CRUDE OIL PRICE FLUCTUATION AND ECONOMIC GROWTH IN NIGERIA

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Abstract

The study examined the effect of oil price fluctuations on economic growth in Nigeria. The study used time series quarterly data ranging from the 1st quarter of 1986 to the 2nd Quarter of 2022 (1986: Q-2022:Q2). The Augmented Dickey-Fuller (ADF) and Phillips–Perron (PP) unit root tests were employed to examine the stationary properties of the time series data. This also includes Non-linear Autoregressive distributed lag method (NARDL) Bound test to examine long-run relationship among the variables and to evaluates asymmetry effects of oil price fluctuation on economic growth in Nigeria. The ADF and P-P unit root tests found that the variables were stationary at the first difference. The NARDL bound test confirmed long-run relationship among oil price fluctuation, exchange rate, inflation rate and economic growth in Nigeria for the period of the study. The study further revealed that both positive and negative changes in oil price fluctuation, exchange rate and inflation rate have positive and significant effect on economic growth in Nigeria in the long-run but indicated negative effect on economic growth in the short-run. Consequently, the study recommends that the Nigerian federal government should workout modalities through public-private partnership to increase petroleum refining capacity of Nigeria so as to become a major exporter of refined oil products rather than depending on crude oil export. The federal government should also intensify effort to strengthen the naira against foreign currencies through increase investments in addition to intensifying efforts in export promotion so as to bring in more foreign earnings.

Keywords: Oil price, economic growth, NARDL Model, agriculture

Introduction

The cause-effect relationship between oil price changeability and economic growth in Nigeria and the world at large is awash in Literature. Thus, it is a general fact that both upward and downward world oil price movements affect different countries differently depending on whether the country in question is a crude oil exporter or a refined oil importer. Nigeria is both an exporter and an importer of oil. Hence, the over-dependence of the Nigerian economy on oil earnings as the primary source of revenue can subject critical macroeconomic variables like economic growth to fluctuations and uncertainty at the slightest world oil price shocks. The oil price instability has considerably influence the whole economy of Nigeria since increase in the price of oil trigger an increase in the cost of production of goods and services, hence, shortening the cash flow, profitability of productions, extreme decrease in the employees' earnings and employment of the manufacturing sector. It is a well-known that since the commercialization of oil sector in Nigeria, the economy has experienced economic distortions because of crude oil price variations. Quite a lot of sectors became less productive having great influence on Nigeria's macroeconomic variables, specifically instabilities in inflations rate, exchange rates, high unemployment and drop in gross domestic product (Akalpler & Nuhu, 2018; Rafiu, Aminu & Folawewo, 2020).

The invisible hand in oil price changeability has made Nigeria; experienced numerous economic recessions, particularly in 1991, 2016 and 2020 (CBN, 2017; Rafiu, Aminu, & Folawewo, 2020). With proof, in 2016 Nigeria witnessed a downturn after 25 years, having observed the last downturn in 1991. The unexpected drop in crude oil price from about $114 per barrel to approximately $50 per barrel in 2014 headed the economic recession in the second quarter of 2016. In the course of the 2016 recession, obtainable data displayed that Gross Domestic Products (GDP) growth rate constricted by 1.58%, and aggregate government proceeds and oil proceeds cut down by 17.84% and 29.66%. Consequently, leading to decrease in government's ability to employ workforce and invest on some basic social amenities. Similarly, in 2020 Nigeria witnessed one more economic downturn as a result of Corona Virus Pandemic which resulted to severe fall in the entire world demand for crude oil and a great decrease in the prices of crude oil and productions which led to drop in gross domestic product (CBN, 2017; Rafiu, Aminu, & Folawewo, 2020). In the light of the aforementioned link between oil price fluctuation and economic growth, the need to account for current broadening in this relationship cannot be overstressed in other to be updated on the relationship between oil price fluctuation and economic growth in Nigeria. Hence, this study is motivated

for the reason that, Nigeria depends greatly on crude oil export proceeds, displaying approximately 90% of the entire export incomes and approximately 70% of government revenues in yearly budgets. Consequently, any flux in oil prices will affect macroeconomic variables in Nigeria. Thus, this study empirically examines the effect of oil price fluctuation on economic growth in Nigeria.

Conceptualizing Global Oil Price Fluctuation

Wakeford (2006) defined oil price fluctuation as price changes resulting from either the demand or supply side of the international oil market. These unexpected and unpredictable changes have traditionally been traced through supply-side disruption. Jelilov Abdullahi, Bilal and Abdurrahman (2020) stated that fluctuation in the price of mineral resources is more connected to the oil shocks because the bulk of the glitches stumbles concerning recession is aggravated by a change in oil price. Anjay and Ujjal (2017) asserted that price fluctuation could generally be defined as the rise or fall of the price of goods, materials and services on the markets. Price fluctuation can occur in any market, that is, international markets, the local market and the labour market. A contractor who tends at a fixed price runs the risk that he may later have to pay more for materials and labour than the prices and wages present at the time of his tender (Conversely, he may benefit if those prices and wages go down). Gujarati and Porter (2009) disclosed that oil price fluctuation is tantamount to oil price oscillation and volatility. Thus volatility is regarded as the eras in which prices display extensive swings for an extended period, followed by the times in which there is proportional stillness.

On the other hand, Uwakaeme (2015) defined economic growth as an improvement in an increment in an economy capacity to produce goods and services, as contrast from one era to another era. The measurement of Economic growth can be achieved in nominal terms. Krugman, Obstfeld and Melitz (2012) asserted that economic growth has two distinct meanings. Sometimes it refers to the growth of that thing we call the economy, the physical subsystem of our world made up of the stocks of population and wealth and the flows of production and consumption. When the economy gets physically bigger, we call that economic growth. On the other hand, if the growth of some activity causes benefits to increase faster than costs, we also call that economic growth. Kimberly (2017) defined economic growth as an increase in the production of goods and services over a specific period. Economic growth can be seen as sectoral growth in such a way that the productive capacities of goods are on a consistent rise, which will impact national income, employment and consumption, among

others. To be accurate, the measurement must remove the effects of inflation.

Theoretical Framework

This study is anchor on Dutch-Disease theory developed by Warner Max Corden and James Peter Neary in 1982 in their model called "The Classic Economic Model" for the Netherlands economy after discovering the large Groningen natural gas field in 1959. The model postulated that an economy that discovered an abundance of natural resources whose demand is competitive in the market would be characterized by the non-tradable sector, which includes services and two tradable sectors, including the booming sector and the lagging or non-booming tradable sectors. The theory is used to describe the possible negative impact that a boom in natural resources will have on a country's manufacturing industry. The country with abundant natural resources will be impacted by the resource mobility and expenditure effects of the resource boom. The resource movement effect refers to the propensity for the thriving sector to lure workers away from the non-tradable sector, consequently lowering production in that area. The spending impact comprises an increase in government spending brought on by the boom, which boosts domestic consumption and subsequently causes the currency rate to appreciate (Neary & Van Wijinbergen, 1986).

The theoretical nexus with the study is that; Dutch disease manifests many symptoms in Nigeria, prominent among which are the oil price fluctuation and the inability of the local productive economy to compete because of the bloated value of local currency helped by the inflow of foreign currency. The high exchange rate means local goods and services are expensive, making them uncompetitive in the international market and even encouraging the import of cheaper alternatives. Other symptoms of the resource curse, which cannot be directly related to the Dutch experience, include weak institutions, official corruption, assertive resource nationalism, internal unrest and even external aggression.

Oil Price Fluctuation and Economic Growth

There have been several researches and studies on the nexus between oil price fluctuation and economic growth across countries in the world including Nigeria with no consensus in the findings. Udoh, Abner, Enemuo, Moguluwa, Onyejiaku, Attamah, and Udo (2023) employed structural vector autoregressive (SVAR) and autoregressive distributed lag (ARDL) methodologies to examine symmetric effect of oil price fluctuation on the business climate, economic growth and macroeconomic indicators on daily

data from 2012 to 2022. The study has shown a significant long-run link amid oil prices and macroeconomic indicators.

Oyalabu and Oyalabu (2023) in their studies employed Auto-Regressive Distributed Lag to examine the effect of crude oil prices on economic growth in Nigeria from 1985 to 2019. The result showed a positive and statistically insignificant relationship exists between crude oil price and economic growth in Nigeria. The study suggested the need for Nigeria government to allocate more funds to capital expenditure in projects to reduce the unemployment rate and diversification of the economy.

Jacob and Rosemary (2022) examine the effects of exchange rate fluctuation on economic growth in Nigeria from 1981-2018 using non-experimental research design. Autoregressive Distributed Lag Model (ARDL) model was used for data analysis, dependent variable for the study is Real Gross Domestic Product (RGDP) which is used as a proxy for Economic Growth and the independent variables are Import (IMPO), Export (EXP), Exchange rate (EXR), government capital expenditure (GOCEXP) and Inflation rate (INFR). The findings of the study revealed that exchange rate, export, government capital expenditure have positive impact on RGDP both in the long-run and short-run however IMP has a negative impact on RGDP both in the short-run and long-run meanwhile INFR has a negative and statistically significant impact on RGDP in the short-run. Nkemdilim and Azuka (2021) examined the effects of persistent exchange rate fluctuations on Nigeria's economic performance. The study employed the autoregressive distribution lag (ARDL) technique to test the short-run and long-run effects of exchange rate fluctuations on economic growth using annual time series data from 1986 to 2019. The empirical result revealed that the exchange rate, net direct foreign direct investments, and inflation rate had a significant adverse impact on Nigeria's economic growth in the long run. By implication, the net effect of this study established that excessive exchange rate fluctuations are detrimental to Nigeria's economic growth.

Onwubuariri, Oladeji and Bank-Ola (2021) evaluate the impact of inflation on Nigeria's economic growth for the past four decades, beginning from 1980 to 2019. Inflation rate, interest rate, exchange rate and government expenditure were the independent variables, while the gross domestic product was the dependent variable. Annual time series secondary data covering the period 1980 to 2019 were obtained from the World Development Indicators (WDI) published by the World Bank. Data collected were analysed using the Autoregressive Distribution Lag (ARDL) model and the Error Correction Model (ECM). Results indicated that inflation has negatively affected economic growth over the years as it

reduces competitiveness as well as lowering the purchasing power of money. Anthony and Oluwabunmi (2019) in an attempt to examine the influence of inflation on the growth prospects of the Nigerian economy, the study employs the autoregressive distributed lag on the selected variables for the period 1980–2018. The study findings indicate that inflation and real exchange rate exert a significant negative impact on economic growth, while interest rate and money supply indicate a positive and significant impact on economic growth.

Akalpler and Nuhu (2018) in their study, used Vector Error Correction model and examined the impact of oil price instability on economic growth in Nigeria from 1981 to 2015. The study found oil price and real effective exchange rate were positively related to economic growth, whereas government expenditure and inflation had a negative relationship. Keji (2018) examined nexus between oil price collapse and economic growth in Angola, Nigeria and Sudan using data from 2010 to 2015. Negative link between oil price collapse and the economic growth was found from panel random effects model. Hence, there is need for a strong fiscal measure in order to sustain economic growth. Ogboru, Rivi and Idisi (2017) examined the impact of changes in crude oil prices on economic growth in Nigeria with use of Ng-Perron and Zivot-Andrews Tests, Johansen's co-integration Test, Granger Causality Test and the Vector Error Correction Model (VECM) on annual data from 2000 to 2015. The study showed crude oil price exert positive influence on the economic growth of Nigeria. Hence, recommended the need for diversification of other sectors. Tehranchian and Mohammad (2017) examined the relationship between volatility in oil prices and economic growth in an oil-exporting country on data from 1980 to 2014 with use of threshold regression model. It showed OPV equal to 1147.77 acts as a threshold value and 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.

Nwoba, Nwonu and Agbaeze (2017) in their study, employed Simple regression analysis, Pearson Product Moment Correlation and Chi-Square and examined the impact of fallen oil prices on the Nigeria economy. It was revealed that there is a significant negative effect on the Nigerian economy. Hence, recommended for diversification of Nigerian economy. Micah (2016) *evaluates the impact of inflation on economic growth in the context of an emerging market using empirical evidence from Nigeria. Using time series data spanning forty one years (1970-2011) which was obtained from the Central Bank of Nigeria (CBN) statistical bulletin volume 22, and Central Bank of Nigeria official website. The Augmented Dickey Fuller (ADF) and Philip-Perron (PP) tests were used to test for the stationary of*

the variables while the granger causality test was employed to ascertain the direction of influence between inflation and economic growth in Nigeria. The results show that there exists a statistically significant positive relationship between inflation and economic growth in Nigeria. However, there is no leading variable in the relation between inflation and economic growth in Nigeria.

Chude and Chude (2015) ascertain the existence of a relationship between inflation and economic growth in Nigeria. The methodology employed in this study is the quantitative research design. Consumer price index (CPI) was used as a proxy for inflation and the GDP as proxy for economic growth, to examine the relationship. The scope of the study spanned from 2000 to 2009. Ordinary least square method and t-test were used to test the variables most likely to impact on economic growth in Nigeria due to inflation. The findings also shows that there is strong relationship between inflation and economic growth in Nigeria, that exchange rate has positive impact on economic growth and that high interest rate discourages investment and hence forestalls economic growth.

Ani, Ugwunta, Oliver and Eneje (2014) employed Granger causality and the ordinary least squares to examine causal relationship amid oil prices and main macroeconomic variables on time series data from 1980 to 2010 in Nigeria. The result shown gross domestic product is not influenced by oil price volatility in the short run, and there is no proof of influence on any macroeconomic variable. Although, there is a positive but insignificant relationship between oil price and GDP.

From the preceding review of empirical literature, most of the studies on the relationship between changes in oil prices and economic growth showed a mixed result; with some studies indicating positive and significant impact of oil price fluctuations on economic growth in Nigeria (Oyalabu & Oyalabu, 2023; Akalpler & Nuhu, 2018; Ogboru, Rivi & Idisi, 2017; Ani, Ugwunta, Oliver & Eneje,2014), while others indicating negative and significant impact of oil price fluctuations on economic in Nigeria (Nwoba, Nwonu & Agbaeze, 2017). These contradictions give rise to the need to re-examine to ascertain the current realities on the relationship between oil price fluctuation and economic growth in Nigeria.

Moreover, most studies reviewed used other analytical techniques such as Auto-Regressive Distributed Lag (ARDL) (Udoh, Abner, Enemuo, Moguluwa, Onyejiaku, Attamah & Udo, 2023; Oyalabu & Oyalabu, 2023), Vector Error Correction model (Akalpler & Nuhu, 2018; Ogboru, Rivi & Idisi, 2017) and simple regression analysis, Pearson Product Moment Correlation and Chi-Square (Nwoba, Nwonu & Agbaeze, 2017; Ani, Ugwunta, Oliver & Eneje, 2014). These techniques however estimated symmetry or one sided effect of oil price without taking into account

asymmetry effects which decomposes the oil price fluctuation into its positive (OP^+) and negative (OP^-) partial sums. These inadequacies in the methodologies further motivated this study which employed Nonlinear Autoregressive Distributed Lag model to accommodate the asymmetry effects.

Research Methodology

The research design for the study was causal-comparative because it established the cause-effect relationship between oil price fluctuation and economic growth in Nigeria. Data relating to the variables of the study were time series quarterly data spanning from first quarter 1986 to second quarter 2022 drawn from statistical bulletins of the Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS). The study employed econometric techniques such as; Augmented Dickey Fuller Test (ADF) and Philips-Perrons (PP) for unit root test to examine the stationary properties of the time series data. The study further employed Nonlinear Autoregressive Distributed Lag model (NARDL) for long-run and effect analysis. The NARDL model estimated within the ARDL framework was used in this study to capture asymmetric effects of oil price fluctuation on economic growth. The advantages of NARDL model is its ability to test for cointegration when the variables are I(0) or I(1) or both (Phong, Bao & Van, 2017). It also produces statistically significant results with a small sample size. In addition, unlike other cointegration techniques, ARDL allows individual variable to take different lags length (Pesaran, Shin & Smith, 2001). The study adapts the model by Onakoya and Agunbiade (2020), who examine oil Sector Performance and Nigerian macroeconomic variables using yearly data from the year 1980 to 2017. Key macroeconomic indicators such as Gross Domestic Product (GDP), inflation rate (INFR), real interest rates (RIR) and real exchange rates (RER) were included in the model. This study modified the model in line with NARDL model specification to investigate potential nonlinear relationships between oil price fluctuation and economic growth. This model allows for distinct responses to positive and negative oil price shocks, capturing potential asymmetries in the impact of price fluctuations. Hence, the functional relationship of the model is stated as thus:

$RGDP = f(OP, INFR, RER)$…….……*(1)*

Equation (1) is expressed in explicit econometric form thus;

$RGDP = \beta_0 + \sum\beta_1 OP_t + \beta_2 INFR_t +$
$\beta_3 RER_t + \varepsilon_t$…… *(2)*

Equation (3) is restated in autoregressive distributed lag form as follows;

$$\Delta\big((logRGDP_{t-1)})\big) = \beta_0 + \beta_1((logRGDP_{t-1})) + \beta_2\big((OP_{t-1})\big) + \beta_3\big((INFR_{t-1)}\big) + \beta_4(RER_{t-1}) + \varepsilon_t \ldots\ldots\ldots\ldots\ldots (3)$$

Where;

RGDP = Real Gross Domestic Product proxied for Economic Growth and measured in billions of naira

OP = Crude Oil Price proxied for oil price and measured in naira

INFR = Inflation rate measured in rate

RER = Real Exchange Rate measured in naira

Consequently, to test the asymmetric effects of the oil price fluctuation on economic growth, the NARDL model proposed by Shin et al. (2001) decomposes the oil price fluctuation into its positive (OP^+) and negative (OP^-) partial sums. The decompose income inequality is stated below:

$$(OP_t^+) = \sum_{i-1}^{t} \Delta(OP_t^+) = \sum_{i-1}^{t} MAX(\Delta OP_i),0) \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$$(OP_t^-) = \sum_{i-1}^{t} \Delta(OP_t^-) = \sum_{i-1}^{t} MIX(\Delta INEQ_i),0) \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Where OP_t^+ and OP_t^- are the partial sum of the positive (or increases) and negative (or decreases) effect of the oil price respectively. Equation (3) can be revised to account for an asymmetric level relationship as follows;

$$\Delta\big(LogRGDP_{t)}\big) = \rho_0 + \rho_1(LogRGDPR_{t-1}) + \rho_2(Op_{t-1}^+) + \rho_3(OP_{t-1}^-) + \rho_4\big((INFR_{t-1)}\big) + \rho_5(RER_{t-1}) + \sum_{i-1}^{p} \aleph_1 \Delta(LogRGDP_{t-1})) + \sum_{i-1}^{q} \aleph_2 \Delta(Op_{t-1}^+) + \sum_{i-1}^{q} \aleph_3 \Delta(OP_{t-1}^-) + \sum_{i-1}^{r} \aleph_4 \Delta\big((INFR_{t-1)}\big) + \sum_{i-1}^{s} \aleph_5 \Delta(RER_{t-1}) + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Where; all parameters remain as previously defined in equation (4). (OP_{t-1}^+) and OP_{t-1}^-) is the positive and negative lag of the oil price decomposed into the partial sums of the positive and negative effect. $\psi_t \sim IN(0, \sigma^2)$. The lag orders of the variables are denoted by p and q respectively. The p represents the lag order of positive partial while q negative partial sum lag oil price fluctuation. The first part of Equations 7 shows the long-run relationship between oil price fluctuation and economic growth and the second part is the associated short-run of the relationship.

Empirical Results

Unit Root Test

The unit root test was conducted to determine the stationary conditions of the series and also to know their order of integration. The results of these tests are given in tables 4.1 using ADF and PP unit root test.

Table 4.1: Unit Root Tests Results

Level

Test/Variables	GDP	OP	RER	INF
ADF	-1.195466	-1.581614	-0.207815	-2.608340
	(0.6754)	(0.4891)	(0.9334)	(0.0939)
PP	0.542056	-1.626244	0.587845	-2.765267
	(0.9876)	(0.4665)	(0.9890)	(0.0660)
First Difference				
Test/Variables	**GDP**	**OP**	**RER**	**INF**
ADF	-3.935351	-3.115075	-3.800666	-4.030982
	(0.0024)	(0.0279)	(0.0037)	(0.0017)
PP	-5.222290	-5.162412	-5.001237	-5.523071
	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Source: Authors Computation using E-views. Version 10 (2023)

Table 4.1 displayed unit root test result showing the variables were not stationary at levels and were difference and became stationary after differencing the time series data. These results suggest the use of ARDL bound test. The ARDL can be used whether the variables are a mixture of I(1) and 1(0) or the same level so far as the none of the variables are I (2). The stationarity tests are necessary to guard against spurious regression and to ensure no variable is integrated of order two. The test was based on Akaike Information Criterion (AIC) which was selected automatically.

The NARDL Analysis

The essence of conducting the NARDL is to assess the non-linearity of oil price fluctuation on economic growth in Nigeria. It gives the impact of the positive and negative effects of oil prices fluctuation on the economics of Nigeria over the period of study. The table 4.2 presents the NARDL bounds testing approach to co-integration results for the model to investigate the long-run relationship between oil price fluctuations on economic growth in Nigeria.

Table 4.2 NARDL Bounds Test

Test Statistic	Value	K
F-statistic	5.593425	2
	Critical Value Bounds	
Significance	I0 Bound	I1 Bound
10%	2.2	3.09
5%	2.56	3.49
1%	3.29	4.37
N=137		

Source: computed by the author using E-views. Version 10 (2023)

From the results of the NARDL bounds testing approach to co-integration are the computed F-statistic of 5.593425. The f-statistics for this bound test which is 5.593425 is greater than both values of the upper bound and lower bound of 3.49 and 2.56 at 5% significance level. Therefore, the null hypothesis of no long run relationship is strongly rejected at the 5% level of significance. Hence, this shows that there is long-run relationship between Gross Domestic Product (GDP_t), oil prices (OP_t), Real Exchange Rate (RER_t) and Inflation Rate (INF_t) over the study period of 1980-2020 in the case of Nigeria.

NARDL Long-Run Coefficients Analysis

The NARDL long-run coefficients were estimated to examine the long-run effect of the independent variables on the endogenous variable having established that, long run relationship exist among the variables. The estimated result of the NARDL long-run coefficients is presented in Table 4. 3.

Table 4.3 NARDL Long-Run Estimates

Variables	Coefficient	S.E	t-values	P-Value
OP_POS	0.09229	0.02243	4.113756	0.0001
OP_NEG	0.08375	0.03184	2.749313	0.0069
RER	0.03953	0.01805	2.189486	0.0304
INF	0.05782	0.04338	1.332882	0.1850
C	0.10845	0.13356	83.37328	0.0000

Source: computed by the author using E-views. Version 10 (2023)

Table 4.3 reveals that, positive effect of oil price fluctuation (OP_POS) indicated positive long-run significant effect on economic growth in Nigeria. This implies that, 1% positive response in oil price fluctuation increases economic growth in Nigeria by 9% within the period of the study. Similarly, the result presented show that, negative effect of oil price fluctuation (OP_NEG) indicated positive long-run significant effect on economic growth in Nigeria. This implies that, 1% negative response in oil price fluctuation increases economic growth in Nigeria by 8% within the period of the study.

The results of the estimated model further suggest that, the NARDL model successfully captures asymmetries in the responses of the level GDP to changes in oil price fluctuation. The responses of the GDP to positive changes are stronger than to negative changes in oil price fluctuation This is apparent in values of long-run coefficients presented in Table 4.3 in which the coefficient of the positive change in oil price fluctuation (OP_POS) is 0.09229, while the coefficient of the negative change in oil price fluctuation (OP_NEG) is 0.08375 or less by1%. The implication is that, though both positive and negative responses in oil price fluctuation

have shown an increasing effect on economic growth in Nigeria for the period of the study, a positive response will be more beneficial to economic growth in Nigeria in the long-run.

In the same vein, exchange rate (RER) indicated long-run positive significant effect on economic growth (GDP). This implies that 1% increase in RER increases economic growth by approximately 4% for the period of the study. Similarly, inflation rate (INFR) indicated long-run positive insignificant effect on economic growth (GDP). This implies that, 1% increase in INFR increases economic growth approximately by 6% for the period of the study. The intercept (C) value of 0.10845 means that if the value for all the variables include in the model were fixed at zero, the average level of GDP in Nigeria will rise approximately by 11%.

NARDL Short-Run Form

The study further ascertains the short-run dynamics of the estimated model having established long-run relationship and effect of the exogenous variables on endogenous variable. The short-run NARDL coefficients are presented in Table 4.4.

Table 4.4: NARDL Short-Run Estimates

Variables	Coefficient	S.E	t-values	P-Value
Δ(OP_POS)	0.03766	0.00729	5.168411	0.0000
Δ(OP_NEG)	-0.03043	0.00548	-5.548745	0.0000
Δ(RER)	-0.04452	0.00254	-1.752416	0.0822
Δ(INF)	-0.01336	0.00404	-3.310384	0.0012
ECT_{t-1}	-0.035410	0.08799	-4.024064	0.0001

Source: computed by the author using E-views. Version 10 (2023)

Table 4.4 reveals that; the value for the coefficients of current year OP_POS affect economic growth positively in the short-run, and the coefficients is statistically significant. On the other hand, the coefficients of the current year OP_NEG indicated negative and significant effect on economic growth in the short-run. Similarly, current year RER shows negative and statistically significant effect on economic growth in the short-run within the study period. In a related development, the values of the coefficients for current year INFR indicated negative and statistically significant effect on economic growth in the short-run for the study period within the economy.

The estimated co-integration term (ECT) conforms to a priori expectation and statistically significant. The magnitude of the co-integration term indicates that, if there is any deviation, the long-run equilibrium is adjusted speedily where about 3% of the disequilibrium may be removed in each period.

Diagnostic Tests

The tests for normality, serial correlation, heteroscedasticity, model mis-specification and stability were conducted for the estimated model. The results for residual tests are presented in Table 4.5 and figures 1.

Table 4.5: Residual Tests

Test	Null Hypothesis	F-statistics	Prob. Value
Jarque-Bera (JB)Test	Series residuals are normally distributed	3.239919	0.077594
Beusch Godfrey Serial Correlation LM Test	No Serial Autocorrelation	1.537445	0.2191
Breusch-Pagan Godfrey	No Hetroscedasticity	2.371407	0.1259
Ramsey Reset	No Misspacification	0.146872	0.7022

Source: computed by the author using E-views. Version 10 (2023)

Table 4.5 indicated the result JB statistic which reveals that, the null hypothesis that the series residuals are normally distribution is accepted because the p-values is greater than 5% significant level. Similarly, the result of Breusch-Godfrey Serial Correlation LM Tests for the estimated model reveals the acceptance of null hypothesis of no Serial Correlation as the F-statistic probability values for the estimated models is significance at 5% level.

In the same vein, the Breusch-Pagan-Godfrey heteroscedasticity Test reveals the acceptance of the null hypothesis that disturbance terms exhibit the equal variance assumption of homoscedasticity for the estimated model. This is because the probability of F-statistic is statistically significant at 5% level. Also, the estimated result of the Ramsey RESET Test for model specification reveals the acceptance of the null hypotheses that, the model has no omitted variables as F-statistic for the estimated model is significant at 5% level.

The NARDL CUSUM test was also conducted to test for parameter stability. The NARDL CUSUM adopted is based on cumulative sum of the recursive residuals. This option plots the cumulative sum together with the 5% critical lines. The test find parameter instability if the cumulative sum goes outside the area between the two critical lines. The significance of any departure from the zero line is assessed by reference to a pair of 5% significance lines, the distance between which increases with increase in the subsamples. Figures 1 show the NARDL CUSUM tests for the estimated model.

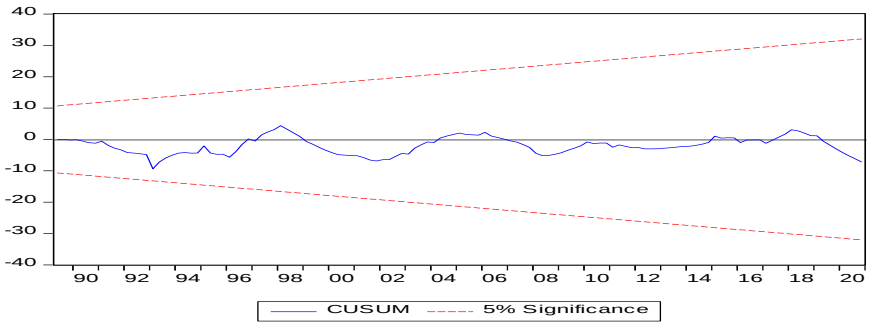

Figure 2: CUSUM Test for the Estimated Model
Source: Extracts from E-Views 10.0, 2023

Movement of recursive residuals inside the critical lines is suggestive of coefficients stability. The cumulative sum of the recursive residuals shows that there is stability in the equation within the sample period.

Discussion of Results

The NARDL Bound tests of Co integration reveal long-run relationships between economic growth and the exogenous variables used for the study. The implication is that, long-run relationship exists between oil price fluctuation and economic growth in Nigeria for the period of the study. The finding corroborate with study by Udoh, Abner, Enemuo, Moguluwa, Onyejiaku, Attamah, and Udo (2023) who also established a long-run link between oil price fluctuation and economic growth.

Moving toward the contribution to the body of knowledge and with more emphasis on the key variable, the study decomposed oil price fluctuation into positive and negative effect and account for its differential effect on economic growth. The result of the estimated NARDL model successfully captures asymmetries in the responses of economic growth due to changes in oil price fluctuation. The study revealed that, though both positive and negative changes in oil price fluctuation have shown an increasing effect on economic growth in Nigeria for the period of the study, a positive change will be more beneficial to economic growth in Nigeria in the long-run. Though on average, in the short-run it indicated negative effect on economic growth. This is possible in view of the fact that, Nigeria major export for foreign exchange is crude oil, priced in dollar and any appreciation or depreciation in value of dollar with respect to local currency will provide for more earnings to the economy because dollar is more valuable than the local currency, hence the rise in GDP. The finding is in tune with studies by Oyalabu and Oyalabu (2023), Akalpler and Nuhu (2018), Ogboru, Rivi and Idisi (2017) as well as Ani, Ugwunta, Oliver and Eneje (2014) which discovered that, oil price fluctuation is positively

related to economic growth in Nigeria. The finding is however in contrast with Keji (2018) as well as Nwoba, Nwonu and Agbaeze (2017) who established negative relationship between oil price fluctuation and economic growth in Nigeria.

In a similar development, exchange rate (RER) indicated long-run positive significant effect on economic growth (GDP). However, in the short-run, the relationship was found to be negative. The finding is in line with Akalpler and Nuhu (2018) as well as Jacob and Rosemary (2022) who found real effective exchange rate is positively related to economic growth. This result is at variance with the study by Nkemdilim and Azuka (2021) who found that, exchange rate has a significant adverse impact on Nigeria's economic growth in the long run. In the same vein, inflation rate (INFR) indicated long-run positive insignificant effect on economic growth (GDP) while in the short-run, it indicated negative relationship with economic growth for the period of the study. The finding is at variance with studies carried out by Anthony and Oluwabunmi (2019) as well as Onwubuariri, Oladeji and Bank-Ola (2021), who concluded that, inflation has negatively affected economic growth over the years as it reduces competitiveness as well as lowering the purchasing power of money. It however supports the findings by Micah (2016*)* as well as Chude and Chude (2015) *which show that, there exists a statistically significant positive relationship between inflation and economic growth in Nigeria.*

Conclusion and Recommendations

In line with finding, the study concludes that any responses to positive or negative movement in oil price has increasing effect on economic growth in the long-run while in the short-run it has depleting effect on economic growth in Nigeria. Nevertheless, a positive change will be more beneficial to economic growth in Nigeria in the long-run. This disparity between the long- and short-run positive and negative effects of the oil price fluctuation on economic growth in Nigeria could be attributed to the complex nature of business cycle in explaining the nature and movement of oil price fluctuation in the international market amidst financial crisis and over dependency on crude oil export for foreign earnings in Nigeria. The study further concludes that; exchange rate (RER) and inflation rate have long-run positive significant effect on economic growth (GDP) in Nigeria. The study therefore suggests the following recommendations based on the conclusions drawn from the study as thus. Government should workout modalities through public-private partnership to increase petroleum products refining capacity of Nigeria so as to become a major exporter of refined oil products rather than depending on crude oil export. This will

enable the nation benefit maximally even at any slightest oil price fluctuation in the international market amidst financial crisis. In view of the fact that, exchange rate has indicated potentials of increasing economic growth in Nigeria, government should intensify effort to strengthen the naira against foreign currencies. This could be achieve through increase investment in other sectors especially agriculture solid mineral, manufacturing and tourism. In addition, export promotion should be intensifying to bring in more foreign earnings through other sectors aside the oil sector of the economy.

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