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C.O. Mgbame
(PhD), Department of Accounting, University of Benin, Nigeria.

P.A. Donwa
(PhD), Department of Accounting, University of Benin, Nigeria.

O.V. Onyeokweni
Department of Accounting, University of Benin, Nigeria.

Correspondence
C.O. Mgbame
(PhD), Department of Accounting, University of Benin, Nigeria.

Impact of oil price volatility on Economic growth: Conceptual perspective

C.O. Mgbame, P.A. Donwa, O.V. Onyeokweni

Abstract
This study examines the conceptual impact of oil price volatility on Nigeria economic growth.
The impact of oil price volatility on the economy has occupied the attention of researchers for almost four decades. Majority of studies support the existence of a negative association while other studies suggest otherwise. The methodology used was purely exploratory. It is a library research which entails review of both conceptual and empirical literature which forms the basis for the study's conclusion and recommendations.
Based on the empirical review of various studies carried out by different researchers, this study is in agreement with the works of those scholars which reviews that there is significant (that is positive) relationship between oil price volatility and Nigeria economic growth. This implies that oil price changes determines government expenditure level, rate of inflation, level of unemployment, which in turn determines the growth of the Nigerian economy. Considering the destabilizing effects of oil price fluctuations on economic activity and government spending in Nigeria, the study makes some recommendations which includes that the country should diversify its export revenue base as a means of minimising reliance on crude oil and petroleum product thereby diversifying to agriculture, operations of budgetary, fiscal prudence , corporate governance, encourage savings and proper accountability. This will further protect the economy from the impact of oil price volatility on the economy, and thus prevent the effect of the shocks from attaining a statistical significance level.

Keywords: Volatility, Oil price and Economic growth.

Introduction
One of the most important driving forces of the global economy is the crude oil and changes in the price of this oil will have significant effects on economic growth and the well-being of the population around the world. The urbanization and modernization of the global economy has lead to the increase in the demand for oil because oil is the life blood of the economy (Eryigit, 2009) [12]. As a result of the daily use of oil by everyone, it leads to an increase in the demand for it. To this effect, the oil market has constantly experience change which will always continue to be so, because oil is so vital to the world economy and its market is really universal (El-badri, 2011) as cited in (Ogundipea, Ojeagaa & Ogundipea, 2014). As a commodity, oil has distinctive features which include its exclusive role as both the common natural heritage of a country and the driven force of global economic growth, its deplorability and price volatility nature, its enclave nature, high capital intensity, a resulting boom–bust cycles, technological sophistication, and the extraordinary profits generation which is been accrue to the state and its private players. With these combined factors, it gives rises to what is called ''the paradox of plenty'' or the ''resource curse'' (Karl, 2005).
United Nations (2005) [28] notes that information irregularity among market players is the main source of oil price volatility in the market today; other factors motivating oil price fluctuations include: crude oil inventories, existence of futures exchanges in the market, disagreements on production quotas and members mistrust, weather, short- term political developments, transportation problems (shipping, pipeline etc.), economic growth, problems along the production- consumption chain, and even comments by OPEC members, leaders of oil-producing countries and sometimes alarmist price predictions also contribute to the public's uncertainty regarding future oil prices. Ogiri, Amadi, Uddin and Dulon (2013) [18] opines that the present of large price increases and decreases replicate a considerable rise in the volatility of the real oil price which creates market uncertainties that will prompt companies to defer their investment.
The objective of this paper is to ascertain the effect of oil price volatility on Nigeria economic growth.

Conceptual Literature

Oil price volatility

The term volatility has been given different definitions by different scholars across disciplines. In relation to crude oil price, volatility is the variation in the worth of a variable, especially price (Routledge, 2002) as cited in (Busayo, 2013) [8]. Volatility is the measure of the tendency of oil price to rise or fall sharply within a period of time, such as a day, a month or a year (Ogiri *et al*. 2013) [18]. Lee (1998) as cited in Oriakhi and Osazee (2013) [23] defines volatility as the standard deviation in a given period. She notes that volatility has a negative and significant impact on economic growth instantly, while the impact of oil price changes delays until after a year. She concludes by saying that ―it is volatility/change in crude oil prices rather than oil price level that has a significant influence on economic growth. In a nutshell, volatility is a measurement of the fluctuations (i.e rise and fall) of the price of commodity for example oil price over a period of time.

Several factors have been identified as triggers of oil price volatility; these factors range from demand and supply of crude oil, OPEC decisions, crises, wars to economic downturn. Pirog (2004) [24] opines that the long term explanatory factor leading to increase oil price could be the drop of the world reserve base; factors such as political unrest like that experienced by oil producing countries like Venezuela and Nigeria, OPEC quota system decisions as well as speculative buying and selling all affect prices which encourage financial traders to adjust their investment portfolios to reflect market conditions. Merino and Ortiz (2005) adopt the traditional approach to assessing the tightness of the oil market, they states that the evolution of oil inventories should reflect the interaction between supply and demand forces, which should contribute in explaining oil price changes. The unexpected economic developments could, in standard, shake crude oil markets and increases volatility. The fear of global shortage of crude oil may also account for changes in oil price. As noted by Appenzeller (2004) [6], there have been diverse arguments about how much more of crude oil reserve the world has before the wells dry up. Although, history has it that oil price shocks were mainly caused by physical disruptions of supply, the price run-up of 2007- 2008 was caused by strong demand confronting world production (Hamilton, 2009; Cale, 2004) [15, 10].

Economic Growth

Economic growth is the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP. In economics, "economic growth" or "economic growth theory" typically refers to growth of potential output, i.e., production at full employment (Wikipedia, 2015) [29]. Economic growth is used to denote a steady and gradual change in the long run which comes through a general increase in the rate of saving and population in a dynamic economy. It is an increase in the capacity of an economy to produce goods and services, compared from one period of time to another. It can be measured in nominal terms, which include inflation, or in real terms, which are adjusted for inflation (Investopedia, 2015).

Nigeria Economy

Nigeria has been the largest oil exporting country in Africa which also has a rapid growing economy. She follows a resource based growth strategy driven by the production and exporting of oil. Her primary productive base includes the production of agriculture, crude oil and other hydrocarbons and is said to account for more than 90 per cent of foreign exchange and 75 per cent of employment. In the last six years, Nigeria's economy grew by an average of 7 per cent and her GDP has shown very impressive growth with a growth rate of 7.43 per cent in December 2011 and 6 per cent in 2012. This growth rate makes Nigeria one of the fastest growing economies in the world despite the lack of infrastructure and economic development (Igberaes, 2013) [16] with Nigeria's rapid growth currently becoming stagnant at around 7 per cent and oil prices which continue to be volatile. This volatility has come from international shocks caused by financial crises, strikes, wars and decreased oil production. It is because of this volatility in oil prices and Nigeria's dependence on oil that many economists raise concern about the future of the economy.

According to Englama (2010) [11] the absolute dependence of oil export revenue has made the level of Nigeria economy vulnerability to sudden oil price movements more noticeable. Factors such as periods of favourable oil price volatility triggered by conflict in oil-producing countries of the world, rise in the demand for the commodity by the consuming nations due seasonality factors, trading positions etc; enhance Nigeria favourable terms of trade evidenced by her experiences of large current account surplus and exchange rate appreciation. On the converse, when crude oil prices are low, occasioned by factors such as low demand, seasonality factors, excess supply, the Nigeria experiences unfavourable terms of trade evidenced by budget deficit and slow economic growth (Englama, 2010) [11].

According to official statistics, the Nigerian economy exhibited strong GDP growth over the last decade with an average of over 8%. This implies that the size of the Nigerian economy is 170% times larger today than at the beginning of the decade. Reported growth in the non-oil economy has been even higher, implying that the Nigerian non-oil economy is now 240% times higher than a decade ago. Furthermore, in contrast to the boom-bust cycles of earlier years, Nigeria experienced no general macroeconomic crisis over this period, and the pace of annual GDP growth never fell below6%. Growth in 2012 slowed somewhat relative to the recent past, registering at 6.6% by preliminary estimates, as opposed to 7.4% in 2011. Growth weakened, in particular, in oil, trade, and agriculture. Slower growth in trade and agriculture likely reflects a combination of fallout from the national strike in January, higher energy prices (tariffs), poor weather conditions (flooding), and growing security challenges in some parts of the North. The oil sector comprises 40% of Nigerian GDP at current prices, but growth in oil has been consistently slower than that of the non-oil economy. In fact, oil production (exports) in Nigeria was essentially stagnant in 2011-2012. Growth in oil is expected to remain low over the medium term pending potential investments that could expand production significantly (World Bank, 2013) [31].

Over the last decade, Nigeria has registered consistently high official GDP growth rates and experienced unprecedented momentum in prudent macroeconomic management, economic stability, democracy, and reform. A more prudent fiscal stance since mid-2011 has restored Counter cyclical fiscal policy in the country and helped boost investor confidence in Nigeria. This is reflected in the current balance of payments surplus and reserve accumulation. While Nigeria is currently in an advantageous position for accelerating economic development, the country still faces a number of

major challenges. Despite the high economic growth reported in official statistics, Nigeria has yet to find a formula for translating its resource wealth into significant welfare improvements for the population. With a fiscal reserve still less than US$ 10billion, the macroeconomic picture in Nigeria is also still quite vulnerable to an oil price shock (World Bank, 2013) [31].

According to the National Bureau of Statistics (2015) [25] the Nigerian economy is facing challenges which seem to occur just about every decade: a decline in crude oil prices. As the country is an oil exporter, the decline in crude oil prices is a downside to the economy in both the short and medium term. Yet, given that reserves are also down relative level accumulated over the previous years --as of November 2014, Official Adjusted Reserves according to the Central Bank of Nigeria (CBN) were down roughly 23.1 percent relative to January 2013 to 35.2 billion) -- the fact that Nigeria is also an importer of refined petroleum products means that it could do away subsidy payments on such items. This will bode well for the government coffers. In addition to declining crude prices, the Nigerian economy is faced with other headwinds; as a result of declining crude oil prices, the supply gap in the foreign exchange market is likely to increase as the demand for dollars outpaces supplies, putting pressure on the Nigerian Naira. The crude oil price shocks are likely to have impact businesses. Nevertheless, prioritization of infrastructure such as roads and power are likely to mean that while growth may slow, it is likely to be stable. While growth is expected to peak at 6.79 percent in 2014, the economy is expected to grow by 5.5 percent in 2015, as the non-oil sector of the economy is expected to drive growth. Over the 2015 through 2017 period, growth is expected to average 5.7 percent (National Bureau of Statistics, 2015) [25].

Oil price volatility and Nigeria economic growth

Literature on oil price volatility and its implications on economic growth are quite broad and they continue to expand over the years. Obioma (2006) [17] opines that Nigeria became more exposed to oil price volatility the moment she started importing refined petroleum products due to the failure of her local refineries in the late 1980‘s. Thus, the country could not understand the very large subsidy it committed itself to, so between 1999 and 2010, the Federal Government had adjusted its subsidy on petroleum products back and forth approximately 8 times, also with the recent removal of fuel subsidy on January 1st 2012. This has negatively affected production, consumption, general welfare and hence the pace of economic growth. Oriakhi and Osazee (2013) [23], oil price volatility has been examined to have more direct effect on the exchange rate of the Naira than any other economic variable, this is as a result of the fact that crude oil export earnings accounts for a large part of Nigeria‘s foreign exchange (about 90%) and thus ultimately determines the amount of foreign reserves of the country which is alarmingly low (about $ 30 billion from over $ 60 billion in 2008) and continuously keeps reducing the numbers. Although the impact (either positive or negative) which oil price volatility would have on any economy, depends on what part of the divide such economy falls into and of course the nature of such price change (either rise or fall). However, the Nigerian economy uniquely qualifies as both an oil exporting and importing economy, by reason of the fact that she exports crude oil, but imports refined petroleum products. Therefore making a conclusive and convincing statement on the impact of oil price volatility on the Nigerian economy is difficult.

Adelman (2000) as cited in (Oriakhi & Osazee (2013) [23] notes that crude oil prices are more liable to change than any other commodity price in spite of the fact that in principle it ought to be less volatile. He states that though oil price movements have always occurred mainly due to seasonal changes in demand, such movements were little. For example, between 1948 and 1970, nominal prices fluctuated between $2.50 and $3 per barrel. He notes that between 1998 and March 2000 international oil prices rose from $10 to $31 per barrel, it further rose to $37 in September 2000, before declining to less than $18 per barrel in November 2001. Since then there has been an upward movement in the prices of crude oil reaching about $147 per barrel in 2008, before averaging $90 per barrel in 2010. He attributes this volatility of crude oil prices to the fixation of prices by collusion in the OPEC cartel and the war in the Middle East at various times. Adedipe (2004) [1] notes that the high rise in oil revenue was influenced by the Middle East war of 1973. It formed amazing, unusual and unanticipated wealth for Nigeria and the naira valued as foreign exchange influxes offset outflows and Nigeria foreign reserves assets increased. Akpan (2009) and Adepipe (2004) [4, 1] established that change in price of oil have been traditionally traced to the supply side disruptions. Such as OPEC supply quotas, political unrest in the oil-rich Middle East and activities of militant groups in the Niger Delta region of Nigeria. The shocks (oil price volatility) could be positive (a rise) or negative (a fall). Two problems are identified with the shocks; first is the degree of the price increase which can be measured in absolute terms or as percentage changes, second is the timing of the shock, that is, the speed and persistence of the price increase. Ogundipea, Ojeagaa and Ogundipea (2014) also opine that from the Mid-1980s the rise and fall in the price of oil have occurred more often than in the time past. OPEC has constantly trying to influence oil price to ensure its stability through allocation of production quotas to its member countries but has been unable to stabilize it; as OPEC share of the world oil production has fallen from 55 percent in 1976 to 42 percent today.

Gounder and Bartleet (2007) [14] contend that the demand side impacts of energy crisis suggest that an energy price shock can result in higher inflation and higher unemployment at the same time; this is known as stagflation. Olaokun (2000) [21] arrived at some exciting assumptions; He states that oil price increases employs a negative effect on the economies of Ghana and Nigeria (although the later is an oil-producing country), but has a positive effect on Russia, which like Nigeria is an oil producing country. This outcome raises a lot of questions. Linking this volatility to the Nigerian economy, Olomola (2006) [22] has claimed that oil price volatility is highly significant in explaining GNP growth and unemployment. Okonju (2009) [20], after exploring the Nigeria‘s growth path in the post oil discovery period, states that it has not been smooth. He also clarified that during the oil boom era GDP grew positively by 6.2% annually, but the growth rate turned negative through the larger part of the 80‘s when oil prices crashed; this period also saw inflation rate jump to 11.8% on average, with a period peak of 41% in 1989; Gross Domestic Investment (GDI) as percentage of GDP fell from 16.3% to 14%. However GDP growth rate managed to turn positive (averaging about 4%) between 1988 and 1997 as a result of structural adjustment policies (SAP). He concluded that oil price volatility has been a major contributory factor to instability in GDP growth pattern in Nigeria. Busayo (2013) [8] notes that Nigeria is a mono-product economy, where the main export commodity is crude

oil, that changes in oil prices has implications for the Nigerian economy growth and exchange rate movements in particular. The latter is mostly important due to the double problem of being an oil exporting and oil-importing country, which is a situation that emerged in the last decade.

Olaokun (2000) [21] notes that a slump overtook the global economy and the years between 1978 and 1982 experiences the deepest global recession ever since the 1930's. Thus all the expectations of continuous growth in the Nigerian economy were destroyed as a result of the oil prices volatility internationally. Duncan (2008) defined Nigeria as a crude oil exporter and importer of refined petroleum products. He re-stated the fact that oil price volatility tends to exert a positive effect on the GDP growth of a net-oil exporting country and a negative effect on a net-oil importing country. On the basis of this, Nigeria's situation is clearly peculiar. The literature on the relationship between oil price volatility and economic growth volatility keeps expanding as new economic challenges unfold. Wit and Crookes (2013) states that Nigeria is an oil dependent country which is highly exposed to oil price volatility. Higher oil prices have had positive benefits in terms of her government expenditure and also from the Nigerian government's ability to subsidise the fuel price, which has benefitted many Nigerians. On the negative side, higher oil prices have increased inequality and also resulted in higher food prices, which have unfavourable effect on inflation and also increased poverty.

Theoretical review

The standard growth theories focus on primary inputs such as; Capital, labour & land, while failing to recognize the role of primary energy inputs such as; oil deposits. However, natural scientists and some ecological economists have made efforts at evolving some theories which capture the role of oil price volatility on eco its availability and volatility and economic growth.

The Mainstream theory of economic growth postulates that production is the most important determinant of growth of any economy, and production which is the transformation of matter in some way, requires energy. This theory categorizes capital, labour and land as primary factors of production; these exist at the beginning of the production period and are not directly used up in production (though they can be degraded or added to). While energy resources (such as; oil and gas, fuels, coal) are categorized as intermediate inputs, these are created during the production period and are entirely used up during the production process. In determining the marginal product of oil as an energy resource useful in determining economic growth, this theory considers in one part its capacity to do work, cleanliness, amenability to storage, flexibility of use, safety, cost of conversion and so on, it also considers other attributes such as; what form of capital, labour or materials it is used in conjunction with. The theory estimates the ideal price to be paid for crude oil as one that should be proportional to its marginal product Oriakhi and Osazee (2013) [23].

The Asymmetry-in-effects theory of economic growth used the U.S economy as a case study. The theory posits that the correlation between crude oil price decreases and economic activities in the U.S economy is significantly different and perhaps zero. Mark *et al*. (1994), members of this school in a study of some African countries, confirmed the asymmetry in effect of oil price volatility on economic growth. Ferderer (1996) [13] another member of this school explained the asymmetric mechanism between the influence of oil price volatility and economic growth by focusing on three possible ways: Counter-inflationary monetary policy, sectorial shocks and uncertainty. He finds a significant relationship between oil price increases and counter-inflationary policy responses.

The Renaissance growth theory/model was an off-shoot of the symmetric and asymmetry in effect schools. Lee (1998) as cited in Oriakhi and Osazee (2013) [23] who was a leading proponent of this school focused her theoretical work on attempting to distinguish between oil price changes and oil price volatility.

Review of empirical studies

Oil price volatility is not a new event; it has been the most important feature in the oil market during the last two decades. Oil price volatility and it impacts on economic growth was first examined using the experience of the developed countries. However, since the 1980's till date there have been a number of studies carried out for some developing economies on which have produced meaningful results on the examination of the impacts of oil price volatility on countries economic growth.

The empirical studies examine in this paper was analysed by other researchers in which their researches are based on the Nigeria economy. Adeniji (2010) notes that oil price volatility do not account for significant observable movements in macroeconomic aggregates. He finds out that the impact of oil price volatility on most of the macroeconomic variables is minimal in Nigeria. Specifically, the results of the impulse response functions and variance decomposition analysis to a large extent confirmed that oil price shocks are only able to explain a small proportion of the forecast error variance of these macroeconomic aggregates. Oil price shocks, as revealed by variance decomposition, accounted for less than 1% of the variations in output, inflation and Government revenue. Despite the introduction of critical thresholds which was included in the estimation procedure this issue still persists. Cantore, Antimiani and Rui (2012) [9] confirmed the link between oil shocks and economic growth in many countries, although results are stronger for longer time horizons or when the oil price increases are permanent. The origin of the oil price shock may also be relevant for the significance or magnitude of the effect on oil-importing countries. Akpan (2009) [4] finds out that there is strong positive relationship between positive oil price changes and real government expenditures. Unexpectedly, the result identifies a marginal impact of oil price fluctuations on industrial output growth. Furthermore, the "Dutch Disease" syndrome is observed through significant real effective exchange rate appreciation. Olomola (2006) [22] found out that oil price volatility is highly significant in explaining GNP growth and unemployment. Oriakhi and Osazee (2013) [23] use quarterly data and employing the VAR methodology in carrying out their finding, using data from 1970 to 2010. They finds out that oil price volatility have direct impact on real government expenditure, real exchange rate and real import, which in turn have impact on real GDP, real money supply and inflation through other variables, notably real government expenditure. This implies that an oil price change determines government expenditure level, which in turn determines the growth of the Nigerian economy. This result seems to reflect the dominant role of government in Nigeria.

Alley, Asekomeh, Mobolaji and Adeniran (2014) [5] they employs the general methods of moment (GMM) to examine the impact of oil price shocks on the Nigerian economy, using data from 1981 to 2012. After appropriate robustness checks,

they finds out that oil price volatility insignificantly retards economic growth while oil price itself significantly improves it. The significant positive effect of oil price on economic growth confirms the conventional wisdom that oil price increase is beneficial to oil-exporting country like Nigeria. Shocks however create uncertainty and undermine effective fiscal management of crude oil revenue; hence the negative effect of oil price volatility. Ogundipea, *et al.* (2014) examines the effects of oil price, external reserves and interest rate on exchange rate volatility in Nigeria using annual data covering the period 1970 to 2011. The long run relationship among the variables was determined using the Johansen Co-integration technique while the vector correction mechanism was used to examine the speed of adjustment of the variables from the short run dynamics to the long run equilibrium. It was observed that a proportionate change in oil price leads to a more than proportionate change in exchange rate volatility in Nigeria; which implies that exchange rate is susceptible to changes in oil price.

However evidences from other studies have not been as straightforward as those just reviewed. Akide (2007) [3] carries out investigation the impact of oil price volatility on economic growth indicators in Nigeria using quarterly data from 1970 to 2000. He found out that within the period of his study, oil price shocks did not affect output and inflation in Nigeria, but significantly influenced real exchange rate. Also Jimenez and Sanchez (2005) empirically assessed the effect of oil price volatility on the real economic activity of the main industrialized countries using both linear and non-linear models. Evidence of non-linear impact of oil price volatility on real GDP was established. Wilson, David, Inyiama and Beatrice (2014) [30] ascertains that in the short run, changes in the gross domestic product (GDP) is not influenced by oil price volatility, nor do they find evidence of influence on key macroeconomic variables. Also they find out that there is a positive but insignificant relationship between oil price and the Nigerian Gross domestic product. Overall oil prices have no significant impact on real GDP and exchange rate in Nigeria. The result suggests that Nigeria has a special case of the Dutch Disease, where a country seems good fortune proves ultimately detrimental to its economy.

Aremo, Orisadare and Ekperiware (2012) [7] examines that oil prices have significant effect on fiscal policy in Nigeria within the study period of 1980 to 2009. They find out that oil price volatility affects Government Revenue and Gross DP first before reflecting on fiscal expenditure. Thank God and Maxwell (2013) [27] establishes that there is a unidirectional relationship existing between the interest rate, exchange rate and oil prices, with the direction from oil prices to both exchange rate and the interest rate. However, a significant relationship between oil prices and real GDP was not found.

Conclusion

The issue of oil price volatility is crucial because it affect the economic growth of a country. Based on the empirical review of various studies carried out by different researchers, this study is in agreement with the works of those scholars which reviews that there is significant (that is positive) relationship between oil price volatility and Nigeria economic growth. This implies that oil price changes determines government expenditure level, rate of inflation, level of unemployment, which in turn determines the growth of the Nigerian economy. Considering the destabilizing effects of oil price fluctuations on economic activity and government spending in Nigeria, also as alternative fuels become more popular and oil importing countries continue to discover oil deposits, there is a need for the Nigerian economy to look to other, more manageable sources of foreign exchange and government revenue to spur economic growth.

Recommendations

The study makes some recommendations which includes that, the country should diversify its export revenue base as a means of minimising reliance on crude oil and petroleum product, budgetary operations, fiscal prudence, corporate governance and proper accountability with this it will further protect the Nigerian economy from the negative impact of oil price volatility on her growth, and thus prevent the negative effect of the shocks from attaining a statistical significance level.

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