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Effect of Crude Oil Price Fluctuations on the Growth Rate of Nigerian Economy (1997 - 2022)

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Abstract **- The study determines the effect of crude oil price fluctuations on the growth rate of Nigeria economy. The specific objectives of the study were; to find out the extent to which domestic crude oil price fluctuations affect growth rate of Nigeria economy, to determine whether international crude oil price fluctuations affects growth rate of Nigeria economy and to assess the effect of oil price exchange rate fluctuations on the growth rate of Nigeria economy. The study employed ex-post facto research design to investigate and analyze the relationship between dependent and independent variables and the reason for employing these designs (ex-post facto) in the study was because the data already existed. The study employed the annual time data from 1997 to 2022 for the dependent and independent variables: using descriptive statistics and normality test, regression analysis, unit root test, VAR lag order selection criteria, long run ARDL cointegration analysis, short run ARDL estimates, Wald test of long run estimates, ARDL long run form and bounds test, test for reliability and stability of the estimates, Heteroskedasticity test: Breush-Pagan-Godfrey, Jarque-Bera statistic test, short run dynamic analysis. The findings of the study revealed that crude oil price fluctuations has no significant relationship with growth rate of Nigerian economy, this result could reflect the unbalanced effect of crude oil exports and refined oil imports. The study recommended amongst others, there is need for the government to diversify the economy to other sectors such as agriculture, manufacturing, tourism and other service oriented sectors to open up a wider spectrum for inflow of income to the economy and break the over independence of the economy on oil sector. Government should try as much as possible to account for the total quantity of refined oil imported into the country on a daily basis and the total costs of such should be made known for the public utilization.**

Keywords: Crude oil, Price fluctuation, Growth rate, Nigeria economy.

1. Introduction

1.1 Background to the study

Crude Oil is considered to be one of the most valuable commodities in the world. Crude Oil is key for development for any economy with crude oil, whether it is developing or developed. Crude Oil is the product which is used in all the sectors of the economy including energy sector, transportation, etc. It is a main product in the economy and is pivotal to economic growth and development. Crude Oil prices have been constantly volatile over the years. The economists and observers point of view is that the volatility seen in last decades had never been before (Arinze, 2011).In the era of industrialization, oil prices were the basic indicator of any financial activity. The oil demand and supply has been on increased dramatically due to financial expansion and energy development in Nigeria and the rest of the world (Arinze, 2011).

Historically, disturbances in oil market affect the economic activities of either developed or industrialized countries or developing countries. Since 1972, although crude oil price has experienced some limited short-run fluctuations between 1930s and early 1970s period, it has gone through rapid cycles since 1972. Concerns have been raised in investigating the effects of the short-run impact as well as its long term trend of fluctuations in oil prices on the economic activities of developing countries like Nigeria. Nigerians export crude oil and import refined oil for usage, therefore fluctuations in the prices of the imported refined products affects its overall economy since the country is wholly depending on oil. Thus, oil price is considered as an endogenous component for the growth of Nigerian economy hence a major reason for this study.

Thus, the irregular supply of petroleum products leads to artificial inflation in the economy. This is because people move goods from one geographical location to another at high cost and this has negative effect on real income which happens to be the major determinants of demand of individuals in Nigeria. The records of the fluctuation of prices of petrol over

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twenty five years of such cases have occurred between 1995-2019. This situation has created more hardship on Nigerians and also affected the prices of agricultural products as well as manufactured goods.

Nigeria has the largest economy in Africa in close competition with South Africa and a population of over 200 million people. The country has the 30th largest economy in the world based on GDP volume (the Economist-Business Environment, 2014-2018). However, Nigeria's economy is highly dependent on oil revenues and is therefore very vulnerable to variation in crude oil prices and production level. Nigeria emerged from a recession in year 2017, so growth remains fragile and sectorial growth patterns are still unstable. In 2018, the oil sector recorded a negative growth rate of -1.62percent, and non-oil revenue came in lower than expected, in spite of reforms to improve the economy. Still, the economy grew slightly under 2per cent in 2018, largely driven by the non-oil industry - particularly mining, quarrying, and manufacturing - and the service sector. That rate is expected to continue in the next couple of years, as the GDP is projected to grow by 2.3 percent in 2019 and 2.5 percent in 2020, backed by the implementation of the Economic Recovery and Growth Plan (the Economist-Business Environment, 2014-2018).

After going through a period of recession in 2016, the Nigerian economy had a gradual recovery in 2017 and 2018, helped by the rebound of oil prices, but remains fragilised. Availability of currency and reserves have been improved, thanks to measures taken in the exchange domain (introduction of an exchange rate for the investors and exporters in April 2017), the rise in oil prices, an attractive return in government securities and a stricter monetary policy (ERGP 2017 - 2020). Although it was high, inflation was kept to 12.4 percent in 2018 and is expected to reach 13.5 percent in 2019, against 15.4 percent at the end of 2017. Public debt was expected to reach 24.8 percent of GDP in 2018, but it stayed at 23.4 percent. For 2019, debt should increase to 26.9 percent of GDP. Thanks to oil revenues, a value added tax on luxury items, and a tax amnesty, the fiscal deficit narrowed in 2018, financed mainly by public debt. The budget deficit is projected to decrease to 1.3 percent of GDP in 2019. Progress has been made in the enforcement of the ambitious infrastructure program of the development plan (OPERG 2017-2020), but they are limited by the burden of the debt service that absorbs 60per cent of State revenues.

The Economic Recovery and Growth Plan anchors Nigeria's industrialization by establishing industrial clusters and staple crop processing zones to give firms a competitive edge through access to raw materials, skilled labor, technology, and materials. Additionally, the Power Sector Reform Program, if effectively implemented, could attract private investment. But Nigeria needs to reorient its federal budget, currently dominated by recurrent spending, toward more capital expenditure and accumulating savings to sustain social spending. Even though the President Buhari had to be absent during more than a semester in 2018 because of illness, which delayed the reforms and put into question his ability to govern and he was reelected in February 2019. The main obstacles to development in Nigeria are the unappropriated energy supply, deficient transport infrastructures, inefficient judiciary system, and widespread, corruption, together with high inflation. The gap between official value of naira and its value on the parallel market remains significant and the banking system is fragilized by the deterioration of the assets quality (Heritage foundation, 2017).

However, crude oil price fluctuations are one of the most challenging issues for countries and companies which are heavily dependent on oil export. This is because oil revenue has unique feature in the governmental expenditure structure due to the fact that at times of high oil prices the country tends to develop very rapidly (extra income coming from the oil export); the opposite is true, in the case of low oil price, revenue immediately falls which bring negative effects on the economic development. The more the country is dependent in its fiscal policy on oil revenues, the more it is vulnerable to unexpected shocks as governmental spending cannot be decreased in the short run, leading to the dramatic and instantaneous increase in the governmental debt. This effect of the oil price shocks on the fiscal policy may constitute yet another transmission channel for the case of oil exporting countries because sustainable fiscal policy is one of the triggers of the economic growth. However, there are oil abundant countries like Nigeria, whose performance is better than others even at times of low oil prices, which triggers discussions about the importance of the institutions predetermining the structure of the governmental spending and the distribution of the oil revenue (El Anshasy, 2014).

Fluctuation is sometimes confused with consistent rise in price of commodities, though fluctuation can result in rising prices, it could also equally result in significant drop or increase in prices. Fluctuation measures the extend of the variability of price or quantity that occurs on a daily, weekly, monthly or yearly basis, it measures how much price changes with regards to either its trend or constant long-term level (Adeniran, &Olorunfemi, 2018). It is important to note that fluctuation does not measure the direction of price changes; rather it quantifies variation of prices around the mean. Kotze, (2015) further explained fluctuation as the variation or dispersion or deviation of an asset's returns from their mean. When price movements are extremely wide over a short period of time, we have 'high fluctuation' on the other hand when

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price movements are low over a short period, there is low fluctuation.

Growth rates refer to the percent change of a specific variable within a specific time period. For investors, growth rates typically represent the compounded annualized rate of growth of a company's revenues, earnings, dividends or even macro concepts, such as gross domestic product (GDP) and retail sales. Expected forward-looking or trailing growth rates are two common kinds of growth rates used for analysis (Lawal, Atunde, & Ahmed, 2016).

At their most basic level, growth rates are used to express the annual change in a variable as a percent. An economy's growth rate, for example, is derived as the annual rate of change at which a country's GDP increases or decreases. This rate of growth is used to measure an economy's recession or expansion. If the income within a country declines for two consecutive quarters, it is considered to be in a recession. Conversely, if the country has grown its income for two consecutive quarters, it is considered to be (Lawal, Atunde, & Ahmed, 2016).

Nigeria Real GDP growth was projected to rise to 2.9per cent in 2020 and 3.3per cent in 2021. It depends on implementing the Economic Recovery and Growth Plan (2017–20), which emphasized economic diversification. The central bank of Nigeria's recent decree that banks hold loan–deposit ratio of 60percentfor increasing lending to the real sector. Simultaneously, the retrenchment of government borrowing and easing of the risks of lending to small business could lower interest rates and unlock bank lending to the private sector. An increase in the value-added tax from 5percent to 7.5percentto shore up domestic nonoil revenues is welcome, though organized labour and businesses have raised concerns of a potential rise in costs. The government also plans to revisit investment tax breaks (African Development Bank, 2021).

The basic factors that determine the crude oil price fluctuations, some studies pointed out that is mainly in the supply and demand, but in my opinion, the crude oil price fluctuations existed not only the constantly self-adjusted between supply and demand on the world crude oil market, but also the strength competition between nations, for this reason caused the diversity and complexity of the factors, which effected the international crude oil price fluctuations. Based on this, the research reviewed the historical path of International crude oil price fluctuations, Domestic premium motor spirit price fluctuations and exchange rate fluctuations and summarized some basic facts, then made further analysis for all factors, which effected the above variables and made predictions for the trend of the variables after financial crises based on the outcome of the analysis.

1.2 Objectives of the study

The general objective of this study is to determine the effect of crude oil price fluctuations on the growth rate of Nigerian economy. To achieve this objective, the following specific objectives are important for the study: To;

1) Examine the extent to which Domestic Premium Motor Spirit Price fluctuations affect growth rate of Nigerian economy,
2) Determine whether International crude oil price fluctuations affect growth rate of Nigerian economy,
3) Assess the effect of exchange rate fluctuations on the growth rate of Nigerian economy.

2. Literature Review

2.1 Conceptual framework

The concept of fluctuation is sometimes confused with consistent rise in price of commodities, though fluctuation can result in rising prices, it could also equally result in significant drop or increase in prices. Fluctuation measures the extend of the variability of price or quantity that occurs on a daily, weekly, monthly or yearly basis, it measures how much a price changes with regards to either its trend or constant long-term level (Adeniran, & Olorunfemi, 2018). It is important to note that fluctuation does not measure the direction of price changes; rather it quantifies variation of prices around the mean. Kotze, (2015) further explained fluctuation as the variation or dispersion or deviation of an asset's returns from their mean. When price movements are extremely wide over a short period of time, we have 'high fluctuation' on the other hand when price movements are low over a short period, there is low fluctuation.

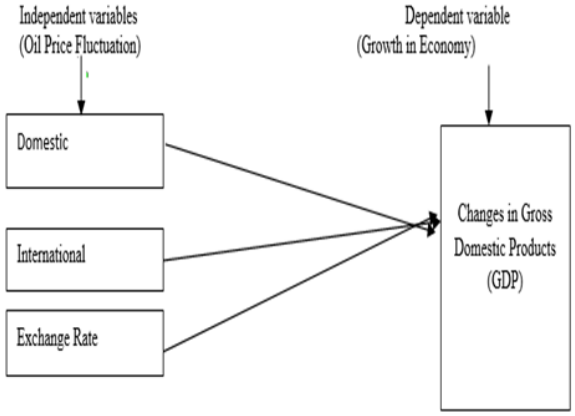

Figure 1: Conceptual framework

Source: Researcher's compilation 2022

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2.2 Theoretical framework

This study is anchored on these three basic theories postulated by various scholars.

Theory of oil price shock effects (1983)

The major contribution of the oil price transmission mechanisms was brought and discussed by Hamilton (1983) who tackled the issue of the essence of oil Shocks which heated up the debate of the effect of crude oil price fluctuations on output. His finding showed that oil prices are nonlinear in terms of the effect on the economic activity of the country because oil price increases are much harder to predict than oil decreases and the strength of the former are higher in terms of the effect on the countries' performance. As a result of these fluctuations, Hamilton (1983), Huntington (1998), Mork (1994) started that oil price changes have the major effect on consumer disposal income which will reduce the consumption of energy-intensive commodities such as automobiles due to the fact that the upward rise in the price of oil will induce petrol prices as well. Therefore, bigger share of household's income will have to be spend on gas. However, people will try to cut petrol usage and one of the remedies would be to switch to less energy-intensive industries. This will cause the shift of the production from oil-intensive to less oil demanding commodities.

The Neoclassical growth theory (1956)

Neoclassical growth theory is an economic theory that outlines how a steady economic growth rate results from a combination of three driving forces: labor, capital, and technology. The National Bureau of Economic Research names Robert Solow and Trevor Swan as having the credit of developing and introducing the model of long-run economic growth in 1956. The model first considered exogenous population increases to set the growth rate but, in 1957, Solow incorporated technology change into the model. The theory states that short-term equilibrium results from varying amounts of labor and capital in the production function. The theory also argues that technological change has a major influence on an economy, and economic growth cannot continue without technological advances. Neoclassical growth theory outlines the three factors necessary for a growing economy. However, neoclassical growth theory clarifies that temporary equilibrium is different from long-term equilibrium, which does not require any of these three factors. Robert Solow and Trevor Swan first introduced the neoclassical growth theory in 1956 (Dragoslava, Slobodan, & Glorica, 2016). While an economy has limited resources in terms of capital and labour, the contribution from technology to growth is boundless (www.investopedia.com.16/08/2019).

This growth theory posits that the accumulation of capital within an economy, and how people use that capital, is important for economic growth. Further, the relationship between the capital and labor of an economy determines its output. Finally, technology is thought to augment labor productivity and increase the output capabilities of labour.Therefore, the production function of neoclassical growth theory is used to measure the growth and equilibrium of an economy and the theory backed up the dependent variables (changes in growth domestic product).

That function is Y = AF (K, L).

Y denotes an economy's gross domestic product (GDP)
K represents its share of capital
L describes the amount of unskilled labor in an economy
A represents a determinant level of technology

However, because of the relationship between labor and technology, an economy's production function is often re-written as Y = F (K, AL). Increasing any one of the inputs shows the effect on GDP and, therefore, the equilibrium of an economy. However, if the three factors of neoclassical growth theory are not all equal, the returns of both unskilled labor and capital on an economy diminish. These diminished returns imply that increases in these two inputs have exponentially decreasing returns while technology is boundless in its contribution to growth and the resulting output it can produce (www.investopedia.com). According to neoclassical growth models, the goals of aid should not be defined in overly ambitious terms. Although it is not difficult to construct models in which aid could have more powerful effects, evaluating their relevance is harder (www.investopedia.com.16/08/2019).

Peak oil theory (1982)

The term "peak oil" refers to that specific point in time when the Earth's oil supply will finally reach that theoretical "maximum rate" of global petroleum extraction and will then signal the start of a progressive decline, where our thirst for oil will finally exceed our available supply of oil! (Hubbert, 1982). "Peak Oil Theory" is a concept originally derived from the measured postulates and predictions of M. King Hubbert, who in the year 1956, set out to scientifically formulate a method to prognosticate peak oil production within the United States between the years 1965 and 1970 (Hubbert, 1982). Peak oil is the theorized point in time when the maximum rate of extraction of petroleum is reached, after which it is expected to enter terminal decline. As of 2019 peak oil forecasts range from the early 2020s to the 2040s, depending on economics and how governments respond to global warming. It is often confused with oil depletion; however, whereas depletion refers to a period of falling reserves and

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supply, peak oil refers to the point of maximum production. The concept of peak oil is often credited to geologist M. King Hubbert whose 1956 paper first presented a formal theory.

Some observers, such as petroleum industry experts Kenneth S. Deffeyes & Matthew Simmons, predicted there would be negative global economy effects after a post-peak production decline and subsequent oil price increase because of the continued dependence of most modern industrial transport, agricultural, and industrial systems on the low cost and high availability of oil (EIA, 2015). Predictions vary greatly as to what exactly these negative effects would be. While the notion that petroleum production must peak at some point is not controversial, the assertion that this must coincide with a serious economic decline, or even that the decline in production will necessarily be caused by an exhaustion of available reserves, is not universally accepted (Hirsch, 2018).

According to the International Energy Agency, conventional crude oil production peaked in 2006. A 2013 study concluded that peak oil "appears probable before 2030", and that there was a "significant risk" that it would occur before 2020, and assumed that major investments in alternatives will occur before a crisis, without requiring major changes in the lifestyle of heavily oil-consuming nations. Predictions of future oil production made in the late 2000s stated that the peak had already occurred; that oil production was on the cusp of the peak, or that it would occur soon. These predictions proved false as world oil production rose and hit a new high in 2018 (EIA 2015).

Hubbert's original prediction that US peak oil would occur in about 1970 appeared accurate for a time, as US average annual production peaked in 1970 at 9.6 million barrels per day and mostly declined for more than three decades after (EIA,2015). However, the use of hydraulic fracturing caused US production to rebound during the 2000s, challenging the inevitability of post-peak decline for the US oil production. In addition, Hubbert's original predictions for world peak oil production proved premature. Nevertheless, the rate of discovery of new petroleum deposits peaked worldwide during the 1960s and has never approached these levels since (Miller & Sorrell, 2013).

The Organization of Petroleum Exporting Countries (OPEC) brought peak oil to the forefront in 1973 when it orchestrated an oil embargo that exposed the United States' vulnerability to a drop in oil supplies. Since then, peak oil on the supply side, either from total drawdown or difficulty of extraction, has been the primary fear of energy-dependent nations. But this same fear spurred investment in exploration and technology, which has continually pushed peak oil's projected date into the future. Every time prices increase based on the assumption that we are reaching peak oil, the incentive is there for new investments in technology that keep it from actually happening. Of course, there is an endgame to this scenario, but it may not come to that because of peak oil demand (OPEC, 1973). Peak oil demand is the point at which new, more efficient technology and alternative energy become more cost-effective than extracting oil. In this scenario, the market decides whether there are still easily accessible deposits or not when peak oil becomes a reality. In 2016, OPEC, one-time bogeyman of peak oil supply, started to discuss peak oil demand as a possibility within a decade. More modest projections have peak oil demand occurring in a range from 2035-2050. So peak oil is once again appearing to be inevitable just not for the reasons we were expecting 30 years ago (OPEC, 2016).

Peak Oil Theory is pressing to become an important issue in the light of the search of new oil reserves necessary to counterbalance the increase in demand. However, there is also significant evidence to undermine Peak Oil Theory, with critics citing the diversification from oil as well as the scientific progress made to explore new means of producing it (OPEC, 2016).

2.3 Empirical literature

Several studies have been carried out in recent times with respect to effect of crude oil price fluctuations on the growth rate of Nigerian economy and such researches are briefly reviewed as follows;

Nelson, Ekokeme, Peter, Eze, (2018), examine the impact of crude oil price changes on economic growth in Nigeria. The study sets out to examine the causal and both short and long-run relationship between crude oil price changes and economic growth in Nigeria. The study employed the annual time series data from 1980 – 2014 for the following variables: crude oil price (COP), Capital Formation (CF), Real Gross Domestic Product (RGDP), Market Capitalization (MCAP), Foreign reserves (FR), Inflation Rate (INF), and exchange rate (EXR), using descriptive statistics and causality test. The results revealed significant relationship between the variables. The causality test result also indicates that a causality relationship runs from crude oil prices to all the indicators of economic growth.

Kibunyi, Nzai, Wanjala, (2018), empirically explored the effect of crude oil prices on GDP growth and selected Macroeconomic Variables in Kenya; by investigating how crude oil prices affect GDP growth, inflation and real exchange rate. Using statistics from the World Development Indicators show that demand for oil in Kenya has been progressively increasing since the 1970s and this is expected

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to grow even further from the current consumption of 4.2 million metric tons per year to 12 million metric tons by the year 2030. The study used time series data covering the period 1970 – 2016, which to capture different oil shocks that have been shown through empirical and theoretical literature to have had an impact on the economy. The study estimated three Auto regression Distribution lag (ARDL) models to analyze the effect of crude oil on the selected variables. The study revealed that crude oil prices has a positive long-run impact on growth, the study attributes this to the fact that Kenya imports oil and re-exports it to Uganda, Rwanda, and South Sudan. The study also revealed that crude oil prices have a positive effect on inflation in the long run, while in the short run its lag of one affect inflation, which implies that the crude oil prices for the previous one year affect the current year's inflation, relationship between crude oil prices and real exchange rate was negative in the long run.

In Kenya, empirical studies on the impact of crude oil prices on inflation have produced mixed results. Odera (2015) researched on the relationship between international diesel price and inflation rate in Kenya. The study adoptedsecondary time series data co-integration test to determine the long run equilibrium relationship when the series has a linear combination and granger causality test to test the short run relationship between dependent and independent variables. The correlation matrix and regression failed to find the perfect link between the variables and granger causality test also confirms that there is no short term relationship; the study concludes that the hike in international diesel oil price does not influence the domestic inflation rate as suggested by monthly data of variables.

(2013), investigated the growth implications of oil price shock in Nigeria. Empirical analysis was conducted by applying the multiple regression of the ordinary least square technique to the annual data on the Nigerian economy for the period 1979 – 2010. The study revealed that a little shock in the price of oil in the global oil market in the current period will produce a long term effect on economic growth in Nigeria. The study suggested the need for the policy marker to diversify the production of the economy to other sectors such as agriculture, manufacturing, tourism and other services oriented sectors to open up a wider spectrum for inflow of income to the economy and break the over dependence of the economy on oil sector.

Akinlo, (2012), examined how importance is oil in Nigeria's economy growth. The study assessed the importance of oil in the development of the Nigerian economy in a multivariate VAR model over the period 1960 – 2009. Empirical evidence shows that the five subsectors are cointegrated and that the oil can cause other non-oil sectors to grow. However, oil had adverse effect on the manufacturing sector. Granger causality test found bidirectional causality between oil and manufacturing and building & construction, manufacturing and building & construction, manufacturing and trade & services, and agriculture and building construction. It also confirms unidirectional causality from manufacturing to agriculture & trade and services to oil. No causality was found between agriculture and oil, likewise between trade & services and building and construction.

Ogbonna, (2012), Investigates the effects of petroleum income on the Nigerian economy for the period 2000 – 2009 using the gross domestic product (GDP), per capita income (PCI), and inflation (INF) as the explained variables, and oil revenue, petroleum profit tax/royalties (PPT/R), and licensing fees (LF) as the explanatory variables. The sample covers all the economic sectors of the country, including the oil sector and non-oil sector. The study used secondary data obtained from Central Bank of Nigeria's (CBN) statistical bulletin, Nigerian National Bureau of Statistics, and the NNPC. Simple regression models statistical package were used in the study. The results of the study show that oil revenue has positive and significant relationship with GDP and PCI, but a positive and significant relationship with INF. Similarly, PPT/R has a positive and insignificant relationship with inflation. It was also found that LF has a positive but significantly relationship between GDP, PCI and INF, respectively. The study concludes that petroleum income (oil revenue and PPT/R) has positively and significantly impacted the Nigerian economy when measured by GDP and PCI for the period 2000 - 2009.

Keane and Prasad (1996) use micro panel data to examine the effect of oil price changes on employment and real wages at the aggregate and industry levels. The data set is from the National Longitudinal Survey of Young Men (NLS). It consists of a nationally representative sample of 5,225 males between 14 and 24 years of age in 1996 and interviewed in 12 times during 16 years from 1966 to 1981. The data contains employment status, wage rates and socio demographic characteristics. Workers are classified into 11 broadly defined industries on the basis of the 3-digit census industrial classification (CIC) codes. They differentiate skilled and unskilled workers and analyze how various human capital variables interact with real shocks to affect wages and employment variability. Oil price increases cause real wages to decline at the aggregate level and all sectors as well as all skilled workers. But, the relative wage of skilled workers increases. This is the difference between panel data econometric techniques, which control for unobserved heterogeneity and OLS estimation methods. In the case of employment, oil price increases do not reduce aggregate employment in the long run since oil and labour are net substitutes instead of gross substitutes in production. When the

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oil price increases, labour supply can increase due to the income effect. Employment probabilities for skilled labour rise even more strongly following an oil price increase because skilled labor may be a good substitute for energy in the production function for most industries.

Lee, Qi, Sim, (1995) and Hamilton (1996) propose non-linear transformations of oil prices to re-establish the negative relationship between increases in oil prices and economic downturns. The transformations are scaled specification (Lee et al., 1995) and net specification (Hamilton, 1996). The objective of scaled specification (SOP) is to account for volatility of oil prices by using GARCH, while the objective of net specification *(NOPI)* comes from consumption decisions. Specifically, it is more responsible to measure an oil price increase by comparing the current price of oil with where it has been over previous periods rather than compare the oil price to a previous period alone. So oil price increase is recognized only when current oil price is greater than its maximum value over the previous periods.

2.4. Summary of Literature

Empirical Literature

S/N	Author(s)/Year of study	Scope of study	Independent	Dependent	Methodology	Research Technology	Results
1.	Qay et al (2020) Nigeria	Impact of oil price fluctuation on Economic Growth in Nigeria 1984-2017	Exchange rate and Interest rate	Gross Domestic Product	Ex-post facto	Generalized Auto-Regression Conditional Heteroskedasticity GARCH (1,1)	There is positive and significant effect of oil price on the Economic Growth in Nigeria.
2.	Kanu et al (2020) Nigeria	Global Oil Price Shocks and Effects on Economic Growth: An Econometric Investigation of Nigeria 1990- 2019	Oil price	Real Domestic Oil price	Secondary Data	Augmented Dickey-Fuller unit root test, Ordinary Least Square and VAR Regression Analysis	In the short run, there is significant effect of changes in oil price on the economic growth and in long run, there is non-integration.
3.	Nelson et al (2018) Nigeria	Impact of Crude Oil Price Changes on Economic Growth rate 1980 – 2014	Exchange rate (ER) and Inflation Rate(INFR)	RGDP, Capital Formation (CF), Market Capitalization	ex-post facto & Simple Investigative Econometric Research	Regression Model	There is a significant relationship between crude oil prices and economic
4.	Kibunyi et al (2018) Kenya	Effect of crude oil prices on GDP growth and selected Macroeconomic variables 1970 – 2016	Crude oil price, foreign remittances and real exchange rate	Real Gross Domestic Products (RGDP)	Empirical research	Auto regression distribution lag (ARDL) and ARDL- bound models	There is a positive relationship between crude oil prices and economic growth on long-run.
5.	Ibrahim (2018) Nigeria	Oil price fluctuation and Aggregate Out Performance in Nigeria 1970- 2015	Oil Price, Aggregate output, Agricultural output, Manufacturing output, Service output	Household Consumption and Domestic Investment	ADF unit root and Johansen cointegration test	Two stage Least Square (2SLS)	There is positively oil price impact on aggregate output but there is a negatively impact on Agriculture, manufacturing and Service sector.
6.	Ergin et al (2018) VHS, Vienna	The Impact of oil price Instability on Economic Growth: Evidence from Nigeria 1981-2015	Real Gross National Income, Real Oil Price, Real Effective Exchange Rate and Inflation	Gross Domestic Product and Government Expenditure	Empirical Research	Vector Error Correction Model and VAR technique	Oil price and real effective exchange rate were positively related to economic growth, whereas government expenditure and inflation had a negative relationship.
7.	Nyako (2016) North Cyprus	Impact of oil dependence on the Nigeria's Economic growth 1973-2013	Oil price and per capital income	Gross Domestic Product	Time series	ARDL bounds testing co-integration	There is an insignificant negative correction with GDP per capita in long run
8.	Idrisov et al (2015) Russia	A theoretical interpretation of the oil prices impact on economic growth in contemporary Russia	Oil prices	Economic growth and small open economy	Empirical Research	Numeric simulation analysis	Constant increase in oil prices cannot influence the long term economic growth rate and only predetermines short-term transitional trends from one long-term equilibrium to another
9.	Odera (2015) Kenya	The relationship between International diesel price and inflation rate in Kenya	Inflation rate (INFR)	Diesel price (DP)	Ex-post facto	Co-integrated test, granger causality test and regression models	There is no short term relationship between international diesel price and inflation rate.
10	Oyeyemi (2013) Nigeria	The growth implications of oil price shock 179 – 2010	Crude oil price (COP)	Economic growth (EG)	Empirical Analysis	Multiple regression model	There is a significant relationship between price of oil in the global market and economic in a long-run.
11	Akinlo (2012) Nigeria	How importance is oil in Nigeria's economy growth 1960 – 2009	Oil sector (OS)	Non-oil sectors (manufacturing, building, constructions, trade & services and Agriculture)	Empirical Research	Multivariate VAR model	There is a significant relationship between the oil sector and non-oil sectors. However, there is an adverse relationship between oil sector and manufacturing sector.
12	Ogbonna (2012) Nigedria	Effects of petroleum income on the Nigeria economy 2000 – 2009	Oil revenue, petroleum profit tax/loyalties (PPT/R) & Licensing fees (LF)	GDP, per capital income (PCI) and inflation (INF)	Ex-post facto research design	Simple regression model	There is a positive and significant relationship between Oil revenue and GDP, PCI and INF.
13	Demachi (2012) Germany	The effect of crude oil price change and volatility on Nigeria economy	Crude oil price, Exchange rate, Domestic price level, and Interest rate	Gross Domestic Product	Secondary Data	Five-variable structural Vector Auto Regression	There is a significant relationship between oil price changes and gross domestic product in

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							Nigeria.
14	Keane et al (1996) Boston (Global)	Effect of oil price changes on employment and real wages at the aggregate and industry levels 1966 – 1981	Oil price changes	Skilled and unskilled labour	National Longitudinal Survey of Young Men	Data econometric techniques and OLS estimation	There is a positive and significant relationship between oil price changes and skilled and unskilled labour. But there is no significant relationship between oil price changes and aggregate employment in long-run

Source: Author's Compilation (2022)

3. Methodology

3.1 Research design

The researcher employed ex-post facto research design to investigate and analyze the relationship among variables namely Crude oil price fluctuations and the growth rate of Nigerian economy and the reason for employing this research design (ex-post facto) in the study is because the data had already existed in the relevant institutions and establishments. This research was designed specifically to measure the relative effect of Crude oil price fluctuations on the growth rate of Nigerian economy.

3.2 Area of the study

The research was carried out in Nigeria, specifically oil sector of the economy. The research area was focused on petroleum products that consist of seventeen by products of petroleum products mentioned in the population of the study, basically, the research was on how the oil sector affects the Nigerian economy growth rate based on the International crude oil price fluctuations, Domestic premium motor spirit price fluctuations and exchange rate fluctuations which was the major area of the study.

3.3 Population of the study and method of population determination

The population of this study consist of Seventeen (17) petroleum products sold Internationally and Domestically which include; Butane, Diesel fuel, Fuel oil, Gasoline, Kerosene, Liquefied natural gas, Liquefied petroleum gas, Propane, Microcrystalline wax, Napalm, Naphtha, Naphthalene, Paraffin wax, Petroleum jelly, Petroleum wax, Refined asphalt and Refined bitumen (Britannica.com/list-of-petroleum-products.20/01/21).These products from the population of the study.

3.4 Sampling Technique

The sampling technique adopted for this study was the systematic sampling technique and the reason for these sampling techniques is because the populations of the study were studied in a fixed periodic interval. The study employed the ex-post facto design; to investigate and analyze the relationship among variables namely Crude oil price fluctuations and the growth rate of Nigerian economy. This research was designed specifically to measure the relative effect of Crude oil price fluctuations on the growth rate of Nigerian economy.

3.5 Sample size of the study

From the petroleum products produced in Nigeria, the study focus on crude oil price fluctuations, which involve ten (10) of the petroleum products and by-products. The products in the crude oil categorization are the major drivers of the Nigerian Economy, and accounts for over 95per cent of the total income from petroleum products. These products include fuel oil, gasoline oil, diesel oil, kerosene, liquefied petroleum gas, butane, propane, petroleum jelly, petroleum wax and refined bitumen.

This study centered on international crude oil price fluctuations and domestic fuel price fluctuations on the point that Nigerian Economy depends largely and significantly on oil to fund it annual budget.

The researcher trend analysis covers twenty five (25) years of Domestic Premium Motor Spirit Price fluctuations (DPMSP), International Crude oil price fluctuations (ICOPF), and Exchange Rate Price fluctuations (ERPF) on the changes in the Gross Domestic Product (GDP) of Nigerian economy (1997 - 2022).

3.6 Sources of data collection

Data were used and consisted of the annual OPEC average crude oil price per barrel, CBN annual average exchange rate; Naira to Dollar, CBN price of premium motor spirit in Nigeria. The data were collected from the various organizations' websites. Data were collected from Central Bank of Nigeria (CBN) statistical Bulletin, National Bureau of statistics, Organization of Petroleum Expecting Countries (OPEC) basket list, as well as Journals publications.

3.7 Method of data collection

The data were pooled from Organization of Petroleum Exporting Countries (OPEC) websites, Central Bank of Nigeria websites, International Monetary fund (IMF) website, African Development Bank (ADB) website and Nigerian Stock Exchange (NSE). The data collected were examined,

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coded questioned and computed for the needed data. Secondary data also collected through reviewing relevant text-books, and journals.

3.8 Model specification

A linear regression model was fitted to determine how the dependent variable, growth rate in the economy, measured by changes in Gross Domestic product (CGDP) is explained by the independent variables; Domestic Premium Motor Spirit Price fluctuations (DPMSP), International Crude oil price fluctuations (ICOPF) and Exchange Rate Price Fluctuations (ERPF). In order to test the research hypotheses, linear regression models of OLS equation (functional model and conceptual model equation) were used:

$Y = f(x) \quad - \quad - \quad -$ Functional model

$CGDP = \beta_0 + \beta_1 DPMSP + \beta_2 ICOPF + \beta_3 ERPF + \varepsilon$ conceptual Model

Where;

CGDP = Changes in Gross Domestic Products
DPMSP = Domestic Premium Motor Spirit Price fluctuations
ICOPF = International Crude oil price fluctuations
ERPF = Exchange Rate Price fluctuations
β_0 = regression constant
β_1 = regression coefficient or parameter
ε = stochastic error term

The 'a priori expectation for each model is that':
$\beta_1 = > 0$; implying that the higher the DPMSP, the higher the CGDP
$\beta_2 = > 0$; implying that the higher the ICOPF, the higher the CGDP
$\beta_3 = > 0$; implying that the higher the ERPF, the higher the CGDP
This study adapted the model used by
Nelson, Timipere, Ayunku & Peter (2018) using a Linear regression.

3.9 Data analysis method

Different econometric analysis tools have been employed in this study to analyze the effect of crude oil price fluctuations on the growth rate of Nigerian economy. The study also employed descriptive and inferential statistics to analyze the data.

A linear regression was used to analyze the effect of the various independent variables (Domestic Premium Motor Spirit Price fluctuations, International crude oil price fluctuations and Exchange Rate Price fluctuations), on the dependent variable (changes in gross domestic products).

The Ordinary Least Squares (OLS) approach was used in the estimation of the parameters. The choices of OLS technique of regression was not only as a result of its simplicity, but as a result of its optimal properties of linearity, unbiasedness, minimum variance, Zero mean (Koustsoyiannis, 1977).

Unit root test was employed to check the stationarity of data, because it is established that macroeconomic data usually exhibit stochastic trend that can be removed through only differencing (Jawad, 2013). To examine the existence of stochastic non-stationarity in the series, the study employed the order of integration of individual time series.

Error correction mechanism (ECM) was employed to measure the speed of adjustment of the dependent variable to changes in the independent variables on the short-run and to their equilibrium levels. And also, causality test was employed to investigate the causal relationship between crude oil price fluctuations and economic growth, the purpose of this test was to determine the direction of causation between the dependent and the independent variables.

3.10 Limitations of the study

This study was limited by the following limitations:

- The research only focused on the oil sector of the economy, leaving other non-oil sectors unstudied.
- The study measured changes in growth domestic product as a proxy for the dependent variable without considering other variables.
- The study was focused on the Nigerian economy growth without taken into cognizance other countries' economy growth rate.
- The research used three variables namely; International crude oil price fluctuations, Domestic premium motor spirit price fluctuations and exchange rate fluctuations to measured independent variables without considering other variables.

3.11 Ethical Issues

No confidential information of the Organizations/Establishments which data were collected from their websites was mentioned in the course of this work. All data collected for the period under study were judiciously used for the analysis, there was no form of data doctoring. The significance of the study was presented without exaggeration. All sources of information were appropriately acknowledged using references and other acceptable methods.

4. Data Presentation

The Data for this study is attached as appendix 1, it represent the variables used for the study on the yearly basis from 1997 to 2022. CGDP represent Changes in Gross Domestic Product, DPMSPF represent Domestic Premium Motor Spirit Price fluctuations, and ICOPF represent International Crude oil price fluctuations while ERPF represent Exchange Rate Price Fluctuations.

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4.1.1 Descriptive Statistics

Table 4.1 below shows the descriptive statistics of the data presented

	CGDP	DPMSP	ICOPF	ERPF
Mean	2019665	4.854157	922.2436	14.39000
Median	2418851	0.000000	808.8000	3.600000
Maximum	4756165	73.00000	5730.150	70.45000
Minimum	-1092694	-41.00000	-5747.730	-7.310000
Std. Dev.	1462187	21.43112	2349.528	23.56952
Skewness	-0.135217	1.646798	-0.242373	1.354774
Kurtosis	2.186087	7.326926	4.675140	3.309236
Jarque-Bera	0.766238	29.57006	3.167786	7.437274
Probability	0.681732	0.000000	0.205175	0.024267
Sum	50491636	116.5000	23056.09	345.3600
Sum Sq. Dev.	5.13E+13	10563.74	1.32E+08	12777.01
Observations	25	24	25	24

Source: Researchers' E-views 10 Computation,

Presented above is the descriptive statistics of the data set collected for this study. These data were keyed into the E-views statistical package which generated the result as presented in table 4.1 above.

Table 4.1above, shows the result of the descriptive statistics. From the result, it can be observed that the mean values of CGDP, DPMSP, ICOPF and ERPF are respectively 2019665, 4.854157, 922.2436 and 14.39000 with their standard deviations of 1462187, 21.43112, 2349.528, and 23.56962 ranging respectively from –-1092694 to 4756165, -40.00000 to 73.00000, -5747.730 to 5730.150 and -7.310000 to 70.45000.

It is worthy of note that the measurement of skewness indicates not only the amount of skewness but also the direction of the data distribution. A close examination of the skewness of the data set as shown in table 4.1 revealed that while DPMSP and ERPF are positively skewed, meaning long right tail, more higher values, with skewness value of 1.646798 and 1.354774 respectively; CGDP and ICOPF are negatively skewed, meaning long left tail, more lower values in its data set, with skewness value of -0.135217 and -0.242373 respectively. Kurtosis measures the peakedness or flatness of the data relative to normal distribution. The coefficient of the kurtosis of the variables indicates that all the variables except CGDP were platykurtic (negative kurtosis, lower values). Meaning that they were below 3.000000 relative to the normal, meaning that the distribution produces higher and more extreme outliers than does the normal distribution. CGDP was platykurtic (negative kurtosis, flatter curve, more lower values) relative to the normal meaning that the distribution produces less outliers than the normal distribution.

The Jarque-Bera (JB) test measures the difference of the skewness and kurtosis of the series with those from the normal distribution. The JB values of 29.57006 and 7.437274 respectively with their respective p-values of 0.00 percent and 2.45 percentfor DPMSP and ERPF showed that the data set was not normally distributed. However, The JB values of 0.76623843 and 3.1567786 for CGDP and ICOPF respectively with their respective p-values of 68.17 percent and 20.15 percent showed that the data set was normally distributed unlike CGDP and ICOPF.

4.1.2 Augmented Dickey Fuller (ADF) Unit Root Test

Table 4.2 below shows Unit Root Test (Augment Dickey Fuller)

Variables	ADF Test Statistics		Order of integration
	Level	1st Difference	
CGDP	-2.102148	-4.836418	I (1)
DPMSP	-5.165766		1(0)
ICOPF	-5.126015		I (0)
ERPF	-2.779914	-6.604158	1(1)

Test critical values at level: 1per cent= -3.639407,
5per cent= -2.951125, 10per cent= -2.614300
Test critical values at 1st Diff: 1per cent= -3.639407,
5per cent= -2.951125, 10per cent= -2.614300

Source: Researchers' E-views 10 Computation, 2022.

The test for stationarity was conducted to examine whether there is the presence of unit root in the data set collected for this study. This test was done using Augmented Dickey Fuller approach, the result is presented above with explanation as shown in table 4.2.

Table 4.2 above, showed that changes in gross domestic products and Exchange Rate Price fluctuations had unit root at levels but after differencing one time they became stationary. Domestic Premium Motor Spirit Price fluctuations and International Crude oil price fluctuations on the other hand was stationary at levels I (0). Since the variables were integrated of different orders, i.e. order I(1).

4.1.3 VAR lag order selection criteria

Table 4.3: Below shows VAR lag selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
	-671.9390	NA	2.67e+24	67.59390	67.79305*	67.63278
1	-653.1435	28.19333*	2.10e+24*	67.31435*	68.31008	67.50873*

*** indicates lag order selected by the criterion**

LR: sequential modified LR test statistic (each test at 5percent level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

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To select the optimum lag length for this study, the VAR lag order selection criteria was applied. The result is presented in table 4.3. From the table, most criteria showed that lag four was most suitable lag length for this study. Since majority of the criteria favored lag one, it meant that lag four was the optimal lag length for this study as shown in table 4.3 above.

4.1.4 Included observations: 20 after adjustment

Table 4.4 shows the ARDL long run estimates of the effect of crude oil price fluctuations on economic growth in Nigeria. The result was analyzed using two dimensions namely, the signs and magnitude. Considering the signs of the parameters of the estimates, the parameter of the CGDP in the lagged period is positive with coefficient values of 0.06 percent. This implies one per cent increase in CGDP in lagged period led to positive growth in the current period GDP.

Similarly, the parameter of the DPMSP in the lagged period is negative with coefficient values of -14231.87 percent. Implying that a one per cent increase in DPMSP in the lagged period led to negative growth in the current period GDP. Again, the parameter of the ICOPF lagged period is negative with coefficient values of -211.9145 percent. Meaning that a one per cent increase in ICOPF in the lagged period led to -211.9145 percent reductions in growth in the current period GDP in Nigeria.

Lastly, the parameter of the ERPF in the lagged period is positive with coefficient value of 5465.197 percent. This implies that one per cent increase in ERPF in lagged period led to 5465.197 positive growths in the current period GDP.

From the result, the R^2 adjusted value of 0.466885 showed that about 46.68 per cent of the changes in the CGDP have been explained by the Oil price fluctuation indices of Domestic Premium Motor Spirit Prices fluctuations, Domestic Premium Motor Spirit Price fluctuations and Exchange Rate Price fluctuations. Furthermore, the F-Statistics value of 1.204179 with its corresponding probability value of 37.76 percent showed that the model is insignificant at 5 percent.

Table 4.4: Shows long run ARDL estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	609632.4	734797.2	0.829661	0.4244
D(CGDP(-1))	0.065309	0.278960	0.234117	0.8192
D(DPMSP(-1))	-14231.87	17156.30	-0.829542	0.4244
D(ICOPF(-1))	-211.9145	201.7542	-1.050360	0.3161
D(OPER(-1))	5465.197	17875.89	0.305730	0.7655
CGDP(-1)	-0.391033	0.244896	-1.596733	0.1386
DPMSP(-1)	9260.809	31247.10	0.296373	0.7725
ICOPF(-1)	374.6588	237.9054	1.574823	0.1436
ERPF(-1)	5229.183	22044.87	0.237206	0.8169

R-squared	0.466885	Mean dependent var	63739.46
Adjusted R-squared	0.079164	S.D. dependent var	1257921.
S.E. of regression	1207104.	Akaike info criterion	31.14751
Sum squared residual	1.60E+13	Schwarz criterion	31.59559
Log likelihood	-302.4751	Hannan-Quinn criter.	31.23498
F-statistic	1.204179	Durbin-Watson stat	2.351492
Prob.(F-statistic)	0.377694		

*indicate Least Squares. Sample (adjusted)

4.1.5 Wald test of long run estimates

To test for the significance of long run estimates, the study applied the Wald statistics. Extract of the result is as presented in table 4.5.

Table 4.5: Shows wald test of long run estimates

Test Statistic	Value	D.F	Probability
F-statistic	2.166387	(4, 11)	0.1402
Chi-square	8.665547	4	0.0700

Null Hypothesis: C(6)=C(7)=C(8)=C(9)=0

4.1.6 ARDL Long run form and bounds test

ARDL Long Run Form and Bounds Test
Dependent Variable: D(CGDP)
Selected Model: ARDL(1, 0, 0, 0)
Case 2: Restricted Constant and No Trend
Sample: 1998 – 2022
Included observations: 22

Table 4.6

F-Bounds Test		**Null Hypothesis: No levels relationship**		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	2.197703	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
Actual Sample Size	22		Finite Sample: n=35	
		10%	2.618	3.532
		5%	3.164	4.194
		1%	4.428	5.816
			Finite Sample: n=30	
		10%	2.676	3.586
		5%	3.272	4.306
		1%	4.614	5.966

The value of the above F-statistics of 2.16638
From Pesaran Bound Test Result at 5percent as shown in table 4.8
Lower Bound = 2.79
Upper Bound = 3.67

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Decision Rule:

Reject null hypothesis if F-Statistic>Upper Bound Result otherwise Accept null hypothesis. 2.16638 < 3.67, implies that the null hypothesis cannot be rejected. Meaning that DPMSP, ICOPF and OPER had no causal relationship with CGDP in the long run. i.e.no-cointegration. In other words, there is no long run causality running from Oil prices/Exchange Rate Price fluctuation variables to changes in economic growth in Nigeria. Hence, we estimate only the short run model.

4.1.7 Test for reliability and stability of the estimates

To test whether or not the long run estimates of the results were reliable and stable, the study applied the Breusch-Godfrey serial correlation LM test, the normality test, the heteroskedasticity test and the CUSUM test. The results of these test are presented below:

From the result in table 4.9, the prob. chi square (2) was higher than 5 percent, it was 21.34 percent, meaning that the null hypothesis of no serial correlation cannot be rejected. It therefore means that the model is free from serial correlation.

From table 4.10, the observed R^2 value of 10.76 with its corresponding prob. Chi-square value of 21.54 percent is more than five percent, implies that the model is free from heteroskedasticity.

Table 4.7: Breusch-Godfrey serial correlation LM test

F-statistic	0.822100	Prob. F(2,9)	0.4700
Obs *R-squared	3.089382	Prob. Chi-Square(2)	0.2134

Source: Researchers' E-views 10 Computation, 2022

4.1.8 Heteroskedasticity Test: Breusch-Pagan-Godfrey

4.8 Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.602750	Prob. F(8,11)	0.2298
Obs*R-squared	10.76484	Prob. Chi-Square(8)	0.2154
Scaled explained SS	2.723894	Prob. Chi-Square(8)	0.9505

Source: Researchers' E- views 10 Computation, 2022

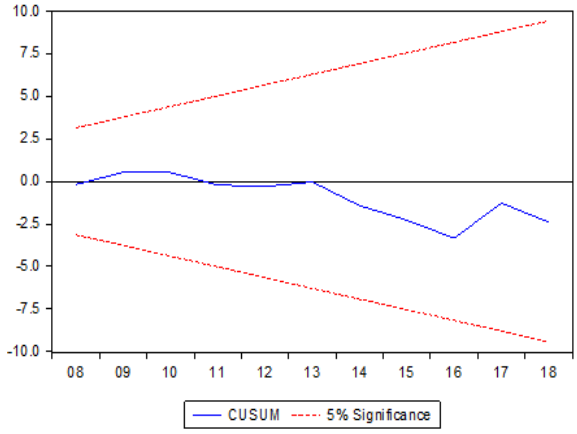

Figure 3: CUSUM test for stability analysis of long run model

Source: Researchers' E-views 10 computation, 2022.

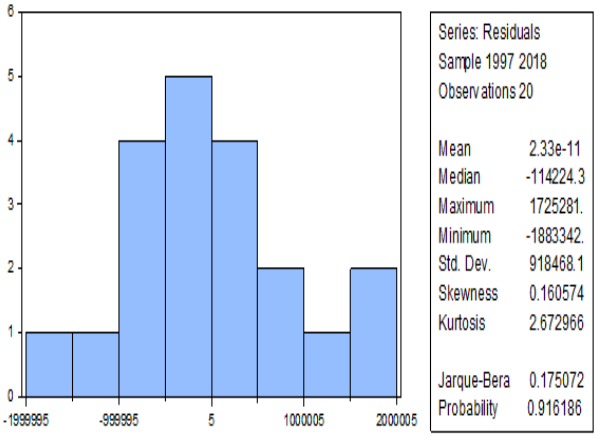

Figure 2: Normality test

Source: Researchers' E-views 9.1 Computation, 2022.

4.1.9 Jarque-Bera statistics Test

The study conducted normality test using the histogram normality test. The Jarque-Bera statistics was the basis for determining whether the residuals of the model were normally distributed or otherwise. The decision rule is that the probability of the Jarque-Bera statistics should be more than 5 percent for the residuals of the model to be normally distributed. The results of the normality test are shown in the figures above.

The JarqueBera statistics of 0.175072 with its corresponding probability of 91.61 percent, greater than 5 percent, means that the residual of the model was normally distributed.

The study also tested for the stability of the estimates by using the CUSUM test, the result is presented in figure 2. From the result in figure 2, it can be seen that the blue line lied

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in between the two red lines. This means that the estimates of our model are stable and reliable.

4.1.10 Short run dynamic analysis

We therefore, estimate only ARDL short run model having confirmed the absence of no long run causality (NO COINTEGRATION) in our model. The results of the parameters are presented in table 4.9 below.

Table 4.9 was the ARDL short run estimates of the effect of crude oil price fluctuations on economic growth in Nigeria. The result was analyzed using two dimensions namely, the signs and magnitude. Considering the signs of the parameters of the estimates, the parameter of the CGDP in the lagged period is positive with coefficient values of 0.06 percent. This implies one per cent increase in CGDP in lagged period led to positive growth in the current period GDP. Similarly, the parameter of the DPMSP in the lagged period is negative with coefficient values of -2328.83 percent. Implying that a one per cent increase in DPMSP in the lagged period led to negative growth in the current period GDP. Again, the parameter of the ICOPF lagged period is positive with coefficient values of 74.39 percent. Meaning that a one per cent increase in ICOPF in the lagged period led to 74.39 per cent increase in growth in the current period GDP in Nigeria. Lastly, the parameter of the OPER in the lagged period is positive with coefficient value of 8108.46 percent. This implies one per cent increase in ERPF in lagged period led to positive growth in the current period GDP.

From the result, the R2 adjusted value of -0.2072 showed that about 20.72 per cent of the changes in the CGDP have been explained by the Oil price fluctuation indices of Domestic Premium Motor Spirit Prices fluctuations, Domestic Premium Motor Spirit Price fluctuations and Exchange Rate Price fluctuations. Furthermore, the F-Statistics value of 0.184564 with its corresponding probability value of 94.28 percent showed that the model is insignificant at 5 percent.

Table 4.9: ARDL short run estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	27370.78	316584.3	0.086457	0.9322
D(CGDP(-1))	0.063516	0.289355	0.219508	0.8292
D(DPMSP(-1))	-2328.831	8900.489	-0.261652	0.7971
D(ICOPF(-1))	74.39565	111.8589	0.665085	0.5161
D(ERPF(-1))	8108.460	14129.32	0.573875	0.5746

R-squared	0.046908	Mean dependent var	63739.46
Adjusted R-squared	-0.207249	S.D. dependent var	1257921.
S.E. of regression	1382140.	Akaike info criterion	31.32848
Sum squared resid	2.87E+13	Schwarz criterion	31.57741
Log likelihood	-308.2848	Hannan-Quinn criter.	31.37708
F-statistic	0.184564	Durbin-Watson stat	2.032249
Prob (F-statistic)	0.942815		

Dependent Variable: D(CGDP)
Method: Least Squares
Sample (adjusted): 1997 –2018
Included observations: 20 after adjustments

4.1.11 Wald test of long run estimates

To test for the significance of short run estimates, the study applied the Wald statistics. Extract of the result is as presented in table 4.10 below.

From table 4.10, it could be seen that the null hypotheses for Oil Prices/Oil exchange rates variables of Domestic Premium Motor Spirit Price fluctuations, International Crude oil price fluctuations and Exchange Rate Price fluctuations were all accepted. This is because their respective F-statistics values of 0.068462, 1.103255, and 0.093471 and their corresponding probabilities of 79.71 percent, 31.51 per cent and 76.55 percent were greater than 5 percent required for significance.

Table 4.10: Wald test of long run estimates

Variable	Null hypothesis	F-statistics	P-value	Decision
DPMSP	C(3)=0	0.068462	0.7971	Accept H_0
ICOPF	C(4))=0	1.103255	0.3151	Accept H_0
ERPF	C(5))=0	0.093471	0.7655	Accept H_0

***denote rejection of null hypotheses at 5percent level**

4.1.12 Reliability and stability of the short run estimates Test

To test whether or not the short run estimates of the results were reliable and stable, the study applied the Breusch-Godfrey serial correlation LM test, the normality test, the heteroskedasticity test and the CUSUM test. Extracts of the results of these tests were presented in table 4.11, table 4.12, table 4.13 and figure 3.

From table 4.13 result, the prob. chi square was greater than 5 percent, it was 15.11 percent, meaning that the null hypothesis no serial correlation cannot be rejected. It therefore means that the model is free from serial correlation.

Table 4.11: Breusch-Godfrey serial correlation LM test

F-statistic	1.514666	Prob. F(2,13)	0.2563
Obs*R-squared	3.779735	Prob. Chi-Square(2)	0.1511

Source: Researchers' E-views 10 Computation, 2022

Table 4.12: Heteroskedasticity Test: Breuscg-Pagan-Godfrey

F-statistic	0.591363	Prob. F(4,15)	0.6741
Obs*R-squared	2.724319	Prob. Chi-Square(4)	0.6050
Scaled explained SS	1.589688	Prob. Chi-Square(4)	0.8106

Source: Researchers' E-views 10 Computation, 2022.

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From table 4.12, the observed R2 value of 2.724319 with its corresponding prob. Chi-square value of 60.50 percent is more than five percent, implies that the model is free from heteroskedasticity.

The study conducted normality test on the short run estimates using the histogram normality test. The Jarque- Bera statistics was the basis for determining whether the residuals of the model were normally distributed or otherwise. The results of the normality test are shown in the figure 3.

The JarqueBera statistics value of 1.796185 with its corresponding probability of 40.73 percent, greater than 5 percent, means that the residual of the model was normally distributed.

The study also tested for the stability of the estimates by using the CUSUM test, the result is presented below: From figure 4, it can be seen that the blue line lied in between the two red lines. This means that the estimates of our model are stable and reliable.

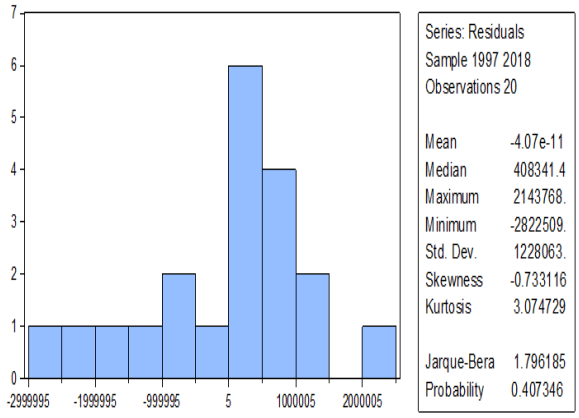

Figure 4: Normality test

Source: Researcher's E-views 10 Computation, 2022.

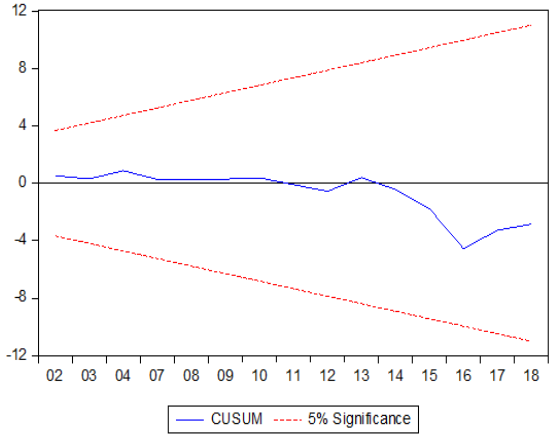

Figure 5: CUSUM test for stability analysis of long run model

Source: Researcher's E-views 10 Computation, 2022.

4.2 Results of hypotheses

Hypothesis one

HO: Domestic Premium Motor Spirit Price fluctuations have no significant effect on the gross domestic products in Nigerian;
H1: Domestic Premium Motor Spirit Price fluctuations have significant effect on the gross domestic products in Nigerian;

Decision Rule

Accept H_0: if calculated F-statistics value < Tabulated F-Statistics Value
Reject H_0: if calculated F-statistics value > Tabulated F-Statistics value.
From the regression result (Table 4.12 and Table 4.8),
Calculated F-statistics value = 0.068462
Tabulated F-Statistics value ($f_{3,21}$)= 3.67

Since the Tabulated F-Statistics value of 3.67 is greater than the calculated F-statistics value of 0.068462 at 5 percent significant level, we accept the null hypothesis and reject the alternative hypothesis. It therefore means that Domestic Premium Motor Spirit Price fluctuations has no significant effect on the gross domestic products in Nigerian;

Hypothesis two

H_O: International crude oil prices fluctuation has no significant effect on the gross domestic product in Nigerian
H_1: International crude oil prices fluctuation has significant effect on the gross domestic product in Nigerian

Decision Rule

Accept H_0: if calculated F-statistics value < Tabulated F-Statistics value
Reject H_0: if calculated F-statistics value > Tabulated F-Statistics value
From the regression result (Table 4.12 and Table 4.8),
Calculated F-statistics value = 1.103255
Tabulated F-Statistics value = 3.67

Since the calculated F-statistics value of 1.103255 is less than the Tabulated F-Statistics value of 3.67 at 5 percentlevel of significance, we accept the null hypothesis and reject the alternative hypothesis. It therefore means that International crude oil prices fluctuation has no significant effect on the gross domestic product in Nigeria.

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Hypothesis three

H_O: Oil price change rate fluctuation has no significant effect on the growth of the Nigerian economy;
H_1: Oil price change rate fluctuation has significant effect on the growth of the Nigerian economy.

Decision Rule

Accept H_0: if calculated F-statistics value < Tabulated F-Statistics value
Reject H_0: if calculated F-statistics value > Tabulated F-Statistics value.
From the regression result (Table 4.12 and Table 4.8),
From the regression result (Table 4.12 and Table 4.8),
Calculated F-statistics value = 0.093471
Tabulated F-Statistics value = 3.67

Since the calculated F-statistics value of 0.093471 is less than the Tabulated F-Statistics value of 3.67 at 5 percent level of significance, we accept the null hypothesis and reject the alternative hypothesis. It therefore means that Exchange Rate Price fluctuation has no significant effect on the growth of the Nigerian economy.

In reality, my findings are not in line with the reality of Nigerian economy because whatever affect the oil sector affects the Nigerian economy either positively or negatively since the economy depend significantly on crude oil price to fund its budget.

4.3 Discussion of findings

This study is on the effect of crude oil price fluctuations on the growth rate of Nigerian Economy. Growth rate was proxies by changes in Gross Domestic Products in formulation and testing of three hypotheses with Domestic Premium Motor Spirit Price fluctuations, International Crude oil price fluctuations and Exchange Rate Price fluctuations as independent variables.

Hypothesis one determine the relationship between Domestic Premium Motor Spirit Price fluctuations and changes in Gross Domestic Products in Nigeria. The result from Long run ARDL Estimates in table 4.6 above shows the parameter of the DPMSP in the lagged period is negative with coefficient values of -14231.87 percent. Implying that a one per cent increase in DPMSP in the lagged period led to negative growth in the current period GDP. From short run ARDL Estimates in table 4.11 above shows the parameter of the DPMSP in the lagged period is negative with coefficient values of -2328.83 percent. Implying that a one per cent increase in DPMSP in the lagged period led to negative growth in the current period GDP

The result from the tested hypothesis one revealed that Domestic Premium Motor Spirit Price fluctuations has no significant effect on the gross domestic products in Nigeria in the period studied; Since the Tabulated F-Statistics value of 3.67 is greater than the calculated F-statistics value of 0.068462 at 5 percent significant level, we accept the null hypothesis and reject the alternative hypothesis.

Hypothesis two determine the relationship between International Crude oil price fluctuations and changes in Gross Domestic Products in Nigeria. The result from Long run ARDL Estimates in table 4.6 above shows the parameter of the ICOPF lagged period is negative with coefficient values of -211.9145 percent. Meaning that a one per cent increase in ICOPF in the lagged period led to -211.9145 per cent reduction in growth in the current period GDP in Nigeria. From short run ARDL Estimates in table 4.11 above shows the parameter of the ICOPF lagged period is positive with coefficient values of 74.39 percent. Meaning that a one per cent increase in ICOPF in the lagged period led to 74.39 per cent increase in growth in the current period GDP in Nigeria.

The result from tested hypothesis two, revealed that International crude oil prices fluctuation has no significant effect on the gross domestic product in Nigeria during the period studied. Since the calculated F-statistics value of 1.103255 is less than the Tabulated F-Statistics value of 3.67 at 5 percent level of significance, we accept the null hypothesis and reject the alternative hypothesis.

Hypothesis three determine the relationship between Oil Price Exchange fluctuations and changes in Gross Domestic Products in Nigeria. The result from Long run ARDL Estimates in table 4.6 above shows the parameter of the ERPF in the lagged period is positive with coefficient value of 5465.197 percent. This implies that one per cent increase in OPER in lagged period led to 5465.197 positive growth in the current period GDP. From short run ARDL Estimates in table 4.11 above shows the parameter of the OPER in the lagged period is positive with coefficient value of 8108.46 percent. This implies one per cent increase in OPER in lagged period led to positive growth in the current period GDP.

The result from tested hypothesis three, revealed that Oil price change rate fluctuation has no significant effect on the growth of the Nigerian economy. Since the calculated F-statistics value of 0.093471 is less than the Tabulated F-Statistics value of 3.67 at 5 percent level of significance, we accept the null hypothesis and reject the alternative hypothesis.

Table 4.6 Long run ARDL Estimates, the R2 adjusted value of 0.466885 showed that about 46.68 per cent of the changes in the CGDP have been explained by the Oil price

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fluctuation indices of Domestic Premium Motor Spirit Prices fluctuations, Domestic Premium Motor Spirit Price fluctuations and Exchange Rate Price fluctuations. Furthermore, the F-Statistics value of 1.204179 with its corresponding probability value of 37.76 per cent showed that the model is insignificant at 5 percent.

The non-significant relationship arrived at is because Nigeria export crude oil and then import refined oil, the country only account for the number of barrels of crude oil produced per day but the countries has no proper record of the quantity of refined oil imported into the country per day. The costs of importing refined oil may have swallowed the revenue generated from exporting crude oil and the country poor data base of capturing the total goods and services produced in the country for a year may have leads to these findings.

Table 4.11 Short run ARDL Estimates, the R2 adjusted value of -0.2072 showed that about 20.72 per cent of the changes in the CGDP have been explained by the Oil price fluctuation indices of Domestic Premium Motor Spirit Prices fluctuations, Domestic Premium Motor Spirit Price fluctuations and Exchange Rate Price fluctuations. Furthermore, the F-Statistics value of 0.184564 with its corresponding probability value of 94.28 percent showed that the model is insignificant at 5 percent.

The research model is insignificant because there was no relationship between the dependent and independent variables, this imply that if there is any changes in the independent variables there will no resultant effect on the Nigerian economy.

5. Summary

5.1 Summary of findings

The main objective of this study was to determine the effect of crude oil price fluctuations on the growth rate of Nigerian Economy. Three hypotheses were developed and tested with the aid of Ordinary Least Square (OLS) and linear regression statistical technique using Econometric-view 10 (E-view 10) and the major findings indicated that each of these proxies of crude oil price fluctuations; Domestic Premium Motor Spirit Price fluctuations (DPMSP), International crude oil price fluctuations (ICOPF) and Exchange Rate Price fluctuations (ERPF) has no significant effect on the growth of the Nigerian economy. The data collected for these study were subjected to; descriptive statistic test, Unit root test, VAR Lag order selection criteria, Long run ARDL Cointegration analysis, ARDL Long run and ARDL-Bounds test, Jarque-Bera statistic test, short run dynamic analysis, Wald test of Lon run Estimates, Reliability and stability of the short run estimates test, Heteroskedaticity test and Normality test before the hypotheses formulated were tested and the findings were:

1) Domestic Premium Motor Spirit Price fluctuations has no significant effect on the gross domestic products in Nigeria in the period studied; Since the Tabulated F-Statistics value of 3.67 is greater than the calculated F-statistics value of 0.068462 at 5 percent significant level.
2) International crude oil prices fluctuation has no significant effect on the gross domestic product in Nigeria during the period studied. Since the calculated F-statistics value of 1.103255 is less than the Tabulated F-Statistics value of 3.67 at 5 percent level of significance.
3) Oil price change rate fluctuation has no significant effect on the growth of the Nigerian economy. Since the calculated F-statistics value of 0.093471 is less than the Tabulated F-Statistics value of 3.67 at 5percent level of significance.

The results of my findings are in line with Odera (2015), and Lee et al (1995), Nyako (2016), and Idrisov et al (2015) but in disagreement with Ogbonna (2012), Demachi (2012), Akinlo (2012), Oyeyemi (2013), Kibunyi et al (2018), Ibrahim (2018), Ergin et al (2018), Nelson et al (2018), Kanu et al (2020), and Osy et al (2020).

5.2 Conclusion

The study investigated the effect of crude oil price fluctuations on the growth rate of the Nigerian Economy. The independent variables which represent crude oil price fluctuations include Domestic Premium Motor Spirit Price fluctuations (DPMSP), International crude oil price fluctuations (ICOPF) and Exchange Rate Price fluctuations (ERPF) while changes in gross domestic products (growth rate) represent the dependent variable.

The relationship between crude oil price fluctuations and economic growth rate was found to be casually significant, the causality test result indicates that there is a causality relationship between from economic growth and all the indicators of oil prices fluctuations in the study.

The study concludes that crude oil price fluctuations have no significant co integration effect on the growth rate of Nigerian economy.

5.3 Recommendations

In line with my findings, that revealed that crude oil price fluctuations has no significant relationship with changes in Gross Domestic Products, in reality, any variations in oil price affect the economy growth rate either positively or negatively especially country like Nigeria that depend significantly on oil

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to fund it budget, the effects of downward crude oil price fluctuations always come with recession, high inflation, low economic growth and low productivity.

Nigeria export crude oil and then import refined oil, the country only account for the number of barrels of crude oil produced per day but the countries has no proper record of the quantity of refined oil imported into the country per day. The costs of importing refined oil may have swallowed the revenue generated from exporting crude oil and the country poor data base of capturing the total goods and services produced in the country for a year may have leads to these findings.

Nevertheless, the study recommends the followings:

1) Government should try as much as possible to account for the total quantity of refined oil imported into the country on a daily basis and the total costs of such made known for public utilization.
2) There is need for regulatory framework in the Nigerian stock market that will monitor the dimension of the changes in the international crude oil prices in order to promote the market Operations.
3) There should be a deliberate policy and proper monitoring by policy makers to set aside fund earned from crude oil especially when prices are high so as to help smoothen expenditure when crude oil prices are down.

5.4 Contribution to knowledge

This research has created awareness on the effect of crude oil price fluctuations on the growth rate of the Nigerian economy. Apart from the gross domestic products (GDP) which has been used as the major indicator of economic growth in many researches, the research also measured fluctuations in three ways: (Domestic Premium Motor Spirit Price fluctuations, International crude oil price fluctuations and Exchange Rate Price fluctuations) The study has extended the time series to 2019 and on a yearly basis.

5.5 Suggestion for further studies

The study looked at the effect of crude oil price fluctuations on the growth rate of Nigerian economy from 1995 to 2019 using descriptive statistics and normality test, regression analysis, unit root test, VAR lag order selection criteria, long run ARDL co-integration analysis, long run ARDL estimates, Wald test of long run estimates, ARDL long run form and bounds test, test for reliability and stability of the estimates, Heteroskedasticity test: Breusch-Pagan-Godfrey, Jarque-Bera statistics test, short run dynamic analysis. Further studies could increase the time bound (scope) or employ other crude oil price fluctuations indicators as independent variables and other factors like Market capitalization, market formation, exchange rate, international crude oil price among others that was not captured in this study that may have led to the variations between ARDL results and F-statistics and R2 results, or still, utilize other statistical technique.

This will enable comparison and increase in reliance on and robustness of the results of the study. This will also confirm the validity of the findings of the study, since different methods, variables and time horizons will be used. It will also widen the body of existing literature on the subject matter. Also further study should be conducted on the effect of crude oil price fluctuations on the growth rate and stability of the Nigerian Economy.

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