

**ANALYZING THE EFFECT OF OIL PRICE FLUCTUATIONS ON NIGERIA
GROSS DOMESTIC PRODUCT**

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**A PROJECT SUBMITTED TO THE DEPARTMENT OF ECONOMICS, IN
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CERTIFICATION

This is to certify that this work titled “**Analyzing the Effect of Oil Price Fluctuations on Nigeria Gross Domestic Product**” was carried out by **Emmanuel Omoroghomwen Ezomo** with matriculation number **SSC2105565** and has been approved in partial fulfillment of the requirement for the award of Bachelor of Science (B.sc) Degree in the Department of Economics, Faculty of Social Sciences University of Benin, Benin City, under the supervision of the following persons;

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DEDICATION

I dedicate this project to God Almighty

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I express my deepest gratitude to God Almighty, the unfailing source of my strength, wisdom and inspiration, throughout the course of this research and the successful completion of this work.

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ABSTRACT

This study Analyze the effect of oil price fluctuations on Nigeria gross domestic product., with a primary focus on its impact on government revenue, foreign exchange rates, investment, economic growth, and overall stability. The objective is to shed light on the complex relationship between OPV and Nigeria's economic performance. Descriptive statistics were employed to analyze historical data, revealing significant insights into OPV's patterns and characteristics in Nigeria. The study emphasizes key statistical measures such as skewness, kurtosis, and normality tests to assess the distribution of OPV. The analysis reveals that OPV is a pervasive factor in the Nigerian economy, with an average volatility level of approximately 17.08. The data suggests that Nigeria experiences occasional spikes in volatility, which can disrupt economic planning. Additionally, the study highlights the potential impacts of OPV on government revenue, foreign exchange rates, investment, economic growth, budget planning, inflation, and unemployment rates. To mitigate the adverse effects of OPV, policymakers are urged to reduce Nigeria's dependency on oil by diversifying the economy, establishing a sovereign wealth fund, and developing robust risk management strategies. Furthermore, investments in infrastructure, fiscal discipline, promotion of economic diversification, and creating a stable investment climate are essential steps to reduce vulnerability to OPV. Public education about the importance of economic diversification and social safety nets to protect vulnerable populations are also emphasized as crucial components of a comprehensive strategy. In conclusion, this study underscores the need for proactive policy measures to navigate the challenges posed by OPV and facilitate Nigeria's transition to a more stable and diversified economic future.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Crude oil as a source of energy since its discovery in the 1800s has been very important to the world economy. Crude oil has an important position in society as a crucial input to global, national and individual production and consumption. Therefore, it is a strategic resource that attracts the interest and attention of nearly everyone on the planet. The prominence of oil has risen to the extent that in a world suddenly without oil, all the major distribution systems that allow economic transactions on a more than local basis would fail and the global economy would collapse (Hathaway, 2009).

Fluctuation in the price of crude is a common phenomenon in the global oil market as the world economy has witnessed a number of changes in the price of crude oil at different times. These price changes, often referred to as crude oil price volatilities are usually described by the events that herald their occurrences. As Hamilton (2011) succinctly puts it, the major post-World-War-II oil volatilities are the Suez Crisis of 1956-57, the OPEC oil embargo of 1973-1974, the Iranian revolution of 1978-1979, the Iran-Iraq War initiated in 1980, the first Persian Gulf War in 1990-91, and the oil price spike of 2007-2008. Crude oil price surged to a historic height in 2008 when it was sold at \$140 per barrel; this was about the highest price recorded in the oil market in recent times (Sanya, 2015).

However, the second half of 2014 marked the beginning of another wave of oil price volatility. By the year 2015, crude oil price had dropped by more than half of its price in the previous year with its attendant consequences on countries of the world. The immediate cause of this fall was the market imbalance sparked by excess supply of crude oil to the market by oil producing countries. Maugeri (2016) noted that the significant output growth experienced by major oil producers like the United States and Iraq as well as the imposition of the policy of no production cutbacks by Saudi Arabia on the Organization of Petroleum Exporting Countries (OPEC) created an output level that could not be absorbed by demand. The steep crash in the prices of crude oil in the international market which was at a time selling above \$140 per barrel to selling as low as \$40 per barrel occurred too sudden for government to take proactive actions to either prevent or minimize its effect.

The oil revenues play a key role in the economic structure of the oil exporting countries. In most of these countries, the oil revenues are an important source of financing the budget and the government budget dependence on oil revenues is very high. It is expected that volatility of the oil market influenced economy aggregate demand, because the government budget constitutes a significant portion of aggregate demand (Yusuf, 2015). Nigeria as a major exporter of oil is not an exception about this matter among OPEC countries. On the one hand, Nigeria's oil exports was rationed by OPEC, on the other hand, the oil price was determined by the global supply and demand. So, the macroeconomic variables were influenced by the change of the oil revenues following the global changes

of the oil prices. This dependence of the macroeconomic variables on oil affected the economic growth. So that the impact of declining oil price is reflected much broader on the economic activities. Increasing in the oil price caused a transfer of income from oil-importing countries to the oil exporting countries. Since the oil sector is one of the important economic sectors in the oil-exporting countries and it has a major contribution in the economic value added, increasing the oil price caused the development of the oil sector which increases the domestic and foreign investment in these countries, and following that the tide of economic growth has flowed.

The major economic investment undertaking by the government in Nigeria is in construction and infrastructural development which arose from increases in oil revenue. The gross domestic product (GDP) is increased by upsurge in the amount of investment in construction projects, and therefore the government has experienced positive economic growth. In contrast, decline in the oil price decreased the oil revenues in these countries, so at the same times, the government expenditure reduced as a result of declining in the oil revenues. This problem reduces the GDP and subsequently reduces economic growth. Since the 1970s, oil producing states have experienced rising budget deficit largely due to the volatile global crude oil prices, and as a result, rising debt-to-gross domestic product (GDP) ratios. In the world's largest crude oil exporter, Saudi Arabia, public debt has been fluctuating since the years following the oil boom (Muye, Kaita, & Hassan, 2016). The recent crash in oil prices undoubtedly plunged Nigeria into an economic quagmire with debilitating effects on some of her major macroeconomic variables. For instance, inflation

rates began a steady rise while the exchange rate continued to depreciate, causing enormous economic difficulties among the populace. Interestingly, as crude oil price was falling at the global market, domestic pump price of petrol in Nigeria suffered distortion and upward review (Ogboru, Rivi & Idisi, 2017).

The stronger naira during the oil boom encouraged import-oriented consumption habit that soon turned Nigeria into a perennial net importer, which became a major problem when oil earnings decreased with lower international oil prices. External reserves collapsed, fiscal deficits mounted and external borrowing ensued with the “jumbo loans” taken in 1979. Nigeria’s debt profile is rising and currently stood at N31.01trn (US\$85.90bn). Most of Nigeria’s macro-economic indices became unstable and worrisome as there was a progressive decline of GDP with the value of naira over the years. For instance, the GDP growth rate which was 25% in 1970 when the naira was N0.7 to a dollar declined to 5% GDP growth rate when the nation’s currency depreciated to N101.7 in 2000 and further reduced to 2% GDP growth rate when naira nosedived to N363.5 per dollar in 2018. The progressive decline of GDP also correlates with increases in crude oil and gasoline pump prices as well as unemployment rate and oil rents from 1970 to date. Nigeria's unemployment rate as at the second quarter of 2020 was 27.1%, indicating that about 21,764,614 (21.7 million) Nigerians remain unemployed. Ayoola (2013) argued that Nigeria as a mono-product economy remains susceptible to the movements in international crude oil prices. Yusuf (2015) also contended that oil plays a critical role in Nigeria in the conduct of fiscal and monetary policies because it accounts for an average of 80% of

government revenue, 90-95% of the foreign exchange earnings and 12% of the real gross domestic product. Despite such windfall, Nigeria has an increasing proportion of impoverished population and experienced continued stagnation of the economy (Okonjo-Iweala & Osafo-Kwaako, 2007).

Nigeria's dependence on oil revenue has been a cause for concern, especially as oil is an internationally traded commodity whose price is subject to unpredictable changes. The volatility in price of oil has various implications for both oil importing and exporting countries alike. However, oil export revenue dependent nations are more prone to the consequences, especially during periods of negative volatility. Nigeria's economy is highly dependent on crude oil export revenue, hence, fluctuations in oil prices affects Nigeria's macroeconomics. As was indicated before, Nigeria is a big oil producing country in Africa and its economy depends heavily on crude oil exports revenue. In addition, she imports refined gasoline to meet up with domestic demand due to inadequate local production. Consequently, Nigeria's case is cut in the irony of being an exporter of crude oil as well as an importer of refined petroleum products. This scenario makes Nigeria unique when considering the oil price and economic growth nexus.

1.2 Statement of the Problem

The volatility of crude oil prices in Nigeria has raised significant concerns about its impact on the country's economy. The sudden and unpredictable fluctuations in oil prices have led to economic instability, affecting various macroeconomic variables. This study seeks to address the following key problems:

1. The need to understand the causal relationship between crude oil price volatility and economic growth in Nigeria.
2. The necessity to analyze the causal relationship between gasoline pump prices and economic growth in Nigeria.
3. The determination of whether crude oil price volatility or domestic gasoline pump prices have a more substantial impact on economic growth in Nigeria.

1.3 Research Questions

Based on the identified research problems, this study aims to answer the following questions:

1. What is the causal relationship between crude oil price volatility and economic growth in Nigeria?
2. What is the causal relationship between gasoline pump prices and economic growth in Nigeria?
3. Which has a greater impact on economic growth in Nigeria: crude oil price volatility or domestic pump prices of gasoline?

1.4 Hypothesis

Based on the research questions, the following hypotheses will be tested in this study:

Null Hypothesis (H₀): there is no significant causal relationship between crude oil price volatility and economic growth in Nigeria.

Alternative Hypothesis (H_1): there is a significant causal relationship between crude oil price volatility and economic growth in Nigeria.

Null Hypothesis (H_0): there is no significant causal relationship between gasoline pump prices and economic growth in Nigeria.

Alternative Hypothesis (H_1): there is a significant causal relationship between gasoline pump prices and economic growth in Nigeria.

Null Hypothesis (H_0): the impact of crude oil price volatility on economic growth in Nigeria is equal to the impact of domestic gasoline pump prices.

Alternative Hypothesis (H_1): the impact of either crude oil price volatility or domestic gasoline pump prices on economic growth in Nigeria is greater.

1.5 Objectives of the Study

The primary objective of this research is to examine the impact of oil price volatility and gasoline pump prices on the Nigerian economy. Following this introduction, the subsequent sections will present a review of relevant literature, the conceptual framework, theoretical framework, and empirical review. The methodology will be outlined in section iii, while section iv will focus on pre-tests and analysis. Estimation results and discussions will be presented in section v, followed by the conclusion of the study with policy implications in section vi.

1.6 Significance of the Study

This research holds significance for several reasons:

- It contributes to the existing body of knowledge by providing insights into the relationship between oil price volatility, gasoline pump prices, and economic growth in Nigeria.
- It offers policymakers and government officials a better understanding of the potential economic impacts of oil price fluctuations, enabling them to make informed decisions.
- The study aids in assessing the vulnerability of Nigeria's economy to external factors, especially in a world where oil price volatility is becoming increasingly common.

1.7 Scopes of Study

The analysis will primarily consider the period from 2014 onwards when Nigeria experienced a significant wave of oil price volatility, the study will concentrate on examining the causal relationships between crude oil price volatility, gasoline pump prices, and economic growth in Nigeria. The geographical scope of the study is limited to Nigeria, as it is a major oil-producing and oil-exporting country with a unique economic structure.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Oil price volatility (OPV) is defined as the standard deviation of oil prices in a given period while an oil price shock is a manifestation of extreme volatility (Ebele, 2015). For the purpose of this study which focuses on oil price volatility as opposed to shocks, it is reasonable to understand the distinction between both measures in terms of the size of price deviations. Acute deviations in oil prices, such as those seen in early 2008 are termed shocks, while relatively minor price deviations are referred to as price volatility (Ebrahim, Inderwildi, & King, 2014). According to Donwa, Mgbame, and Aigboduwa (2015), the term oil price volatility refers to instability, changes, a rise or fall, in the supply or demand side of oil prices in the international oil market. The rise or flux in the prices of oil can be termed positive (i.e. a rise) or negative (i.e. a fall).

2.1 The Concept of Economic Growth

An economy's growth is measured by the change in the volume of its output or in the real incomes of its residents (World Bank, 2006). Economic growth is the continuous expansion of the productive potential of an economy; it means that the capacity utilization to produce goods and services as well as to meet the wants of the populace is increased. Apart from the productive expansion in the goods market, it also refers to a situation whereby improvements in the quality and quantity of resources (including technological improvements) contribute to the overall growth in the real domestic output of an economy.

The measurement of economic growth could be in either real or nominal terms; real growth implies that inflationary and exchange rate adjustments had been taken into consideration. Nevertheless, macroeconomic output is generally measured by Gross Domestic Product (GDP) or one of the other national accounts.

2.1.1 Oil and the Nigerian economy

Nigeria achieved independence from Britain in 1960, a time when oil had little or no role in the management of the Nigerian macro-economy. Ayadi et al (2000) re-ported that the discovery of oil in commercial quantities at Oloibiri, in Nigeria's Niger Delta region, occurred in 1956, but production did not start until 1958. Table 1 shows the relative significance of oil to the economy. A cursory view of table 1 shows that the relative significance of manufacturing increased from 4.8 per cent in 1960 to 8.2 per cent in 1990. However, in 2000 and 2002, this sector of the economy took a big hit. As for the petroleum sector, its relative significance has dominated other sectors, especially since 2000. Therefore, while the petroleum sector grew in importance over time, the industrial sector did not experience much growth.

The country became a member of the Organization of the Petroleum Exporting Countries (OPEC) in 1971. In 2003, it was the fifth-largest supplier of crude oil to the US. It is the seventh-largest producer of oil in the world. The economy of Nigeria is heavily dependent on oil. It accounts for over 90 per cent of the nation's export revenues and over 90 per cent of foreign exchange earnings. Over 80 per cent of government revenue comes

from this source. In 2003, Nigeria produced an average of 2.1 million barrels per day of oil. However, in 2004, OPEC raised Nigeria's production quota to 2.14 mb/d.

The information presented in table 1 becomes clearer as presented in the following

2.2 Conceptual / Theoretical Framework

Oil price volatility (OPV) refers to the degree of fluctuation and variation in the prices of crude oil or oil-related products over a specific period. It is typically measured as the standard deviation of oil prices. OPV quantifies the extent to which oil prices deviate from their average or expected values during a given timeframe.

Distinction between Oil Price Volatility and Shocks:

Oil price volatility and oil price shocks are related but distinct concepts:

Oil price volatility: This encompasses regular fluctuations in oil prices, both upward and downward, that occur as part of the normal market dynamics. These fluctuations can be relatively minor and are part of the routine behavior of oil prices.

Oil Price Shocks: In contrast, oil price shocks represent extreme and sudden deviations in oil prices from their usual patterns. These shocks are often caused by unforeseen events such as geopolitical crises, natural disasters, or major disruptions in the oil supply chain. They are characterized by their magnitude and the disruptive impact they have on economies.

Understanding Positive and Negative Price Deviations:

Positive Price Deviations: Positive deviations in oil prices refer to situations where oil prices rise significantly above their baseline or historical levels. These increases can be

driven by factors such as increased demand, supply disruptions, or geopolitical tensions. Positive deviations are often associated with concerns about inflation and increased production costs.

Negative Price Deviations: Negative deviations in oil prices occur when oil prices fall significantly below their baseline or historical levels. These decreases can result from factors like oversupply, decreased demand, or global economic downturns. Negative deviations can have implications for economic stability, especially for oil-exporting countries heavily reliant on oil revenue.

Instability in Supply and Demand of Oil Price Volatility:

Oil price volatility reflects the instability and fluctuations in both the supply and demand sides of the oil market. Factors influencing OPV include:

Supply Instability: Changes in the production and availability of oil due to geopolitical events, disruptions in oil-producing regions, or changes in production quotas set by oil-exporting countries can contribute to supply-side volatility.

Demand Instability: Fluctuations in global economic conditions, shifts in consumer behavior, and changes in energy policies can lead to variations in oil demand, contributing to demand-side volatility.

Global Market Dynamics: The interplay between supply and demand on the global oil market, influenced by geopolitical tensions, technological advancements, and market speculation, further amplifies oil price volatility.

2.3 Theoretical Framework

2.3.1 The Mankiw, Romer and Weil's Theory of Economic

Growth In view of the shortcomings of Solow's growth model, the amplified version of the model was specified by Mankiw, Romer and Weil (1992). In this augmented version of the model, a Cobb-Douglas production function is assumed. This started off by adding human capital accumulation to the Solow model. According to Mankiw, Romer and Weil (1992), the aggregate output of the economy can be written as:

$$Y = A T K^{\alpha} H^{\beta} L^{1-\alpha-\beta}$$

Where, A - index of technical change that varies overtime but for the moment held constant,

K - the capital stock,

L - labour supply and

H - stock of human capital

It should be noted that the coefficients α and β are assumed to lie between 0 and 1 and $(\alpha + \beta) < 1$, implying that there are decreasing returns to all capital. Assuming s_k to be the fraction of income invested in physical capital and s_h the fraction invested in human capital, the evolution of the economy is determined by:

$$\dot{K} = s_k Y - (n + g + \delta) K$$

$$\dot{H} = s_h Y - (n + g + \delta) H$$

Where, $y = Y/AL$, $k = K/AL$, and

$h = H/AL$ are quantities per effective unit of labour.

It is assumed that the same production function applies to human capital, physical capital, and consumption. In other words, one unit of consumption can be transformed at no cost into either one unit of physical capital or one unit of human capital. Human capital (H) is the knowledge acquired by workers, often as the result of specific investment in education. Since human capital involves investment just as physical capital, it also depreciates. In a case where $\alpha + \beta$ equals one, then there are no constant returns to scale in the reproducible factors and there will be no steady state for the model. It is implied in equations (1a) and (1b) that the economy converges to a steady state defined by:

Substituting equation (2) into the production function and taking the natural logs gives an equation:

This equation shows how per capita income (proxy for economic development – a superset of economic growth) depends on population growth and accumulation of physical and human capital. In adopting the model above for this study, the researcher was motivated by Ahmed, Mahalik and Shahbaz (2016) and Odularu (2008) in which focus was restricted to human capital investment in the form of crude oil, ignoring investment in health, among others. This study, therefore, adopted the Mankiw, Romer and Weil's theory of economic growth.

2.4 Empirical Review

The idea that oil price volatility affect economic growth was first put forth by Hamilton (1973) and then subsequent enormous scholarly works stemmed out. Several other economists have investigated this relationship but there is no uniformity in their

findings as some authors argued that crude oil price volatility could promote growth or has the potential of doing so (Akpan, 2009; Aliyu, 2009; Olomola. 2006; Donwa, Mgbame & Aigboduwa, 2015; Akinlo & Apanisile, 2015; Ogboru, Rivi & Idisi, 2017, etc.) while others said it could also inhibit growth (Darby, 1982; Cerralo, 2005; Cantah & Asmah, 2015 ; ElAnshasya, Mohaddesby & Nugent, 2015). Yet, other findings were inconclusive or insignificant (Ani, Ugwunta, Oliver & Eneje, 2014).

For instance, Amir and Mohammad (2017) investigate the relationship between volatility in oil prices and economic growth in Iran. In their paper, the impact of oil price volatility (OPV) on the economic growth in Iran has been tested by using the threshold regression model on time series data 1980- 2014 extracted from the Central Bank of Iran. Findings of their study show that the OPV equal to 1147.77 acts as a threshold value. Also, due to the fact that the coefficient of OPV has decreased in the second regime compared to the first one, the effectiveness amount of the OPV on economic growth has decreased over time. Their assertion that due to the fact that the coefficient of OPV has decreased in the second regime compared to the first one, the effectiveness amount of the OPV on economic growth has decreased over time is too declarative. They should have found out if the decrease in OPV coefficient in the second regime was due to episodic factors that would have necessitated the application of structural breakes.

On the other hand, Jawad (2013) analyzed the impact of OPV on the economic growth of Pakistan using data from 1973 to 2011. Linear regression analysis used to analyze the dependency among the dependent and independent variables. All variables

including oil price, oil supply, oil demand, GDP, public sector investment, private sector investment and trade balance were stationary at 1st difference through ADF test. Results showed that the trade balance, private sector investments have a significant effect on GDP and public sector investment, OPV have insignificant impact on GDP. He believed that the government should make a proper plan and procedure according to Pakistan's economic growth and requirement which would help to maintain the equilibrium of oil demand and supply and decrease the impact of OPV on the economic growth. Meanwhile, the government of Pakistan should focus on trade balance and also tries to increase private sector investment to increase economic growth. The omission of exchange rate variable from Jawad's study could probably accounted for OPV having insignificant impact on GDP.

Moreover, Mureithi (2014) in his study established the causes of oil import volatility and its effect on economic growth in Kenya. His study used quarterly data from Kenyan National Bureau of Statistics (KNBS), Central Bank of Kenya (CBK), and OPEC to determine the long-run and short-run causes of oil import volatility, and to study the effects of the volatility on GDP growth. The variables of interest are GDP growth rate, exchange rate, OPEC oil production, quantity of money (M2), traffic volume, total manufacturing index, international oil prices, and domestic energy (electricity) production. The analysis is based on the Johansen-Juselius approach to co-integration test and vector error correction. Results indicate that exchange rate was has a statistically significant effect on oil import volatility in the short-run. In the long-run, oil import volatility is determined

by several macroeconomic variables. Specifically, exchange rate, traffic volume, total manufacturing index, and GDP growth rate have positive and statistically significant effects on oil import volatility. OPEC oil production has a negative relationship with oil import volatility. Mureithi used too many variables (8 variables) with some of them like domestic energy (electricity) production irrelevant. He should have used domestic energy (gasoline) pump price.

Moreover, Ani, Ugwunta, Oliver and Eneje (2014) investigated chiefly the casual relationship between oil prices and key macroeconomic variables in Nigeria in a multivariate framework using time-series data from 1980 to 2010. To examine whether there is prediction between oil prices and macroeconomic indicators (inflation, interest rate, exchange rate and real GDP) as well as the impact of oil prices on the applied macroeconomic indicators, their research adopted the Granger causality and the Ordinary Least Square (OLS) respectively. After ensuring data stationarity, their results suggest that in the short-run, changes in the GDP is not influenced by oil price volatility, nor do they found evidence of influence on key macroeconomic variables. Again, the findings indicated that there is a positive but insignificant relationship between oil price and the Nigerian GDP and that, overall, oil prices have no significant impact on real GDP and exchange rate in Nigeria. Their findings suggested that Nigeria has a special case of the Dutch Disease, where a country seemingly good fortune proves ultimately detrimental to its economy. The authors employed outdated models like OLS and Granger causality test and yet they didn't utilize important variables like gasoline price and monetary policy rate

that would have shed more light on the relationship between oil price volatility and economic growth in Nigeria.

In addition, Akinlo and Apanisile (2015) investigated the impact of the volatility of oil price on economic growth in 20 Sub-Saharan African countries from the period of 1986-2012. These countries were divided into Group A and Group B. Group A consists of 10 oil exporting countries, while Group B consists of non-oil exporting countries in sub-Saharan Africa. Panel data were used for the analysis. Panel pooled OLS, panel fixed effect model and generalized method of moment (GMM) models were employed in the estimation for both oil exporting and non-oil exporting countries. The estimation of panel A model consisting of the oil exporting countries showed that the OPV has a positive and significance effect on the economic growth of oil exporting countries. The result of panel B consisting of non-oil producing countries showed that the volatility of oil price also has a positive and insignificant impact on economic growth. The Panel pooled OLS, panel fixed effect model and generalized method of moment (GMM) models employed by Akinlo and Apanisile for this study are not appropriate for this study. The most appropriate model should have been Panel ARDL.

Similarly, El-Anshasya, Mohaddesby and Nugent (2015) examined the long-run effects of oil revenue and its volatility on economic growth as well as the role of institutions in this relationship. They collected annual and monthly data on a sample of 17 major oil producers over the period 1961 to 2013, and used the standard panel autoregressive distributed lag (ARDL) approach as well as its cross-sectionally augmented

version (CS-ARDL) for estimation. Therefore, in contrast to the earlier literature on the resource curse, the authors took into account all three key features of the panel: dynamics, heterogeneity and cross sectional dependence. Their results suggest that (i) there is a significant negative effect of oil revenue volatility on output growth, (ii) higher growth rate of oil revenue significantly raises economic growth, and (iii) better fiscal policy (institutions) can offset some of the negative effects of oil revenue volatility. They, therefore, argue that volatility in oil revenues combined with poor governmental responses to this volatility drives the resource curse paradox, not the abundance of oil revenues as such. Their conclusion that that volatility in oil revenues combined with poor governmental responses to this volatility drives the resource curse paradox and not the abundance of oil revenues as such is questionable and against realities. It is endemic corruption in the oil industry in Nigeria for instance which retard growth.

Cantah and Asmah (2015) employed the ARDL approach to cointegration to examine the relationship between crude oil price and Ghana's economic growth using annual data set from 1967 to 2011. Unlike previous studies on crude oil price economic growth relationship for Ghana, this study controlled for the effect of fiscal policy in the relationship. The results of the study indicated the existence of a long run relationship between crude oil price and economic growth in Ghana. Also, the study revealed that oil price increases had a negative impact on economic growth in both the short run and long run and this was reinforced by increases in government expenditure in response to the oil price in the form of fuel subsidies. The policy implications are that fuel subsidies should be

removed and the country should consider alternative sources of energy such as Compressed Natural Gas (CNG), liquefied Petroleum Gas (LPG), or Ethanol (Fuel made from sugar cane) which are cheaper relative to crude oil price. The ARDL approach to cointegration employed by Cantah and Asmah to examine the relationship between crude oil price and Ghana's economic growth was appropriate but the weakness of their study was omission of domestic pump price of gasoline.

On the other hand, Ogunsakin and Oloruntuyi (2017) examined the relationship between oil price volatility and macroeconomic performance in two top net oil exporting countries in Africa (Angola and Nigeria). Quarterly data which were sourced from international monetary fund online database and Central Bank of Nigeria and Angola were used to carry out the empirical analysis. Structural Vector Autoregressive model (SVAR), E(GARCH) and Granger Causality test were used as estimation techniques. Findings from the results showed that oil price volatility has marginal impact on growth rate of Gross Domestic Product of both countries. However, both Impulse Response Function and Variance Decomposition showed that shocks to exchange rate from oil price volatility was the highest. That is, exchange rate appreciates when oil price increases and depreciates when oil price reduces. This has much impact on the economies of Angola and Nigeria being net oil exporting countries. The Granger causality test showed that the direction of causality between oil price volatility and macroeconomic variables in Nigeria was bi-directional while the relationship in Angola was uni-directional during the study period. Based on these findings, it is recommended that, both countries Angola and Nigeria should

improve upon their crude oil refining capacity. Also Economic diversification should be strengthened to promote indigenous production so as to reduce importation of those goods that could be endogenously produced.

Amagoh, Odoh and Okuh (2014) in their multivariate study of the implications of pump prices of petroleum products change on some economic variables reveals that PMS has significant impact on all economic variable studied. The AGO also has significant impact on only GDP and Per capita GDP while DPK only has significant impact on GDP per capita. Ocheni (2015) examined the impact of fuel price increase on the Nigerian economy in 2014. The study adopted a survey research design approach to evaluate the level of effect the fuel price increase has on the Nigeria economy. Finding revealed that there is a significant relationship between the recent increases in fuel prices and economic growth in Nigeria. It was also discovered that the Nigeria economy is not developing because of the effect of fuel price hike on purchasing power and finally the finding showed that there is significant relationship between increase in pump price of petroleum and food security.

Nwosa (2013) examined the effect of gasoline price on economic sectors in Nigeria from 1980 to 2010. The objectives of the study are to examine the long and short run relationship between gasoline price and sectoral output in Nigeria. Six sectors (agriculture; manufacturing; building and construction; wholesale and retail; transportation and communication) of the economy were examined. The long run regression estimate showed that gasoline price is a significant determinant output in all sectors examined with

exception to the building and construction sector while the short run error correction estimate revealed that only output of the agriculture and the manufacturing sectors of the Nigerian economy is affected by gasoline price increase in the short run

In the same vein, Donwa, Mgbame and Aigboduwa (2015) based on the empirical review found that there is a significant and positive relationship between OPV and Nigeria economic growth. He believes that oil price changes determine 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 include that the country should diversify its export revenue base as a means of minimizing reliance on crude oil and petroleum products 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 OPV on the economy, and thus prevent the effect of the shocks from attaining a statistical significance level. The study by Donwa, Mgbame and Aigboduwa (2015) was only an empirical review and as such, didn't estimate the relationship between oil price and economic growth in Nigeria.

In contrast, Alhassan and Kilishi (2016) (2016) gave a diagnostic insight on macroeconomic modelling and oil price volatility in Nigeria. They used GARCH model and its variants (GARCH-M, EGARCH and TGARCH) with daily, monthly and quarterly data. They found that the macroeconomic variables included in the model in terms of (real

gross domestic product, interest rate, exchange rate and oil price) are exceptionally unstable; the asymmetric models (TGARCH and EGARCH) outperform the symmetric models (GARCH (1 1) and GARCH – M); and oil price is a noteworthy source of macroeconomic fluctuation in Nigeria. By suggestion, the Nigerian economy is vulnerable to both internal shocks (interest rate volatility, real GDP volatility) and external shocks (exchange rate volatility and oil price volatility). In this way, it is reasoned that more assurance ought to be given to symmetric models in dealing with macroeconomic volatility in Nigeria and oil price volatility should be considered as pertinent variable in examining macroeconomic fluctuations in Nigeria. The authors employed many models and variables yet they didn't utilize important variables like gasoline price and monetary policy rate that would have shed more light on the relationship between oil price volatility and economic growth in Nigeria.

Likewise, Mai-Lafia, Eneji and Nnandi (2016) assessed the impact of oil price volatility on macroeconomic variables and sustainable development in Nigeria. They argued that the significant role of oil in the Nigerian economy cannot be overestimated. They acknowledged that there were studies by other researchers on oil prices and macroeconomic variables, but the findings by such studies were contentious and country-specific. They used secondary time series data in a Vector Autoregression (VAR) analysis. They found that fluctuations in oil prices do substantially affect the real GDP, exchange rates, Unemployment, Balance of payments and interest rates in Nigeria, and that negative volatility in the international oil market, have significant impact on price fluctuations.

They concluded that due to increased imports in the Nigerian economy, inflationary pressures are inevitable and are pronounced and that government revenues and expenditures have decreased significantly. They, therefore, recommended diversification of the economy and energy sources for sustainable development in Nigeria. The study didn't utilize important variables like gasoline price and monetary policy rate that would have shed more light on the relationship between oil price volatility and economic growth in Nigeria.

However, Orlu, (2017) investigated the impact of Premium Motor Spirit (PMS) Price on the growth of Nigerian economy as well as the effect of gross domestic investment (GDI), labour employment (LEMP) and lending interest rate (LIR) between 1970 and 2013 on economic growth of Nigeria. The study focused on PMS pricing due to government foot dragging on the deregulation of PMS Price in Nigeria. For his study, secondary data were obtained from Statistical fact sheets of National Bureau of Statistics (NBS) and Central Bank of Nigeria (CBN) publications. Using the Error Correction Mechanism approach, the study reveals that increase in PMS Price had a negative significant impact on the Nigerian economy (Real GDP) at 5% level of significance. This indicates that 1% rise in PMS price of one year lag leads to 0.7% decrease in Real GDP. That is, increase in energy (PMS) price will negatively impact on the production of the firms, individuals (household) or Government Institutions, which will consequently lead to a fall in real GDP.

Similarly, Ogboru, Rivi and Idisi (2017) empirically examined the impact of changes in crude oil prices on economic growth in Nigeria from 1986 to 2015. Variables used were crude oil price, inflation rate, real effective exchange rate, fuel pump price and GDP growth rate. They applied Ng-Perron and ZivotAndrews Tests, Johansen's co-integration Test, Granger Causality Test and the Vector Error Correction Model (VECM) as techniques of analysis. The time series property examined showed the existence of co-integration among the variables while the empirical results suggest that the ECT coefficients have negative signs and are statistically significant in all VECMs. In addition to that, the significance of ECT also exhibits that if the system is exposed to shock, it will converge to the long-run equilibrium at the following speed: for GDP (- 0.8002), inflation (-0.6714) and real effective exchange rate (-0.5715). VECMs compare to the convergence speed of fuel pump price (-0.6047) and crude oil price (-0.0436), VECMs. The study found out that a positive and unidirectional relationship that runs from crude oil prices to GDP growth rates exists. The value of R² and that of adjusted R² stood at 0.6177 and 0.5085 respectively. The value of F-statistic is 5.6570 and it is greater than the tabulated value of 2.76. The study concluded that crude oil price exert positive influence on the economic growth of Nigeria. The study recommends the need for diversification, building of buffers, more refineries and overhaul of the existing ones as well as the adoption of floating exchange rate policy. A critique of this study is in the choice of methodology: Johansen's co-integration Test, Granger Causality Test and the Vector Error Correction Model (VECM) as techniques of analysis. It has been demonstrated that ARDL bounds test

approach to cointegration gives more robust results in small samples than the Johansen's approach.

Yakubu and Akanegbu (2019) examined empirically the effect of oil price volatility on economic growth in Nigeria using annual time series data from 1985 – 2016. Their study adopts the econometric method of multiple linear regression approach using Ordinary Least Square (OLS). The findings revealed that OPV has a negative and insignificant effect on economic growth in Nigeria. It was also found that the variables used in the study have a long-run relationship and finally no evidence of causality was found between oil price volatility and economic growth in Nigeria. The study recommends that exploring other alternatives has the potential to make the Nigerian economy stronger to face volatility crisis. Their findings are conflicting. It indicates problems of multicollinearity, model misspecification and inappropriate stationary test as well.

2.4.1 Research Gaps

From the foregoing review of literature it was found that the debate on oil price and economic growth relationship remains largely unresolved with three strands emerging. One thought argued that changes in crude oil prices have positive impact on economic growth, others opined that the effect is a negative one and yet still, the third category of researchers saw no link between the two. The combination of these factors provoked many questions than answers and further stimulates the need for this study. Moreover, Nigeria's case is cut in the irony of being an exporter of crude oil as well as an importer of refined petroleum products. As such, it will be difficult to make a conclusive and authoritative statement on

the impact of oil price on the Nigerian economy without a simultaneous assessment of the joint effect of crude oil price volatility and gasoline price on growth. However, very few studies (Ogboru, Rivi, & Idisi, 2017) simultaneously considered the joint effect of crude oil price and domestic pump price of gasoline in the study of the relationship between oil price and the Nigerian economy. Even then, no specific study on the impact of oil price volatility on the Nigerian economy has concurrently applied crude oil price volatility and gasoline pump price as variables. As such, the area of research is still pretty grey and would require further investigation compared to other fields with abundant extant literature. Hence, there is the need to fill the gap by adding gasoline pump price to the model in order to test for its simultaneity impact with crude oil price volatility on economic growth in Nigeria. In addition, even though Olubusoye, Oloko, Isah and Ogbonna (2016) added monetary policy rate (MPR) to their model, their study focused on impact of oil price and monetary policy shocks on macroeconomic fundamentals and not on oil price volatility. Hence, this study filled this gap by adding the MPR to the model of assessing the impact of oil price volatility on the Nigerian economy. This is in line with Bohi (1989), Bernanke, Gertler and Watson (1997), DeLong (1997), Barsky and Killian (1999), Clarida, Gali and Gertler. (2000) and Hooker (2002) who suggested that there is a role for monetary policy when dealing with oil price volatilities.

Moreover, this research encompassed the time period from 1970 to 2018, thereby captured most of the known volatility time frame which makes the scope of this study wider when compared to previous researches. In addition, the adoption of the

Autoregressive of order one [AR (1)] model to extract volatility from annual data instead of the ARCH/GARCH and the standard deviation methods commonly used to extract volatility from daily, weekly and monthly dataset makes this study unique in terms of methodology in the Nigeria's setting. Even though few studies (Loayza & Ranciere, 2006; Shahbaz, 2013; and Devereux & Sutherland, 2009) used an approach similar to AR(1) method to generate volatility in foreign countries, its application in Nigeria is still lacking. The addition of a stochastic or deterministic time trend to the AR(1) which absolute value of the residuals is extracted as the oil price volatility is still a grey area in application in the Nigeria's setting. Hence, the need to fill this gap with an adoption of AR(1) with a stochastic or deterministic time trend to extract oil price volatility. Finally, the combination of Granger causality test with ARDL models for estimation enables a comparative analysis of findings which make this study unique.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

To investigate the impact of oil price volatility on the Nigerian economy, an ex-post facto research design was employed. This research approach delves into past events and relies on preexisting data. The success of a research study hinges on the careful design of its components to address the research problem effectively. In this chapter, we outline the key elements of our research strategy and provide insight into the sources of data. Additionally, we identify the specific variables under scrutiny in this study. Lastly, we elucidate the methodologies employed to conduct this research.

The data for this study were primarily sourced from reputable and official publications. The primary data source is the Statistical Bulletin of the Central Bank of Nigeria, spanning various issues from 1990 to 2020. These bulletins serve as a valuable repository of economic information, making them ideal for a comprehensive analysis of the Nigerian economy over the selected period.

3.2 Theoretical Framework

The theoretical framework of this study on "Oil Price Volatility and the Nigerian Economy" is based on Mankiw, Romer, and Weil's Economic Growth Theory, which provides valuable insights into how fluctuations in oil prices can impact economic growth in a resource-dependent economy like Nigeria.

Mankiw, Romer, and Weil's Economic Growth Theory, often referred to as the Solow Growth Model, offers a framework to analyze the relationship between factors of production and economic growth. In this context, we can apply this theory to understand the dynamics of oil price volatility and its effects on the Nigerian economy. In the context of studying the impact of oil price volatility on the Nigerian economy, the Solow Growth Model provides a foundational structure. This model starts with a production function that links a country's real GDP (Y) to its inputs of capital (K) and labor (L). To incorporate the effect of oil price volatility, we can extend this production function as follows:

$$Y = F(K, L, O)$$

- Y represents Nigeria's real GDP.
- K symbolizes the total capital stock in the economy.
- L denotes the size of the labor force.
- O signifies the influence of oil price volatility on economic output.

The theory emphasizes the role of capital accumulation as a driver of economic growth. In Nigeria, oil revenue contributes significantly to capital accumulation through investments in infrastructure, human capital, and technology. Oil price volatility can affect the rate of capital accumulation due to fluctuations in government revenue. The Solow Model underscores the importance of technological progress (A) in driving economic growth. Oil price volatility can influence the adoption of new technologies in the oil sector and also affect the broader economy through changes in government policies and investments.

The theory suggests that economies tend to converge towards a steady-state level of income. Oil price volatility may disrupt this convergence process by affecting savings and investments, potentially leading to divergence in income levels among different regions or sectors within Nigeria. The Solow Growth Model provides insights into the role of government policies in mitigating the adverse effects of oil price volatility. It underscores the importance of prudent fiscal policies, diversification of the economy, and investments in human capital and technology to foster sustainable economic growth, especially in the face of volatile oil prices.

3.3 Model Specification

To empirically examine the impact of oil price volatility on the Nigerian economy within the framework of Mankiw, Romer, and Weil's Economic Growth Theory (Solow Growth Model), a comprehensive model specification is presented. This specification seeks to capture the intricate relationship between oil price volatility and various economic variables in Nigeria.

$$\text{GDPR} = f(\text{OPV}, \text{GFCF}, \text{UNEM}, \text{EXCR}, \text{FDI})$$

Where

GDPR = Gross Domestic Product growth rate

OPV = Oil Price Volatility

GFCF = Gross Fixed Capital Formation

UNEM represents Unemployment rate

EXCR represents Exchange rate

FDI represents Foreign Direct Investment

3.4 Determination of Reliability of Estimated Results

Oil Price Volatility (OPV): A priori Expectation: Negative relationship

Rationale: Increased oil price volatility can lead to uncertainty in revenue and economic instability in a heavily oil-dependent economy like Nigeria. Higher oil price volatility may hinder economic growth due to fluctuations in government revenue and investment.

Gross Fixed Capital Formation (GFCF): A priori Expectation: Positive relationship

Rationale: Higher levels of gross fixed capital formation, indicating increased investment in infrastructure and productive assets, are generally expected to contribute positively to GDP growth by enhancing productive capacity and economic efficiency.

Unemployment Rate (UNEM): A priori Expectation: Negative relationship

Rationale: It is anticipated that a higher unemployment rate will have a detrimental effect on GDP growth. High unemployment rates can signify underutilized labor resources and reduced consumer spending power, potentially leading to lower economic growth.

Exchange Rate (EXCR): A priori Expectation: Direction is ambiguous

Rationale: The relationship between the exchange rate and GDP growth can vary. An appreciation of the exchange rate may positively affect economic growth by reducing import costs, while it may negatively impact growth by making exports less competitive. The direction of the relationship may depend on various factors.

Foreign Direct Investment (FDI): A priori Expectation: Positive relationship

Rationale: Foreign Direct Investment is often seen as a source of capital, technology, and employment. Higher FDI inflows are generally expected to contribute positively to economic growth by increasing capital formation and improving productivity.

3.5 Methodology

In this research, we will employ a methodology that includes descriptive analysis, measures of central tendency, visual representation of data, trend analysis, and correlation analysis to comprehensively investigate the variables and address the research issue.

Descriptive analysis is the initial step in our research methodology. It involves using statistical techniques to summarize, organize, and present data in a meaningful and informative manner. Descriptive statistics aim to provide a clear and concise overview of the data, enabling researchers to understand the fundamental characteristics and patterns within the collected information.

3.5.1 Measures of Central Tendency:

Measures of central tendency are statistical tools used to represent the typical or central value of a dataset. They offer a single value that summarizes the distribution of the data and provide insight into where most of the data points are concentrated. The primary measures of central tendency we will employ are as follows:

Mean: The mean is calculated by summing all values in the dataset and dividing the total by the number of data points. It is often referred to as the "average" and is widely used in various fields. The mean, however, can be sensitive to extreme values, known as outliers, which can significantly influence it.

Median: The median is the middle value in a dataset when the data is arranged in ascending or descending order. It divides the lower half of the data from the upper half. The median is not affected by outliers and is considered a robust measure of central tendency.

Mode: The mode is the value that appears most frequently in a dataset. It represents the data point with the highest frequency. A dataset can have one mode (unimodal) or multiple modes (bimodal, trimodal, etc.), or it can be multimodal if several values share the highest frequency. Unlike the mean and median, the mode can be used with both numerical and categorical data.

3.5.2 Visual Representation of Data

Visual representation of data, or data visualization, is the graphical portrayal of information and data to effectively communicate insights, trends, and patterns. Data visualization plays a vital role in data analysis and decision-making by providing an intuitive understanding of complex data. We will utilize various visualization techniques to enhance our data analysis.

Trend Analysis:

Following measures of central tendency, we will conduct trend analysis to illustrate changes in the variables over the years. This analysis will help identify and visualize any discernible patterns or shifts in the data.

3.5.3 Correlation Analysis:

Lastly, we will perform correlation analysis, a statistical technique used to examine the relationships between two or more variables. This analysis will determine whether and to what extent the variables are related, along with the direction and strength of their associations. Correlation analysis is a valuable tool to explore patterns and dependencies between different variables and will contribute to our research findings.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF RESULT

4.1 Data Presentation and Trends

4.1.1 Descriptive Statistics

Descriptive statistics are a set of statistical measures used to summarize and explain a dataset, which can represent either an entire population or a sample from it. These statistics can be categorized into measures of central tendency, measures of variability (spread), and, at times, measures of normality. These measures serve the purpose of providing fundamental and valuable insights into the variables under consideration. They include the mean, median, maximum, minimum, standard deviation, skewness, kurtosis, and the Jarque-Bera statistic.

The Mean, for instance, calculates the average value of a given set of data points or a data series. The median, on the other hand, identifies the middle value within a series of observations. The maximum simply represents the data point with the highest value in the series. Standard deviation, a measure of dispersion, quantifies the variability of data points from the mean.

Skewness assesses the symmetry or asymmetry of a dataset. In cases of symmetry, the data is evenly distributed to the left and right. However, an asymmetric dataset may have a longer tail to the left (negatively skewed) or to the right (positively skewed). Kurtosis, on the other hand, gauges the peakedness or flatness of a dataset's distribution. A kurtosis coefficient of 3 indicates a mesokurtic distribution, while a coefficient greater than

3 suggests a leptokurtic distribution (highly peaked), and a coefficient less than 3 indicates a platykurtic distribution (flattened).

Table 4.1: Descriptive Statistics

	EXCR	FDI	GDPR	GFCF	OPV	UNEM
Mean	129.3248	30.82806	4.342581	47.27548	17.08161	4.687742
Median	128.6500	30.40000	4.630000	43.97000	17.13000	4.000000
Maximum	358.8100	74.40000	15.33000	123.8400	31.48000	9.710000
Minimum	8.040000	1.040000	-2.040000	12.34000	0.000000	3.700000
Std. Dev.	97.16521	24.33722	4.082044	28.62462	7.134231	1.711609
Skewness	0.685857	0.183733	0.413115	0.806562	-0.385149	1.958325
Kurtosis	2.839494	1.595238	3.180398	3.128515	2.911073	5.158864
Jarque-Bera	2.463676	2.723332	0.923798	3.382464	0.776637	25.83442
Probability	0.291756	0.256233	0.630086	0.184292	0.678196	0.000002
Sum	4009.070	955.6700	134.6200	1465.540	529.5300	145.3200
Sum Sq. Dev.	283232.4	17769.01	499.8926	24581.06	1526.917	87.88814
Observations	31	31	31	31	31	31

Source: Authors compilation using evIEWS 10

The dataset consists of six variables over 31 periods, including Exchange Rate (EXCR), Foreign Direct Investment (FDI), Gross Domestic Product Growth Rate (GDPR), Gross Fixed Capital Formation (GFCF), Oil Price Volatility (OPV), and Unemployment Rate (UNEM). The mean values of the variables over the 31 periods reveal some key insights. Exchange Rate (EXCR) has an average of approximately 129.32 Naira per Dollar, while Foreign Direct Investment (FDI) averages around 30.83 billion dollars. Gross Domestic Product Growth Rate (GDPR) shows an average growth rate of about 4.34%, and Gross Fixed Capital Formation (GFCF) has an average of roughly 47.28 billion Naira.

Oil Price Volatility (OPV) holds an average value of approximately 17.08, and Unemployment Rate (UNEM) has an average rate of roughly 4.69%.

When looking at the median values, which represent the middle values of the datasets, we find that Exchange Rate (EXCR) has a median of 128.65 Naira per Dollar, Foreign Direct Investment (FDI) has a median of 30.40 billion dollars, and Gross Domestic Product Growth Rate (GDPR) shows a median of 4.63%. Additionally, Gross Fixed Capital Formation (GFCF) has a median of 43.97 billion Naira, Oil Price Volatility (OPV) has a median of 17.13, and Unemployment Rate (UNEM) has a median of 4.00%.

Exploring the maximum values observed in the dataset, we find that Exchange Rate (EXCR) reached a maximum of 358.81 Naira per Dollar, Foreign Direct Investment (FDI) reached a maximum of 74.40 billion dollars, and Gross Domestic Product Growth Rate (GDPR) peaked at 15.33%. Moreover, Gross Fixed Capital Formation (GFCF) had a maximum of 123.84 billion Naira, Oil Price Volatility (OPV) reached a maximum of 31.48, and Unemployment Rate (UNEM) had a maximum value of 9.71%.

On the other end of the spectrum, the minimum values in the dataset indicate that Exchange Rate (EXCR) had a minimum of 8.04 Naira per Dollar, Foreign Direct Investment (FDI) had a minimum of 1.04 billion dollars, and Gross Domestic Product Growth Rate (GDPR) reached a minimum of -2.04% (noting a negative growth rate). Gross Fixed Capital Formation (GFCF) had a minimum of 12.34 billion Naira, Oil Price Volatility (OPV) had a minimum of 0.00 (possibly indicating no volatility), and Unemployment Rate (UNEM) had a minimum value of 3.70%.

To assess the variability or spread of each variable around its mean, we can examine the standard deviations. Exchange Rate (EXCR) has a standard deviation of 97.17, Foreign Direct Investment (FDI) has a standard deviation of 24.34 billion dollars, and Gross Domestic Product Growth Rate (GDPR) shows a standard deviation of 4.08. In addition, Gross Fixed Capital Formation (GFCF) has a standard deviation of 28.62 billion Naira, Oil Price Volatility (OPV) has a standard deviation of 7.13, and Unemployment Rate (UNEM) has a standard deviation of 1.71.

All the variables exhibit positive skewness, indicating that their distributions have a longer tail to the right. GDPR is only slightly positively skewed, while UNEM shows a more significant positive skew. In terms of kurtosis, GDPR has a kurtosis coefficient of 3.18, suggesting a leptokurtic distribution with more extreme values. The other variables exhibit varying degrees of kurtosis, indicating that their distributions may deviate from a normal distribution.

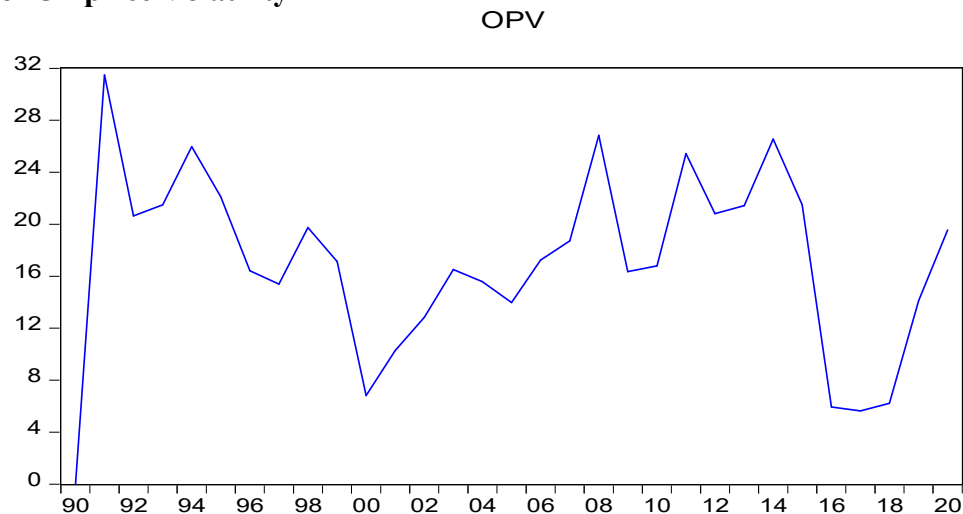
The Jarque-Bera statistic, which assesses the normality of distributions, reveals that the distribution of Gross Domestic Product growth rate (GDPR) and Oil Price Volatility (OPV) closely approximate normality with statistics of 0.92 and 0.77, respectively. However, the distribution of Gross Fixed Capital Formation (GFCF) moderately deviates from normality, as indicated by a Jarque-Bera statistic of 3.38. Conversely, the Unemployment rate (UNEM) exhibits a significant departure from normal distribution with a remarkably high Jarque-Bera statistic of 25.83. Exchange rate (EXCR) and Foreign

Direct Investment (FDI) distributions are reasonably close to normal, with Jarque-Bera statistics of 2.46 and 2.72, respectively.

4.1.2 Trend Analysis of the Variables

A trend is the overall direction of a variable of interest over time. It is the most consistent element of a distribution across time. The graphical trend of the respective variables used in this research work are given below.

Trend of Oil price Volatility



Source: Authors computation on eviews 10. OPEC 2021 issue

From 1990 to the early 2000s, Nigeria's Oil Price Volatility (OPV) exhibited relatively stable fluctuations, ranging from a low of 5.63 to a high of 31.48. This period can be characterized as one of moderate volatility in oil prices, with fluctuations not exceeding the 31.48 mark.

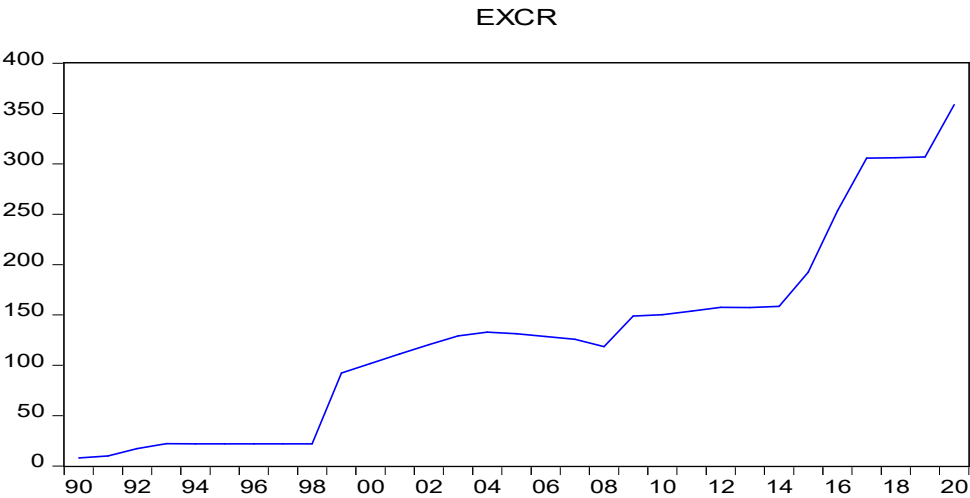
However, from around 2004 to 2013, OPV displayed a degree of variability. It reached its highest point in 2004 at 31.48 and experienced fluctuations, with values such as

25.97, 26.84, and 26.56 in subsequent years. Nevertheless, it did not surpass the levels seen in the early 1990s.

After 2013, OPV appeared to stabilize again, with values around 20.65, 21.49, and 22.12, suggesting a period of relative stability in oil prices. However, it's essential to note that oil prices remained significantly higher than the levels observed in the 1990s.

Overall, the trend analysis indicates that Nigeria experienced periods of moderate to relatively high oil price volatility from 1990 to 2013, with fluctuations in the early 2000s and a peak in 2004. Afterward, there was a return to a more stable oil price environment, albeit at higher price levels. Economic factors, global oil market dynamics, and policy measures can influence oil price volatility, highlighting the importance of considering broader economic and global contexts when interpreting these trends.

Trend of exchange rate



Source: Authors computation on eviews 10. World Indicators 2021

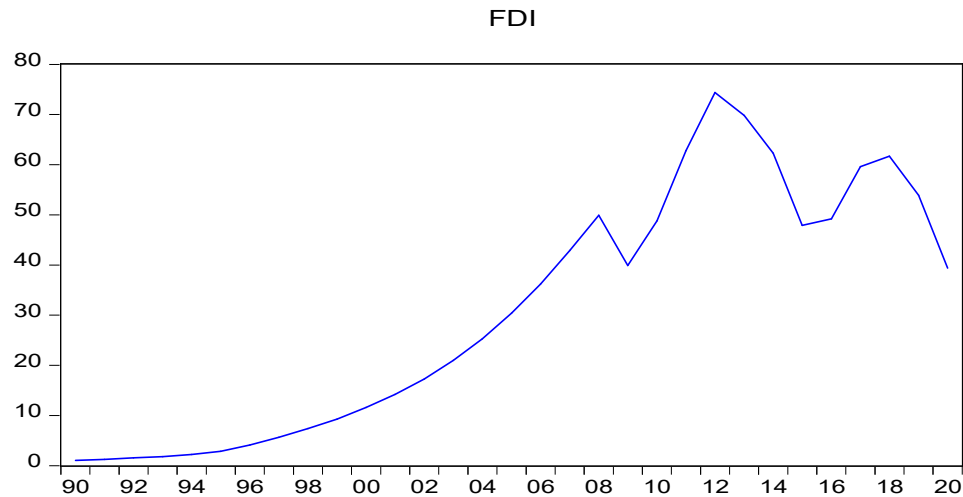
From 1990 to the early 2000s, Nigeria's exchange rate (1\$/Naira) remained relatively stable and low, fluctuating within a narrow range. It started at 8.04 and gradually increased over this period, reaching around 22.07 in the early 2000s. This period can be seen as characterized by a stable and relatively low exchange rate. However, from around 2004 to 2013, the exchange rate started to increase more significantly, reaching 129.22 by 2013. This marked an extended period of moderate depreciation of the Naira against the U.S. dollar, indicating some fluctuations in the exchange rate during this time.

After 2013, the exchange rate experienced a more rapid increase, particularly from 2014 to 2016, where it spiked to 306.08 in 2016. This period signaled a considerable depreciation of the Naira, indicating economic challenges and increased exchange rate volatility.

The situation continued to worsen from 2017 to 2020, with the exchange rate rising further to levels above 358.81 by the end of the period. This represents a prolonged period of economic difficulties and a significant depreciation of the Naira against the U.S. dollar.

Overall, the trend analysis shows that Nigeria experienced a period of stable and low exchange rates in the 1990s and early 2000s. However, since the mid-2000s, there has been a significant increase in the exchange rate, particularly from 2014 onwards, indicating increased exchange rate volatility and economic challenges. It's important to note that various economic factors and policy measures can influence exchange rates, and these trends should be considered in the context of broader economic and social factors.

Trend of Foreign Direct Investment in Nigeria



Source: Authors computation on eviews 10. World Indicators 2021

From 1990 to the early 2000s, Nigeria's Foreign Direct Investment (FDI) exhibited a consistent upward trend, steadily increasing from 1.04 billion dollars to 14.2 billion dollars by 2003. This period can be characterized as one of significant growth and attractiveness for foreign investments.

Between 2003 and 2013, FDI continued to grow, reaching its peak at 74.4 billion dollars in 2013. This period represents a robust and dynamic phase for foreign investment in Nigeria, with a substantial influx of capital into the country's economy. However, from 2014 onwards, the trend in FDI began to shift, experiencing fluctuations and a gradual decline. In 2016, FDI declined sharply to 39.9 billion dollars, indicating a potential change in the economic landscape and foreign investment climate.

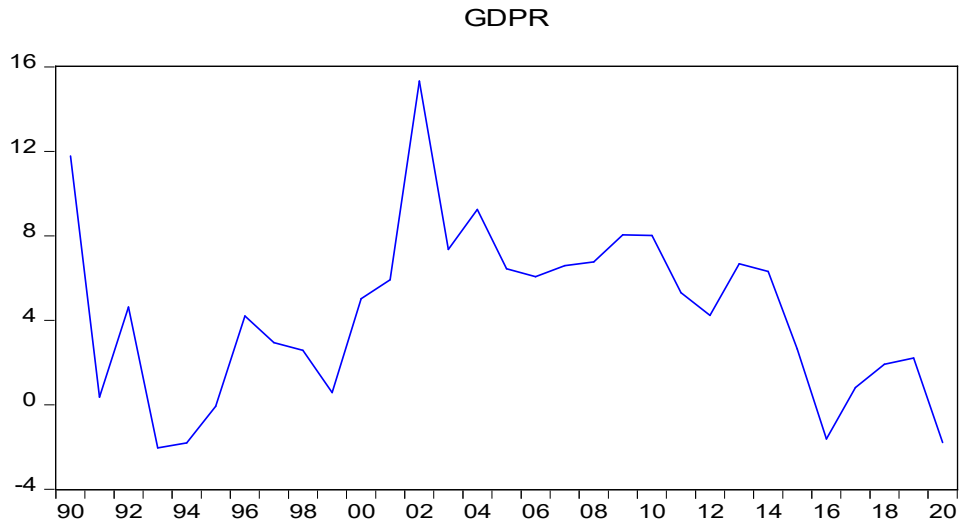
The situation worsened from 2017 to 2020, with FDI decreasing further to 39.4 billion dollars in 2017, 48.8 billion dollars in 2018, and 62.8 billion dollars in 2019, before

dropping to 53.9 billion dollars in 2020. This period reflects a challenging environment for foreign investment, potentially influenced by economic factors and policy measures.

In summary, the trend analysis of Foreign Direct Investment in Nigeria from 1990 to 2020 indicates a prolonged period of growth and attractiveness for foreign investments from the early 1990s to the mid-2010s. However, from 2014 onwards, there has been a shift in the trend, marked by fluctuations and a decline in FDI, suggesting changing economic conditions and investment dynamics. It's essential to consider broader economic and policy contexts when interpreting these trends in foreign investment.

Trend of Gross Domestic Product growth rate

From 1990 to the early 2000s, Nigeria's Gross Domestic Product growth rate (GDPR) exhibited notable fluctuations. It began at 11.78% in 1990 and experienced varying levels of growth, including a dip to 0.36% in 1991. However, it rebounded to 4.63% in 1992 and then temporarily turned negative at -2.04% in 1993 before slightly recovering to -1.81% in 1994. From 1995 to 2000, the GDP growth rate remained relatively stable, hovering around 4% to 5%, indicating a period of moderate economic performance.



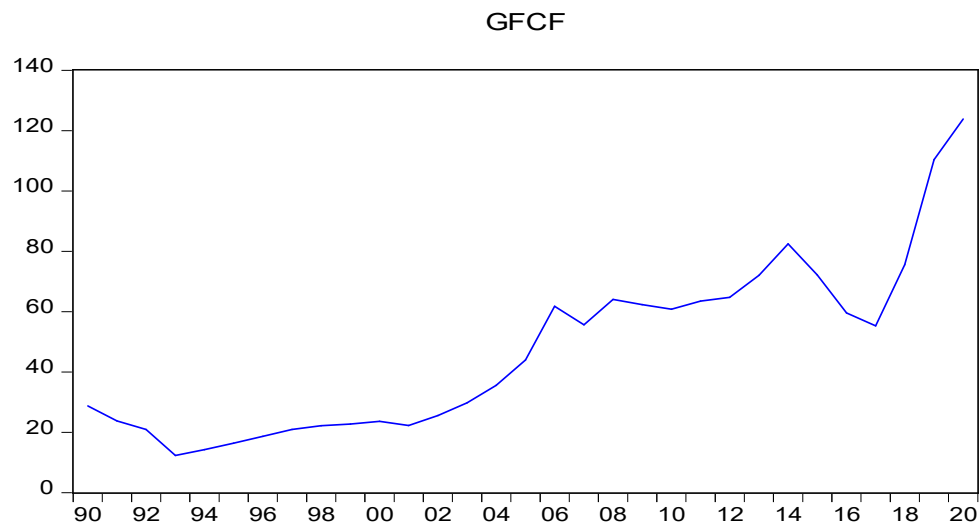
Source: Authors computation on eviews 10. CBN STATISTICAL Bulletin 2021

In the early 2000s, specifically from 2001 to 2003, GDP growth showed signs of improvement, with growth rates of 5.02%, 5.92%, and 15.33%, respectively, suggesting a period of robust economic expansion. This period can be seen as a phase of relative economic stability and growth.

However, from 2004 to 2013, the GDP growth rate experienced fluctuations but generally maintained positive growth. The lowest point during this period was 2.58% in 2003, while the highest was 15.33% in 2006. Despite some ups and downs, this period can still be considered relatively stable in terms of economic growth. After 2013, there was a noticeable decline in GDP growth, mirroring the trend seen in the unemployment rate. From 2014 to 2016, the GDP growth rate showed sharp fluctuations, with 2016 recording a growth rate of 2.65%. This could indicate economic challenges and reduced growth during this period.

The situation worsened from 2017 to 2020, with GDP growth rates consistently below 3%, hitting a low of -1.62% in 2016 and -1.79% in 2020. These years signify a prolonged period of economic difficulties and negative growth. In summary, the analysis of GDP growth rate in Nigeria from 1990 to 2020 reveals a period of stable and moderate growth in the 1990s and early 2000s, followed by a decline in growth rates from the mid-2000s onwards. Economic factors and policy measures likely played a role in these trends, emphasizing the importance of considering broader economic and social contexts when interpreting these figures.

Trend of Gross Fixed Capital Formation



Source: Authors computation on eviews 10. World Indicators 2021

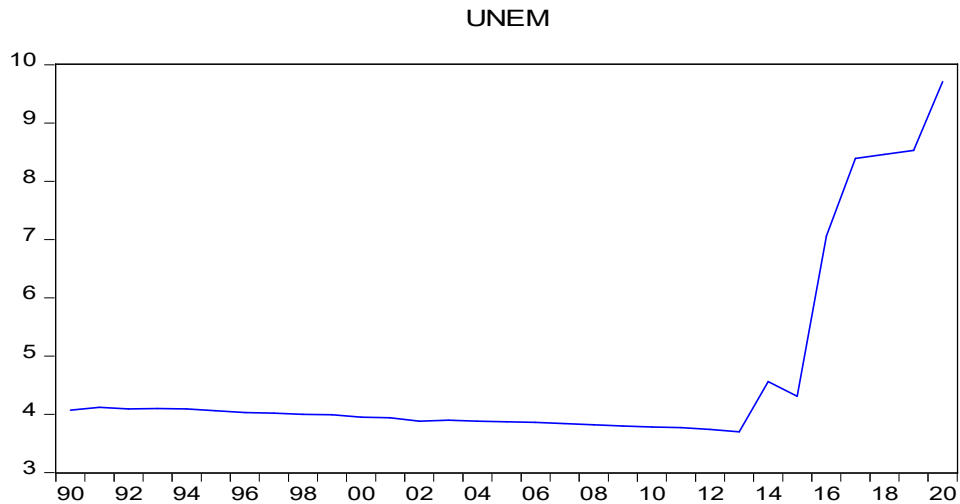
From 1990 to the early 2000s, Nigeria's Gross Fixed Capital Formation (GFCF) exhibited a relatively stable and low trend. During this period, GFCF values fluctuated within a narrow range, ranging from 12.34 to 28.71. However, after the early 2000s, there

was a gradual increase in GFCF, reaching its highest point in 2020 at 123.84. This period can be seen as a phase of notable economic growth and increased investment in fixed capital.

Overall, the trend analysis indicates that Nigeria experienced a stable and low level of Gross Fixed Capital Formation in the 1990s and early 2000s, but from the mid-2000s onwards, there was a significant upward trend in GFCF, culminating in a substantial increase in 2020. Economic factors, policies, and investment climate can influence GFCF trends, highlighting the importance of considering broader economic and policy contexts when interpreting these trends.

Trend of Unemployment rate in Nigeria

From 1990 to the early 2000s, Nigeria's unemployment rate remained relatively stable and low, fluctuating within a narrow range of around 4.00% to 4.12%. This period represented a phase of consistent employment conditions, with minimal fluctuations. However, starting around 2004, the unemployment rate began a gradual decline and reached its lowest point in 2013 at 3.70%. This period can be characterized as one of relative economic stability, marked by declining unemployment rates.



Source: Authors computation on eviws 10. World Indicators 2021

After 2013, a significant shift occurred, and the unemployment rate started to increase significantly. From 2014 to 2016, there were sharp fluctuations, with a notable spike in 2016, reaching 7.06%. This indicated a challenging economic period and increased joblessness.

The situation worsened from 2017 to 2020, with the unemployment rate rising further, exceeding 8% consistently. These years marked an extended period of economic difficulties and rising joblessness. In summary, the trend analysis of Nigeria's unemployment rate from 1990 to 2020 reveals a phase of stability and low unemployment in the 1990s and early 2000s, followed by a significant increase in unemployment, particularly from 2014 onwards. These trends suggest that various economic factors and policy measures influenced the unemployment rates, and a broader examination of economic and social contexts is crucial for a comprehensive understanding of these shifts.

4.2 Correlation Analysis

Correlation is a statistical coefficient that quantifies the strength and direction of the association between two or more variables of interest. It is a valuable statistical tool for assessing the degree and nature of relationships between these variables. It's important to note that correlation analysis provides insight into the extent of association but does not establish causation. The correlation among the pertinent variables in this research study is presented in Table 4.2 below.

Table 4.2. Correlation Matrix

	GDPR	FDI	EXCR	GFCF	OPV	UNEM
GDPR	1					
FDI	0.077964	1				
EXCR	-0.142429	0.757194	1			
GFCF	-0.059872	0.807985	0.846544	1		
OPV	-0.221432	0.016531	-0.290832	0.032887	1	
UNEM	-0.458593	0.354576	0.802636	0.621912	-0.347075	1

Source: Authors compilation using eviews 10

The correlation matrix provided offers insights into the relationships between various independent variables (FDI, EXCR, GFCF, OPV, and UNEM) and the dependent variable GDPR (Gross Domestic Product growth rate). Here's an interpretation of the correlations with GDPR as the dependent variable:

FDI (Foreign Direct Investment): The correlation between FDI and GDPR is quite low at 0.078. This suggests a weak positive relationship, indicating that changes in FDI are only slightly associated with changes in GDP growth rate.

EXCR (Exchange Rate): The correlation between EXCR and GDPR is -0.142. This indicates a weak negative relationship, suggesting that as the exchange rate increases (the value of the national currency strengthens), GDP growth rate tends to decrease slightly.

GFCF (Gross Fixed Capital Formation): There's a moderate negative correlation -0.059 between GFCF and GDPR. This suggests that there is a relatively weak negative relationship between the level of fixed capital investment and GDP growth rate.

OPV (Oil Price Volatility): The correlation between OPV and GDPR is -0.221. This indicates a weak negative relationship, suggesting that higher oil price volatility is associated with lower GDP growth rate to some extent.

UNEM (Unemployment Rate): The correlation between UNEM and GDPR is -0.459, which suggests a moderately strong negative relationship. This means that as the unemployment rate increases, GDP growth rate tends to decrease significantly.

4.3 Discussion of Findings

Based on the descriptive analysis provided, we can discuss the potential impact of Oil Price Volatility (OPV) on the Nigerian economy. Oil is a significant driver of the Nigerian economy, as it is one of the country's primary exports and a major source of revenue. Here are some key findings and insights regarding the impact of OPV on the Nigerian economy:

The dataset indicates that the average level of oil price volatility in Nigeria is approximately 17.08. This suggests that oil prices in Nigeria tend to fluctuate, which can have both positive and negative consequences for the economy. The dataset also shows

that the maximum observed oil price volatility in Nigeria reached 31.48. High levels of volatility can create uncertainty in the market and may have adverse effects on economic stability.

The positive skewness of OPV suggests that there are more instances of higher volatility (right tail) in the distribution. This indicates that Nigeria may experience occasional spikes in oil price volatility, which can disrupt economic planning and stability. The kurtosis coefficient of 1.18 suggests that the distribution of OPV is not extremely peaked or flat, but it may have some degree of outliers or extreme values. This means that Nigeria might face occasional extreme oil price fluctuations. The Jarque-Bera statistic of 0.77 suggests that the distribution of OPV closely approximates a normal distribution. This could mean that while there is volatility, it tends to follow a somewhat predictable pattern, making it easier for economic stakeholders to anticipate and manage.

Now, looking at the potential impacts of oil price volatility on the Nigerian economy: Nigeria heavily relies on oil revenue. High volatility in oil prices can lead to fluctuations in government revenue. When prices are high, the government may have more funds for development projects, but during price drops, it can face budget deficits and reduced spending capabilities.

Oil price volatility can impact the exchange rate (EXCR). If oil prices fall sharply, Nigeria's foreign exchange reserves may be strained, affecting the exchange rate and potentially leading to depreciation of the Naira. Foreign Direct Investment (FDI) may be

influenced by oil price volatility. Investors may be hesitant to commit capital to Nigeria during periods of high volatility, fearing instability and uncertainty.

The Gross Domestic Product Growth Rate (GDPR) can be affected by oil price fluctuations. When oil prices are high and stable, Nigeria tends to experience economic growth, but sudden drops can lead to recessions. Oil price volatility can disrupt government budget planning. The government may have to adjust spending priorities, increase borrowing, or implement austerity measures during periods of low oil prices. Inflation may also be affected by oil price volatility. A sudden increase in oil prices can lead to higher fuel and energy costs, which can contribute to inflationary pressures. High unemployment rates (UNEM) can result from economic instability caused by oil price volatility. Job losses and reduced economic opportunities can have adverse social consequences.

In summary, oil price volatility has a substantial impact on the Nigerian economy, affecting government revenue, foreign exchange rates, investment, economic growth, and overall stability. To mitigate these impacts, Nigeria may need to diversify its economy, reduce its dependency on oil, and develop strategies for managing and adapting to oil price fluctuations.

CHAPTER FIVE

POLICY IMPLICATIONS, RECOMMENDATIONS AND CONCLUSION

5.1 Policy Implications

Policy Implications Based on the Findings:

- i. The average exchange rate of approximately 129.32 Naira per Dollar indicates relative stability. However, the maximum and minimum values suggest significant fluctuations over time. Policymakers should implement measures to minimize extreme exchange rate volatility, as it can disrupt trade and investment. Maintaining a competitive and stable exchange rate is crucial for attracting foreign investment and promoting economic growth.
- ii. The average FDI of around 30.83 billion dollars is a positive sign for the economy. Policymakers should continue efforts to attract foreign investment by creating a favorable business environment, reducing bureaucratic hurdles, and providing incentives for investors. FDI can boost economic growth, create jobs, and enhance technology transfer.
- iii. With an average growth rate of about 4.34%, the economy has shown moderate growth. To sustain and improve this growth, policymakers should focus on implementing pro-growth policies, investing in infrastructure, and promoting sectors with high growth potential. GDP growth is essential for increasing revenue generation capacity.

- iv. The average GFCF of roughly 47.28 billion Naira indicates investment in capital assets. Policymakers should encourage private and public sector investments in infrastructure and other productive assets to stimulate economic growth. Adequate capital formation can contribute to increased productivity and job creation.
- v. With an average value of approximately 17.08, oil price volatility can pose risks to revenue generation since Nigeria heavily depends on oil exports. Policymakers should consider diversifying the economy to reduce reliance on oil revenue. Implementing hedging mechanisms or a sovereign wealth fund to mitigate the impact of oil price fluctuations is advisable.
- vi. While the average unemployment rate is relatively low at about 4.69%, the observed fluctuations suggest underlying labor market challenges. Policymakers should prioritize strategies for job creation, vocational training, and skill development. Reducing unemployment not only benefits individuals but also increases tax revenue and reduces social welfare costs.
- vii. Policymakers should be aware that most variables exhibit positive skewness and varying degrees of kurtosis, suggesting non-normal distributions. This implies that economic policies should be flexible and adaptable to handle potential outliers and extreme values, especially in the case of GDPR and UNEM.
- viii. The distributions of GDPR and OPV approximate normality, making them relatively predictable. However, GFCF and UNEM deviate from normality, indicating a need for specialized policy approaches for these variables.

Policymakers should be cautious when relying on assumptions of normality in their decision-making processes.

In conclusion, the policy implications drawn from the study emphasize the importance of maintaining economic stability, attracting foreign investment, promoting economic growth, diversifying revenue sources, addressing unemployment, and adopting data-driven policy-making approaches to enhance Nigeria's fiscal position and overall economic development.

5.2 Recommendations

Based on the findings and policy implications of the study on Oil price volatility and the Nigerian economy, here are specific policy recommendations

- Reduce Dependency on Oil - Nigeria should actively work on diversifying its economy to reduce its heavy reliance on oil revenue. This includes promoting and investing in non-oil sectors such as agriculture, manufacturing, technology, and services. Diversification can help cushion the impact of oil price fluctuations.
- Create and effectively manage a sovereign wealth fund to save excess oil revenues during periods of high prices. This fund can be tapped into during periods of low oil prices to stabilize the economy and maintain critical government services.
- Develop and implement effective risk management strategies to monitor and respond to oil price volatility. This includes regularly stress-testing fiscal policies and budget assumptions under various oil price scenarios to identify potential vulnerabilities.

- Invest in critical infrastructure projects to reduce the economy's vulnerability to oil price fluctuations. Improved infrastructure can attract investments in non-oil sectors, stimulate economic growth, and reduce the overall impact of oil price shocks.
- Encourage fiscal discipline by adhering to responsible budgeting practices. Avoid overreliance on oil revenue to fund government expenditure and consider implementing budgetary controls during periods of high oil prices to prevent excessive spending.
- Implement targeted policies and incentives to promote economic diversification, innovation, and entrepreneurship. Support small and medium-sized enterprises (SMEs) and startups to create alternative sources of income and employment.
- Develop and maintain a robust oil price forecasting system to anticipate price movements. Regularly monitor global oil market dynamics and adjust fiscal policies accordingly to mitigate adverse effects.
- Create a stable and attractive investment climate to encourage foreign direct investment (FDI) in non-oil sectors. Streamline regulatory processes, reduce bureaucracy, and provide incentives for investors to minimize the impact of oil price volatility on FDI.
- Educate the public and key stakeholders about the potential risks associated with oil price volatility and the need for economic diversification. Building awareness can lead to more informed decision-making and support for diversification efforts.

- Develop and expand social safety nets to cushion the impact of economic downturns caused by oil price volatility. These safety nets can include unemployment benefits, food assistance programs, and targeted subsidies to protect vulnerable populations.

5.3 Conclusion

In conclusion, the study's analysis of oil price volatility (OPV) and its impact on the Nigerian economy reveals a complex relationship with both challenges and opportunities. Nigeria's heavy reliance on oil revenue makes it particularly susceptible to the fluctuations in global oil prices. The average OPV of approximately 17.08 underscores the inherent volatility in this crucial economic indicator.

The findings highlight that while oil price volatility can lead to economic instability and uncertainty, it also presents opportunities for proactive policy measures. The positive skewness in OPV indicates occasional spikes in volatility, which can disrupt economic planning and stability. Moreover, the kurtosis coefficient suggests that Nigeria may face occasional extreme oil price fluctuations.

To mitigate the adverse effects of OPV, the study provides policy implications and recommendations. These include diversifying the economy, establishing a sovereign wealth fund, enhancing risk management strategies, investing in infrastructure, and promoting fiscal discipline. Furthermore, creating a favorable investment climate and educating the public about the importance of economic diversification are crucial steps to reduce Nigeria's vulnerability to OPV.

In essence, while Nigeria's oil-dependent economy remains exposed to the challenges posed by oil price volatility, proactive and well-considered policies can help build resilience, stimulate economic diversification, and ensure sustainable growth. By implementing these recommendations, Nigeria can better navigate the impacts of OPV and chart a path toward a more stable and diversified economic future.

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APPENDIX

Year	OPV	EXCR	FDI	GFCF	UNEM	GDPR
1990	0	8.04	1.04	28.71	4.07	11.78
1991	31.48	9.91	1.25	23.77	4.12	0.36
1992	20.65	17.3	1.54	20.92	4.09	4.63
1993	21.49	22.07	1.8	12.34	4.1	-2.04
1994	25.97	22	2.24	14.23	4.09	-1.81
1995	22.12	21.9	2.85	16.39	4.06	-0.07
1996	16.42	21.88	4.13	18.68	4.03	4.2
1997	15.4	21.89	5.64	20.92	4.02	2.94
1998	19.74	21.89	7.38	22.14	4	2.58
1999	17.13	92.34	9.3	22.73	3.99	0.58
2000	6.81	101.7	11.6	23.65	3.95	5.02
2001	10.27	111.23	14.2	22.24	3.94	5.92
2002	12.84	120.58	17.3	25.53	3.88	15.33
2003	16.52	129.22	21	29.76	3.9	7.35
2004	15.59	132.89	25.3	35.55	3.88	9.25
2005	13.98	131.27	30.4	43.97	3.87	6.44
2006	17.23	128.65	36.2	61.78	3.86	6.06
2007	18.72	125.81	42.9	55.62	3.84	6.59
2008	26.84	118.57	49.9	64.02	3.82	6.76
2009	16.36	148.88	39.9	62.29	3.8	8.04
2010	16.79	150.3	48.8	60.78	3.78	8.01
2011	25.43	153.86	62.8	63.49	3.77	5.31
2012	20.82	157.5	74.4	64.73	3.74	4.23
2013	21.43	157.31	69.8	72.06	3.7	6.67
2014	26.56	158.55	62.3	82.46	4.56	6.31
2015	21.5	192.44	47.9	72.18	4.31	2.65
2016	5.93	253.49	49.2	59.58	7.06	-1.62
2017	5.63	305.79	59.6	55.29	8.39	0.81
2018	6.22	306.08	61.7	75.54	8.46	1.92
2019	14.11	306.92	53.9	110.35	8.53	2.21
2020	19.55	358.81	39.4	123.84	9.71	-1.79