



## Impact of Oil Price Fluctuations and Economic Growth: Insights from Nigeria

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### Abstract

This study was conducted to examine the impact of Oil Price Fluctuations and Economic Growth: Insights from Nigeria". The study aims to thoroughly examine how variations in oil prices affect Nigeria's long-term economic growth and how they affect variables under discourse like inflation rate, unemployment rate, human capital index, and gross domestic product (GDP). The research questions and hypothesis were formulated in the same direction. The Autoregressive Distributive Lag model was utilized so that the models that were under evaluation could be estimated. The data came from the annual statistical Bulletin of the Central Bank of Nigeria, the Nigeria Bureau of Statistics, and the OPEC database that were collected between 2002 and 2019 for the period of 17years. The price of oil is an independent variable, in contrast to other economic indicators such as GDP, the Human Development Index, the unemployment rate, and inflation rate, all of which serve as replacements for economic growth and are dependent factors. The price of oil alone has a direct and significant influence on the expansion of Nigeria's economy, as measured by GDP, regardless of other variables being understudied. The report makes several recommendations, one of which is that the government should establish vertical and horizontal links in the oil sector for economic diversification, appropriate utilization of necessities, and beneficial investment in the beneficial development of infrastructure.

**Keywords** Oil Price Fluctuations; Economic Growth; Human Development Index; Nigeria

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## Introduction

Unquestionably, Nigeria's economy has suffered greatly as a result of its excessive reliance on oil production for revenue generation and a basic standard of living maintenance. It was anticipated that Nigeria's rapid economic expansion would be fueled by the oil industry replacing agriculture as the nation's primary source of revenue. Since the beginning of this century, fluctuating oil prices have rendered Nigeria's macroeconomic ambitions unattainable (CBN, 2008). Since the 1970s' oil boom, Nigeria has continued to suffer from its failure to invest in infrastructure or other long-term goals as a result of the huge income it earned from selling oil and gas. All capital expenditures are currently funded by the federal government through debt, while oil revenue is mostly used to pay for ongoing expenses. A new administration was expected to be able to properly handle oil earnings when democracy was eventually established in 1999. In 2006, the agitation for resource control swelled into violence, with the kidnapping of oil and gas workers and the vandalism of oil and gas sites becoming increasingly common.

In 2007, Nigeria's overall profits were ₦5.72 trillion, a 4% drop in oil revenue as a result of escalating unrest in the Niger Delta. End-of-year oil revenues in Nigeria fell by 39% to ₦4.84 trillion as a result of a global economic downturn that began in 2009 and persisted through 2012. Nigeria's economy is in bad shape, as seen by this development. The rise of oil revenues has slowed significantly even though both the global economy and crude oil prices improved in 2010, resulting in increases in government revenue of ₦7.3 trillion and ₦11.1 trillion, respectively, despite oil prices averaging above \$100 per barrel in 2012 (Budget, 2012). As a result, Nigeria's imports from Nigeria decreased and it was unable to reach its budgetary goals because of increased American oil production. The failure to fulfil budget production targets was also due to a decrease in Nigerian imports. In 2014, the United States did not purchase any oil from Nigeria due to a decrease in global oil prices. Nigeria's oil revenue was significantly reduced as a result.

Given the fluctuation in the price of oil, it is clear that relying solely on oil and gas revenues is not sustainable. Because it is unsustainable, this conclusion is backed by evidence. Oil prices may not return to their prior levels of growth shortly and this does not imply that things will improve any time soon.

When the Monetary Policy Committee met in October 2011, they expressed concerns about whether or not the demand for petroleum imports was genuine, according to a text from that meeting's minutes. Moreover, US\$7.0 billion in oil imports have been acquired from DAS so far this year alone, reducing the country's external reserves. "The external reserves have continually come under strain," which may lead to a halt in payments made in foreign currency as a result of falling oil prices. In the absence of an increase in oil prices, Nigeria may be obliged to borrow money to pay salaries and other obligations, which would result in a new deficit. Continual volatility in the price of oil would put Nigeria's foreign reserves under long-term stress since the country's dollar receipts would continue to decline.

That the Nigerian government does not have a practical strategy to diversify the economy, ensure a parabolic growth in revenue collection from sources other than oil, and reduce the stock of government debt to manageable levels, is particularly concerning. Studies on Nigeria's total public debt at national and subnational levels in 2018 showed that the debt profile increased in comparison to Nigeria's GDP size. Regardless of whether the data came from 2017 or 2018, this was the case. At ₦24.34 trillion in December 2018, the Nigerian government's debt-to-GDP ratio is estimated to be in the range of 24 per cent. This represents an improvement above last year's total. A deficit of ₦1.954 trillion is expected to be created by the Federal Government's economic plans for the 2017 fiscal year, which call for total expenditures of ₦9.12 trillion and income estimates of ₦7.166 trillion. However, a deficit of ₦1.954 trillion means that the budget would be in the red (Budget, 2018).

Approximately ₦6.05 trillion was spent and approximately ₦2.71 trillion was collected in 2017 according to the Budget Office's budget implementation report. There was a 41.77 per cent discrepancy between the deficit projection of ₦3.34 trillion and the actual deficit.

As of this writing, Nigeria's debt servicing is more than 60 per cent of GDP, while the country's revenue is at an embarrassingly low level. In the absence of a strategy that is both practicable and long-term, Nigeria's current income-to-GDP ratio prevents the country from accruing further debt. 50 per cent debt to GDP is the maximum amount that the IMF considers generally acceptable for emerging economies (EEAs). Nigeria has a 24 per cent proportion, which is low by international standards. At almost 60%, Nigeria spends ₦60 out of every ₦100 it earns

on debt service, which is more than the World Bank's recommendation of a debt service to revenue ratio of no more than 22.5%. According to GDP, Nigeria's revenues are a fraction of what they should be.

Growth in Nigeria's economy has been less than stellar over the last three decades, and this can be attributed to both domestic and external factors. According to an analysis of the Federal Government's revenue profile in the last half-decade, the non-oil industry provided less than 20% of the foreign exchange revenues. This shows just how vulnerable the global economy is to fluctuations in the price of oil. Over eighty per cent of the country's total foreign exchange profits came from oil.

Given that oil is Nigeria's primary export commodity, the country's economic future is tied to the movement of oil prices. As the price of oil varies inexorably, the federal government's debt stock grows, driving up the cost of servicing that debt. A new analysis by (Budget, 2018) states that Nigeria's credit rating was recently lowered even further, to "junk" status, due to the country's dangerous accumulation of debt without accompanying significant revenue growth.

As projected in Nigeria's MTEF (2017-2019) report, the country may have to borrow money every fiscal year just to cover its basic expenditures. This is a concerning development, as it indicates that oil revenues are no longer sufficient to cover operating expenses and debt obligations.

In the absence of an efficient federal income generation plan to support the budget deficit (the difference between accrued revenue and expenditure), debt servicing is increasing, particularly for foreign debts, resulting in stagnant savings in the Excess Crude Account.

The country's GDP per capita is less than \$5, a reflection of the country's crippling debt burden that has yet to yield significant economic gains. With an average of 65 percent of the population living below the poverty line despite accumulated debt and debt relief granted in 2005 and 2006 and subsequent benefits from oil sales, the prudent use of revenue accruing from oil sales, and subsequent benefits for Nigeria's economic growth is in question. Therefore, the study aims to thoroughly examine how variations in oil prices affect Nigeria's long-term economic growth and how they affect variables like inflation rate, unemployment rate, human capital index, and gross domestic product (GDP)

Specifically, this study set out to answer the following research question:

1. Do changes in oil prices have a significant impact on economic development?
2. What is the relationship between the price of oil and the growth of the economy?

The following assumptions were examined to achieve the study's objective:

1.  $H_0$ : Nigeria's economic growth is unaffected by variations in the price of oil.
2.  $H_1$ : There is no correlation between oil prices and economic growth.

## **Review of Related Literature**

### **Conceptual Review**

The (United Nations 2005) says that the reason oil prices change so much is that market participants have different levels of information. Futures exchanges in the market, disagreements over production quotas, and members' distrust have all added to uncertainty and fueled volatility. Climate change, short-term political events, transportation issues (shipping, pipelines, etc.), economic growth, problems along the production-consumption chain, and even comments from OPEC members and leaders of other oil-producing countries all contribute to oil price volatility. Too pessimistic price estimates make people even more worried about rising oil prices.

As a result of a sudden rise in oil prices, the term "oil price fluctuation" is of major concern in most economies. The construct, on the other hand, lacks a generally agreed-upon definition. That's because it has a variety of different names, including "oil price shock," "changes," "volatility," and "variations." When attempting to characterize the construct, researchers looked at it from both the supply and demand sides. Oil price variations have been defined

by (Ogiri et al., 2013) as an inward shift in the supply curve for crude oil that is triggered by political events that are not directly related to the oil market or the macroeconomy. As a result, the authors of the study, Baumeister and Kilian (2016), defined oil price swings as the difference between expected and actual oil prices. Nwanna & Eyedayi (2016) contend that the drop in oil prices is the result of an unanticipated change in the global economic environment that affects country economies. This effect could manifest as a shift in trade agreements, a halt in the expansion of the global export market, or an increase in interest rates determined by international financial markets. Simply said, a drop in the price of oil might result in a rise in the cost of crude oil on the global market, which would be at the expense of the local market price for oil. In turn, this would result in faster economic expansion.

Oscillations in the price of oil in the worldwide market are characterized by Manasseh et al. (2019) as a long-term upward or downward movement in oil prices, followed by periods of relative calm.

Many factors might cause oil prices to fluctuate, including political turmoil in the Middle East and the increased demand for oil in Asian countries. Oil price oscillations, according to Keji (2018), cause disturbances in the steady movement of goods across markets. He then said a country's energy policy must be efficient to remedy this anomaly. The recent decline in the price of oil can be attributed to some different factors, including an increase in demand from developing economies, global financial crises, strikes, and wars, decreased oil production, a lack of refinery capacity, supply bottlenecks, risk related to domestic problems (such as in Nigeria), and international politics. The commoditization of oil on a global scale has also been a contributing factor (Donwa et al., 2015).

Selfishness, ignorance, and a lack of institutional structure are only a few examples of the other elements that contribute to the corruption and misappropriation of government funds. Because of this, the economy was not well prepared for any potential negative shocks (Oyeyemi, 2013). These variables were further divided by Nwanna & Eyedayi (2016) into four categories: demand, supply, geography, and other aspects.

Countries' need for oil will rise as industrialization, fast urbanization, and an increasingly affluent populace take hold. Since crude oil demand is inelastic to changes in the price level, it will raise import bills for net oil importers in aggregate (Udoka and Nkamare, 2014). This will lead to an increase in the country's trade deficit, which will in turn lead to an increase in the country's current account deficit (Apere and Ijeoma, 2013). As a result of these repercussions, the country as a whole will suffer more large, negative, and dangerous consequences (employment rate, inflation rate, trade balance, stock market prices, and exchange rates).

According to the majority of experts, the increased demand for oil from the world's most industrialized nations will continue to benefit oil-producing countries such as those in Sub-Saharan Africa, as well as other countries. Oil demand in developing countries is increasing at the fastest rate in the world right now (Aremo et al., 2012). Despite this, the United States of America remains the world's greatest consumer of oil. Two-thirds of the country's total oil consumption is accounted for by the transportation industry, according to the Energy Information Administration (EIA). Chinese oil consumption currently ranks second only to that of the United States around the globe. As of the end of 2011, China accounted for half of the global oil consumption growth rate (1/2). (According to the 2011 Energy Information Administration) Some of China's oil consumption can be traced to the country's booming economy, shifts in the transportation and commercial sectors, as well as improvements in refinery capacity. These economies look to be dependent on oil, at least in the short term. One of the reasons for their addiction is that they have so many industrial needs. For example, the industrial sector's requirement for oil, which is used to make chemicals, and plastics, and generates electricity has an impact on oil demand. Internal combustion engines are the primary mode of transportation for the world's most advanced nations. It is because of this that the demand for oil in these countries is much larger than in countries with a lesser level of industrialization.

In addition to OPEC members, the vast majority of crude oil is produced by non-members of the cartel as well. Iraq's capital Baghdad hosted the official founding meeting of the Organization of the Petroleum Exporting Countries (OPEC), which took place in September of that year. OPEC stands for "Organization of the Petroleum Exporting Countries," and it is an acronym for that statement. There are currently twelve (12) countries in the Organization of the Petroleum Exporting Countries (OPEC): Venezuela (U.A.E), Qatar (Qatar), Kuwait (Kuwait), the Islamic Republic

of Iran (Iran), Iraq, Angola, and Algeria. Vienna, Austria, serves as the organization's administrative headquarters. OPEC's key competitors in the oil market include the likes of the United States (including Canada), Russia, Mexico, China, and Brazil (including Brazil and Norway). Brazil and China round out the list of nations. There is little influence on oil prices by producers who are not members of the Organization of the Petroleum Exporting Countries (OPEC). Non-OPEC countries only have 18.67 percent of the world's crude oil reserves because of this. Because they only have a limited supply of reserves, their current output level is not projected to last long and is expected to decline significantly shortly. According to the (World Bank Report, 2015), crude oil price fluctuations can be classed as either exogenous or endogenous.

When it comes to the oil market, exogenous and endogenous factors are the two types of components that are considered. Specifically, these two characteristics can either help or hurt oil output. Short-term disruptions caused by weather, strikes, or conflict can have a significant impact on oil prices. Crude oil's price more than doubled as a result of the Iranian revolution and the Iran-Iraq War. Crude oil prices were \$35 per barrel in 1981, compared to \$14 per barrel in 1978, for example. As a result, Iran, as well as countries like Libya and Yemen, have felt the impact to varying degrees.

Since 1970, the price adjustment for PMS pumps in Nigeria has been on the rise (upward trend). In 1990, the price of a barrel of crude oil was \$70,000, compared to \$20,000 in 1982. Then, between 1992 and 2013, it climbed to N97. This is further demonstrated by the collapse in oil prices from \$114 to below \$50 in 2015, which proceeded to drop to \$35. Furthermore, to support this claim, (Ogbonna and Orlu, 2017) claimed to have eliminated fuel consumption subsidies by adjusting PMS products upward for decades. In economics, GDP is an abbreviation for Gross Domestic Product (GDP).

One of the most important aspects of a successful economic system is to understand that total income depends on the volume of production in a community or an economy. The modern economy must be measured for people to understand its behavior. The total output of goods and services, as well as the total income received by everyone in the economy, needs to be measured. The (Central Bank of Nigeria 2008) states that GDP is calculated by subtracting the free onboard values of exported products and services from expenditures at purchase price when calculating Nigeria's Gross Domestic Product (GDP). According to Anyanwu (2004), GDP is the entire worth of all commodities and services produced in a country over the course of a year, regardless of nationality. When determining a country's wealth, this factor is taken into consideration. GDP is defined by (Jhingan, 2003) as the total market value of the flow of products and services produced by a country's population over the course of a year. The GDP of the country is used to calculate this figure. Gross domestic product (GDP) is defined as the monetary worth of goods and services produced in a given period, independent of the country in which they were produced, according to the (Central Bank of Nigeria, 2008). According to the (Central Bank of Nigeria's 2008) report, this is the case.

### **Economic Growth**

Economic growth, according to (Dwivedi, 2004), is a long-term rise in national output or net national product per capita for a large number of people. For this to hold, the total output must rise faster than the population. Economic growth can also be quantified by looking at how many items and services are included in the national output to meet the requirements of the greatest number of people. Human capital, national resources, capital formation, and technological innovation all play a role in economic growth. In economics, economic growth refers to an increase in the amount of production that may be generated. Growth in aggregate demand or observable output leads to full employment, which is a result of the increase in production. Theoretically, it is defined as a growth in the economic output's total value. The real GDP growth rate is often measured as a percentage. The constant rise in a country's output and, consequently, its GDP is what economists mean when they talk about economic growth. Typically, it is expressed as a percentage of the growth in real GDP or GNP over time. Per capita production continues to increase, allowing for an increase in average per capita income. It also indicates that the annual output of commodities and services that contribute to raising the standard of living of the people of the country will continue to rise. According to the growth rate, a nation's annual output increases by a certain percentage each year. Economic development, on the other hand, is a long-term process in which a society achieves a high level of self-sufficiency and economic

growth while simultaneously reducing poverty, unemployment, and income inequality. Changes in economic and social systems are always associated with economic growth, which is another way of saying "economic development." Better health care, better housing, and improved sanitation are just a few examples of how economic and social institutions can be improved. Note that the United Nations International Development Strategy for the 1970s declared that the ultimate goal of development should be to promote the well-being of individuals and benefit everyone.

### **Human Development Index (HDI)**

Three elements of human development are measured by the Human Development Index (HDI): a long and healthy life; access to information; and a reasonable level of living. People and their capacities, not only economic progress, should be the final criterion for evaluating the development of a country, as the HDI was designed to underscore. Human development outcomes in two nations with the same GNI per capita might differ significantly, which is why the HDI can be used to challenge national policy choices. As a result of these contrasts, policymakers may be prompted to reconsider their priorities.

Using the Human Development Index (HDI), one may see how well a country is doing in terms of health, education, income, and other aspects of human development. Normalized indexes for all three dimensions are averaged together to calculate the HDI. Life expectancy at birth is used to measure the health dimension. The averages of the number of years an adult has spent in school, on average, and the number of years a youngster will spend in school, on average, are used to calculate the education dimension. Gross national income per capita is used to determine a country's standard of life. According to the HDI, logarithmic income is used to represent the decreasing relevance of income as GNI rises. HDI dimension indices are combined into a composite index using a geometric mean.

### **Theoretical Framework**

This study is anchored on the Dutch Disease Theory, with support from Rent-Seeking Theory, Structural Theory, and Rational Expectations Theory.

The Dutch Disease Theory was first proposed by W. Max Corden and J. Peter Neary in 1892. It aims to explain why the Netherlands' economy has grown so slowly since the North Sea oil was discovered. As a country's natural resource wealth develops, its currency will appreciate, according to the Dutch Disease Theory (DDT). Manufacturers' export competitiveness is reduced as a result. When a once-thriving natural resource industry is now in decline, it's known as Dutch disease, according to (Ismail 2021). Resource movement effect (RME) and spending effect (SE) were used by (Corden and Neary, 1982) to categorize the economic consequences of Dutch illness (SPE).

An increase in the price of a recently discovered natural resource prompts the RME to raise wages for its employees. This is because the price of the natural resource rises in tandem with the value of the marginal product. The tradable industries are therefore compelled to contract, with some of them probably failing. As the SPE points out, the SPE's earnings from oil prices can only go up if the price goes up significantly. Imports will rise as a result of increased tradeable and non-tradeable goods. An oil-exporting nation's industrial structure may change over time as a result of rising oil prices, according to the theory. Although the value of the national currency increases as a direct result of rising oil income, local producers are less competitive as a result. The rent-seeking theory also supports DDT (Krueger, 1974).

Arnason (2008) defines rent-seeking as spending time and money on activities other than product development to influence government policy to maximize profit. The use of specific specialized services could be restricted, incentives could be offered for specific outputs, and so on. As a result, this hypothesis supports the idea that politicians profit from extortion (Ross, 2001).

For structural shocks, price swings in food and oil can be attributed to macroeconomic changes (Sommer, 2002). However, structuralist theorists are widely divided on the impact of structural shocks. Short-term macroeconomic effects of supply shocks, according to some (Ball and Mankiw, 1995; Lee et al., 1995). Others argue that the government should not react to fluctuating food and energy prices because they are so volatile (Armando, 2009).



Focus on "the second-round effect," which is more likely to be long-lasting and may cause a recession (Inflation Report, 2006). Moreover, according to (Fischer, 1985) there is no provision for real wage resistance payable to employees, and policymakers are not needed to concentrate on structural shocks. Inelastic supply may dampen certain additional structural shocks in the energy and agriculture sectors (Pindyck, 1979). Institutional rigidities, according to this theory, cause prices to rise in tandem with economic growth, particularly in the government, energy, agriculture, and international commerce sectors. Therefore, they advocated for removing these institutional barriers to lessen the impact of future shocks.

The aforementioned viewpoints are not shared by proponents of the reasonable expectation theory (Sommer, 2002). Expectations are said to influence the supply side of variation (Sommer, 2002). For example, if people assume that structural shocks' consequences would last indefinitely, then that is exactly what will happen. Economic factors swiftly return to their pre-shock state when people believe the impacts of shocks are merely transitory (Ujunwa, 2015). This idea had a profound impact on the research's theoretical underpinnings.

### **Empirical Review**

An extensive examination of other studies has helped to strengthen this study's findings. The vast bulk of studies focuses on oil-importing rich countries. Despite Nigeria's reputation as an oil exporter, there is research on how oil prices affect Nigeria's macroeconomic fundamentals.

Ikechi & Nwadiubu (2020) argue that there is evidence of volatility clustering of oil price on economic growth in Nigeria, as explored in *Global Oil Price Shocks and Effects on Economic Growth: An Econometric Investigation of Nigeria*. According to the findings, Nigeria should shift its focus away from primary production and export at the expense of low-value addition.

According to OOkonkwo & Ogbonna (2018), the Nigerian economy has been affected by changes in oil prices. The study's methodology was based on the Dutch theory of sickness. Variables taken into account include the price of crude oil as well as the GDP, currency exchange rate, unemployment rate, and expenditures by the federal government. National Bureau of Statistics (NBS) and Central Bank of Nigeria (CBN) yearly reports and statistics bulletins were used to compile these data. The study found a direct correlation between the Nigerian economy, the exchange rate, the unemployment rate, and crude oil prices. "Therefore, the experts urged that the government of Nigeria strive to diversify the economy".

A VAR model was employed by Benramdane (2017) to examine the economic impact of OPV in Algeria. OPV's negative effects outweighed the oil boom's good ones, according to this study, leading some to claim that OPV is to blame for Algeria's "resource curse" dilemma.

Researchers Ogbonna and Orlu employed error correction to study the impact of oil price variations on Nigeria's economy from 1970 to 2013. PMS price fluctuations have little impact on the Nigerian economy, according to the findings of this study. As a result, the study's findings suggest that Nigeria's government relaxes its grip on PMS pump pricing. Again, the private sector must be encouraged to take an active role in downstream crude oil processing.

From 1980 to 2014, Nwanna and Eyedayi (2016) looked at the impact of crude oil price fluctuations on Nigeria's economic growth. They found a strong and positive correlation between the growth of Nigeria's economy and the price of oil using the OLS approach.

Aimer (2016) examined the effect of oil price variations on Libya's economic growth using annual data from 2000 to 2015. VAR model and Johansen cointegration were used to analyze the impact of fluctuation on output when he realized that oil price fluctuations were a key source of economic volatility on a global scale. He realized that oil prices and economic growth don't always go hand in hand. A statistically significant impact on Libya's economic growth is what he claims oil prices do.

According to Augustine (2015), Nigeria's economic performance has been linked to and impacted by fluctuations in the currency rate and oil prices. According to the report, Nigeria's economic performance is boosted by 1.2 percent because of the actual exchange rate. A 1% increase in the price of oil would result in a 4% increase in Nigeria's economic output. To put it another way, R2 shows that 82 percent variation in GDP can be explained by explanatory

factors. This shows that the methodologies utilized in the study have been proven to be effective. In a piece authored by Mansour

Analysis of oil price fluctuation on economic growth in twenty countries from 1986 to 2012 was conducted by Akinlo and Apanisile for a 2015 paper. These countries were placed in Groups A and B. Oil-producing countries make up Group A, whereas non-oil-producing sub-Saharan African nations make up Group B. Data from a panel was used in the analysis. Panel pooling OLS, panel fixed effect model, and modified method of moment model were used to estimate oil-exporting and non-exporting countries. According to the panel A model, which covers oil-exporting countries, the OPV has a favorable and considerable impact on economic growth. Oil price changes have a small but favorable impact on economic growth in non-oil-producing countries, according to the results of panel B.

Using an aggregate demand model and the Generalized Method of Moments, Alley et al. (2014) investigated the impact of an oil price shock on Nigeria's economic growth (GMM). Despite Alley's analysis's robustness, the study period (1981–2012) emphasizes price shock and obscures the relationship between the variables under consideration. Research into how oil prices affect economic growth and how they affect important macroeconomic indicators in Nigeria within the framework of policy goals would fill a void in the oil-macroeconomics literature.

Ani et al. (2014) studied the impact of crude oil price changes on the Nigerian economy between 1980 and 2010. Even though crude oil prices and GDP move in the same linear direction, the study found that crude oil price changes had no impact on GDP. As a result, the Dutch Disease hypotheses have been proven to be correct.

Oil price and GDP correlation research began with an emphasis on the American economy (Boheman & Mexen, 2015). In 1983, Hamilton demonstrated that increases in oil prices were mostly responsible for most post-World War II U.S. recessions. This correlation between U.S. GDP and oil price was uncovered via Granger causality analyses. This connection was further confirmed by Burbridge and Harrison (1984), Gisser and Goodwin (1986) and Ferderer (1996). According to Mork (1989), there is an asymmetrical relationship between the price of crude oil and U.S. output, with a negative effect from a price increase and no effect from a price fall. Hamilton later verified this to be the case (2003).

In his research, Ujunwa (2013) examined how the oil industry affects Nigeria's economic growth performance. According to a two-tailed test with 5 percent significant values, the two explanatory factors did not influence the growth performance of the Nigerian economy during the same period. Therefore, the researcher recommends that the government develop a mix of policies that would encourage enterprises in the oil sector to enhance their performance and contribution.

Rentschler (2013) looked at how developed and developing nations, importers, and exporters handle oil price volatility. The US, Germany, India, Japan, South Korea, Malaysia, and the UK are among them. Rentschler uses VAR. Both oil-exporting and oil-importing countries may suffer from oil price volatility. He also says a nation's economy is vulnerable to oil price fluctuations due to its reliance on commerce. Emerging nations are understudied. From 1952 to 2005, oil price shocks affected some MENA net exporters' and importers' GDP growth (Berument, Ceylan, & Dogan, 2010). They imply that most OPEC nations, except Oman and Syria, increase production in response to oil price shocks. Algeria, Iran, Iraq, Kuwait, Libya, Oman, Qatar, Syria, and U.A.E.

Between 1996 and 2007, Iranian government expenditures and oil export revenues were examined by Fereydoon & Reza (2012) using a wavelet analysis methodology. Government spending was found to have a considerable impact on oil export profits at various points in time, according to research. There is a strong and positive long-term correlation between these two factors.

Nigeria's gross domestic product (GDP) and per capita income (PCI) were utilized as explanatory variables in Ogbonna & Appah (2012)'s research on how petroleum income affected the Nigerian economy between 2000 and 2009. Oil income, petroleum profit tax/royalties (PPT/R), and license fees are composed of the explanatory variables (LF) (LF). A positive but insignificant correlation exists between oil revenue and GDP and PCI, whereas a statistically significant one exists between oil revenue and INF. PPT/R has a considerable and positive association with GDP and PCI, but a negative and minor one with inflation. On top of all of this, it was found that the LF had a positive but negligible



connection to the GDP, PCI, and INF. According to these data, this research shows that Nigeria's GDP and PCI were positively and significantly influenced by the country's petroleum income (oil revenue and PPT/R) from 2000 to 2009.

## Methodology

### Research Design

This study used an ex-post facto research design that included descriptive statistics, Time Series Regression (Autoregressive Distributed Lag model), and the Granger Casualty test to determine the impact of fluctuating oil prices on Nigeria's economic growth. The study was purely a secondary data type sourced from CBN statistical bulletins and NBS Reports from 2002 to 2019. The population of the study is economic growth indices in Nigeria, which include Gross Domestic Product (GDP), Human Development Index (HDI), Unemployment Rate, and Inflation Rate.

### Model Specification

The following model was developed based on the variables used in the study:

$$GDP_t = \beta_0 + \beta_1 GDP_{t-1} + \dots + \beta_k GDP_{t-k} + \alpha_0 OP_t + \dots + \alpha_k OP_{t-k} + \varepsilon_t$$

Where,

GDP is the Gross Domestic Product which serves as a proxy for Economic growth

OP is the oil price

$\beta_0, \dots, \beta_k$  and  $\alpha_0, \dots, \alpha_k$  are the regression model coefficients.

t= time

k= lag of the time

$\varepsilon$  = error term

$$HDI_t = \beta_0 + \beta_1 HDI_{t-1} + \dots + \beta_k HDI_{t-k} + \alpha_0 OP_t + \dots + \alpha_k OP_{t-k} + \varepsilon_t$$

Where,

GDP is the Human Development Index which serves as proxy for Economic growth

OP is the oil price

$\beta_0, \dots, \beta_k$  and  $\alpha_0, \dots, \alpha_k$  are the regression model coefficients.

t= time

k= lag of the time

$\varepsilon$  = error term

$$UR_t = \beta_0 + \beta_1 UR_{t-1} + \dots + \beta_k UR_{t-k} + \alpha_0 OP_t + \dots + \alpha_k OP_{t-k} + \varepsilon_t$$

Where,

GDP is the Unemployment rate which serves as proxy for Economic growth

OP is the oil price

$\beta_0, \dots, \beta_k$  and  $\alpha_0, \dots, \alpha_k$  are the regression model coefficients.

t= time

k= lag of the time

$\varepsilon$  = error term

$$IR_t = \beta_0 + \beta_1 IR_{t-1} + \dots + \beta_k IR_{t-k} + \alpha_0 OP_t + \dots + \alpha_k OP_{t-k} + \varepsilon_t$$

Where,

GDP is the Unemployment rate which serves as proxy to Economic growth

OP is the oil price

$\beta_0, \dots, \beta_k$  and  $\alpha_0, \dots, \alpha_k$  are the regression model coefficients.

t= time

k= lag of the time

$\varepsilon$  = error term

### Data Presentation and Analysis

**Data Presentation**

**Table 1: Descriptive statistics of the study variables**

Variable	GDP (Per Capita) US \$	HDI Annual Rate) %	(Average Unemployment rate (%)	Inflation rate (%)	Oil Price (US \$)
<b>Mean</b>	2007.167	0.817	11.975	80.654	4.738
<b>Median</b>	2102	0.535	12.155	77.229	3.78
<b>Standard Deviation</b>	698.236	1.040	3.273	29.437	1.799
<b>Maximum</b>	3099	3.8	17.86	145.31	8.39
<b>Minimum</b>	742	-1.63	5.39	32.68	3.54
<b>Observation</b>	18	18	18	18	18

HDI= human Development Index

**Source:** Author’s Computation, 2022

Table 1 focuses on the variables' descriptive statistics. The results are based on the averages and variances for the years in question. To summarize, GDP in each year from 2002 to 2012 was an average of \$7.167, with a low of \$742 in 2002 and a high of \$3099 in 2012. The lowest oil price in US dollars was in 2002, and the highest price was in 2008, throughout the period under consideration.

**Table 2: Examining the relationship using Granger Causality**

Null Hypothesis	n	F	p-value
GDP does not granger cause Oil price	16	0.945	0.418
Oil price does not granger cause GDP		0.910	0.431
HDI does not granger cause Oil price	16	0.508	0.615
Oil price does not granger cause HDI		1.906	0.195
Inflation rate does not granger cause Oil price	16	1.130	0.358
Oil price does not granger cause the Inflation rate		3.394	0.071
The unemployment rate does not granger cause Oil price	16	0.538	0.599
Oil price does not granger cause the Unemployment rate		1.639	0.238

**Source:** Author’s computation, 2022

The granger causality in table 2 shows that for all the human development indices under study, the oil price does granger cause them. This implies each of the development indexes will be better explained together with oil price than its lag variables. Hence, Autoregressive Distributed Lag Model will be appropriate to model the effect of oil price on the development indices.

**Table 3: The fit of GDP on Oil price using Auto Regressive Distributed Lag model**

Variable	B	t-statistic	p-value
Constant	-35.7374	-0.1138	0.9131
GDP(-1)	1.1852	3.8240	0.0087
GDP(-2)	-0.6324	-1.5905	0.1628
GDP(-3)	-0.3200	-1.1796	0.2828
GDP(-4)	0.4656	2.5655	0.0426
Oil Price	7.7188	3.5571	0.0120
Oil Price(-1)	-6.0476	-1.7885	0.1239
Oil Price(-2)	7.4227	2.2174	0.0684
$\bar{R}^2$	0.8612	NA	NA
F-statistic	12.5268	NA	0.0034
D.W	2.3730	NA	NA

NA= not applicable, D.W=Durbin-Watson,  $p < 0.05$  indicates significance

Source: Author's computation, 2022

The model is represented thus:

$$GDP_t = -35.7374 + 1.1852GDP_{t-1} - 0.6324GDP_{t-2} - 0.32GDP_{t-3} + 0.4656GDP_{t-4} + 7.7188OP_t - 6.0476OP_{t-1} + 7.4227OP_{t-2}$$

(GDP= Gross domestic product, t=time(year), OP= oil price)

The result in table 3 shows that within the year under review, GDP is significantly ( $p < 0.05$ ) affected by the GDP of the previous year, that of the previous four years and the oil price of that year.

**Table 4: The fit of HDI on Oil price using Auto Regressive Distributed Lag model**

Variable	B	t-statistic	p-value
Constant	-0.0704	-0.0997	0.9220
HDI (-1)	0.0118	-0.2724	0.7893
Oil Price	-0.0860	1.1786	0.2582
$\bar{R}^2$	0.090	NA	NA
F-statistic	0.6960	NA	0.5151
D.W	2.118	NA	NA

Source: Author's computation, 2022

NA= not applicable, D.W=Durbin-Watson,  $p < 0.05$  indicates significance

$$HDI_t = -0.0704 + 0.00118HDI_{t-1} - 0.0860OP_t$$

(HDI=human development index, t= time (year), OP= Oil price)

The result of the analysis in table 4 shows that oil price does not significantly ( $p > 0.05$ ) affect HDI in the years under review.

**Table 5: The fit of Inflation rate on Oil price using Auto Regressive Distributed Lag model**

Variable	B	t-statistic	p-value
Constant	23.1312	4.1876	0.0015
Inflation rate(-1)	0.2335	0.9739	0.3510
Inflation rate(-2)	-0.6330	-2.7003	0.0206
Oil Price	-0.0048	-0.1410	0.8904
Oil Price(-1)	-0.0724	-2.1671	0.0530
$\bar{R}^2$	0.404	NA	NA
F-statistic	3.540	NA	0.0432
D.W	2.404	NA	NA

**Source: Author's computation, 2022**

NA= not applicable, D.W=Durbin-Watson,  $p < 0.05$  indicates significance

$$IR_t = 23.1312 + 0.2335IR_{t-1} - 0.6330IR_{t-2} - 0.0048OP_t - 0.0724OP_{t-1}$$

(IR=inflation rate, OP=oil price, t=time (year))

The result of the analysis shows that the Inflation rate of a particular year is significantly ( $p < 0.05$ ) affected by the inflation of the two previous years and the oil price of that previous year simultaneously.

**Table 6: The fit of the Unemployment rate on Oil price using the Auto Regressive Distributed Lag model**

Variable	B	t-statistic	p-value
Constant	0.9400	0.8756	0.3971
Unemployment(-1)	0.9826	7.4782	<0.0001
Oil Price	-0.0071	-0.7508	0.4661
Oil Price(-1)	-0.0002	-0.0287	0.9776
$\bar{R}^2$	0.8055	NA	NA
F-statistic	23.089	NA	0.00002
D.W	1.7781	NA	NA

**Source: Author's computation, 2022**

NA= not applicable, D.W=Durbin-Watson,  $p < 0.05$  indicates significance

$$U_t = 0.9400 + 0.9826U_{t-1} - 0.0071OP_t - 0.0002U_{t-1}$$

(U= unemployment, OP=oil price, t=time (year))

### Summary of the Findings

For Unemployment, the result showed that the unemployment of the previous year affects the current unemployment status significantly but not oil price. According to the findings, the price of oil has a direct and considerable influence on the GDP of Nigeria; however, the price of oil does not have a direct or significant influence on HDI, UR, or IR. This is in contrast to the findings of past studies, which demonstrated that the price of oil had a direct and considerable influence on the expansion of the economy.

### Conclusion

In conclusion, although the country has a wealth of oil resources, the country has not been successful in breaking the cycle of poverty despite the many different policies and initiatives that have been put into place. According to the conclusions of this study, fluctuations in the price of oil have a direct and significant impact on the economy (contrary to the findings of some earlier studies). An increase in the price of oil indeed has a positive influence on the economy, but it also hurts the economy due to the effect that it has on the execution of the budget and the

financial instability that it causes. According to the findings of this study, this has a negative effect on the economy, although not to a degree that can be considered statistically significant.

### Recommendation

In light of the findings, the government ought to make prudent use of the rise in oil prices, with the goal of enhancing fundamental infrastructure and laying out distinct plans and policies for the diversification of the economy. This is because oil prices are positively correlated with the expansion of the economy.

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