabilize the macroeconomic structure of the Nigerian economy with specific focus on alternative sources of government revenue (reduction of dependence on oil proceeds) and reduction in monetization of crude oil receipts (fiscal discipline).

b) Furthermore, the efforts of government in protecting its spending plans from the swings in crude oil revenue, by using the budget benchmark price of oil that is considered to be more realistic and sustainable in the long run than the current market price of oil, are steps in the right direction. The extra revenue that is saved in the excess crude oil account when oil is sold above the budget benchmark price helps to sustain government spending when the price of oil falls below the budget benchmark price and ensures that the revenues on which spending is planned are not subject to the swings in oil prices.

c) The Federal Government should take seriously the issue of a Sovereign Wealth Fund (SWF) as that will provide a vehicle for excess crude oil revenue to be prudently invested and managed to yield returns for sustaining government expenditure in the rainy days. This will, however, require transparency, accountability and sound management of the fund.

d) The government should go a step further in intensifying efforts at diversifying the economy away from overdependence on the oil industry and develop other sources of revenue in order to withstand the storms that arise from negative price fluctuations in crude oil sales..

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