



CRUDE OIL PRICE SHOCKS AND SELECTED MACROECONOMIC VARIABLES IN NIGERIA

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Abstract: The study examined crude oil price shocks and selected macroeconomic variables in Nigeria from 1980-2019. The objectives of the study were to; analyze nature of shocks between crude oil price and gross domestic product in Nigeria; and determine the type of shocks between crude oil price and inflation rate in Nigeria. Annual data were collected from CBN statistical bulletins and World Development Index (WDI). The main technique of analysis is the Impulse Response Function (IRF). The technique of Augmented Dickey Fuller (ADF) unit root test was used to ascertain the order of integration of the variables before they were subjected to the IRF. The ADF result showed that all variables were stationary at first difference. The empirical results showed that, there is a symmetric shock between crude oil price and gross domestic product. But an asymmetric shock between crude oil price and inflation rate. Meaning that, there is positive response between crude oil prices and GDP, but a negative response between crude oil price and inflation rate. Based on the findings it was recommended amongst others that there is the need for proper coordination of fiscal and monetary policy for sustainability of macroeconomic variables in terms of inflation and real gross domestic product.

Keywords; Asymmetric, Crude Oil, Macroeconomic, Price, Shocks, Symmetric

1. Introduction

The Nigerian economy is a mono cultural economy which export crude oil and import refine petroleum products. As a result of this, it is highly susceptible to variations in the international oil market despite being the 6th largest producer of oil in the world. This is given the fragile nature of the Nigerian macro economy and the heavy dependence on oil proceeds (Ijeomah, 2015). When market prices tend to change often over a relatively short time, the market is said to be volatile. But when relative stable prices prevail, the market is said to have low volatility.

Meanwhile, oil price shocks are the unanticipated components of a substantial change in the price of oil which is defined as the differential between the expected and realized oil price (Kilian, 2009). The price of oil has witnessed significant fluctuations since 1970; it oscillates

between \$17per barrels and \$26 at different times in 2002 and about \$53 per barrel by October 2004 (Philip & Akintaye, 2006). Between 1986 and 2010, oil prices increased more than six folds from \$23 per barrel in January 2000 to a peak of \$146 per barrel in July 2008 (Hassan & Zahid, 2011) and by 2012 it average \$72per barrel but falls to as low as \$37 per barrel in 2016.

The transmission mechanisms through which oil prices have impacted on real economic activities include both supply and demand channels. The supply-side effects are related to the fact that crude oil is a basic input to production, and consequently an increase in oil prices leads to a rise in production costs that induces firms to lower output. Oil price changes also entail demand-side effects on consumption and investment. Consumption is affected indirectly through its positive relation with



disposable income. Oil price rises reduces the consumers spending power.

Nigerian economy is exposed to oil price shocks since oil contributes over 90% of the total revenues. This shock is so severe that the budget is even tied to a particular price of crude oil and the budget was adjusted in some occasions when there is sudden changes in crude oil prices such as the reduction of budget due to fall in oil prices during the last global financial crisis. This is even worsened due to the fact that despite the four refineries, Nigeria is still exposed to oil price shocks due to massive importation of refined crude oil products. As an oil exporter and importer of refined petroleum products, Nigeria is thus vulnerable to oil price volatility.

Meanwhile, the fall in the oil price is expected to negatively affect macroeconomic variables in Nigeria in term of economic growth and inflation rates due to the mono cultural nature of the Nigerian economy and the adverse impact is not only felt by the oil sector but also the non-oil sectors of the economy. Based on the background above, the study examined crude oil price shocks and selected macroeconomic variables in the Nigerian economy by providing answers to these questions; what is the effect of crude oil price shocks on gross domestic product (GDP)? What is the effect of crude oil price shocks on the rate of inflation in Nigeria from 1980-2019?

2. Literature Review

2.1 The asymmetry-in-effect theory

The Asymmetry-in-effect theory of economic growth proposes that a decline in oil prices is associated with no significant effect on the economic activities in the US and some OECD countries (Mork, 1989; Lee, Ni & Ratti, 1995; Ferderer, 1996). For instance, Mork (1989) expanded the work of Hamilton (1983) by investigating the asymmetric response of oil price volatility by disintegrating oil price volatility into real price increases and decreases. The findings show that oil price drop is significantly different and perhaps zero. The results of

Mork (1989) are reinforced in the study of Lee et al. (1995) when they examined the asymmetry-in effects during the period before and after 1985. Lee et al. (1995) were able to resolve the issue of whether the asymmetric effect is dependent on the macroeconomic variable or not. As a follow-up, Ferderer (1996) sought to explain the asymmetric relationship between oil price volatility and economic activity by introducing three possible activity channels: sectoral shocks, counter-inflationary monetary policy and uncertainty. Ferderer concluded that the asymmetric oil price-output relationship is partly explained by the responses found in asymmetric monetary policy.

2.2 Review of empirical literature

Ibrahim (2020) applied a nonlinear approach to explore the asymmetric impact of oil price on inflation in Egypt from 1960-2017. The results of the nonlinear ARDL model, confirmed the existence of co-integration which means that there is a long-run equilibrium relationship between inflation, oil prices, GDP, and money supply, in the Egyptian economy. Results also captured short-run and long-run asymmetric impacts of oil price increases and decreases on inflation. Alenoghena (2020) used structural vector autoregression (SVAR) approach to examine the effect of oil price shocks on the macroeconomic performance of the Nigerian economy from 1980 to 2018. The results revealed that oil price shocks have significant and negative effects on economic growth and industrial output. Furthermore, while the results show that oil price shocks have a significant positive effect on inflation, the effect is also positive on interest rate and exchange rate, but it is not significant. The results of impulse response function showed a negative effect on output growth, it is positive on inflation, but mild and indeterminate on industrial production, interest rate and exchange rate.

Onyeiwu and Oguntade (2018) examined the impact oil prices on the Nigerian economy from 1980 to 2016 with the use of unit root test, co-integration to test and the



OLS. The research found that there is a significant and positive relationship between oil price changes and economic growth in Nigeria. In the short-run, Nigeria was able to have increasing growth because of the high global oil prices, but in the long-run, the inconsistency of oil prices and lack of diversification of the productive base has not really helped the Nigeria economy.

Eagle (2017) examined the relationship between oil price volatility and macroeconomic performance in Nigeria and Angola between 1990 and 2014. The study made use of Structural Vector Autoregressive model, E(GARCH) and Granger Causality Test as estimation techniques. Results from both impulse response function and variance decomposition showed that oil price volatility had marginal impact of growth rate of gross domestic product which was used to proxy economic growth. The E (GARCH) result showed that oil price was relatively volatile during the study periods. Also, Pairwise Causality Test showed a bi-directional relationship between oil price and macroeconomic variables in Nigeria, but a unidirectional relationship in Angola.

Akram and Mumtaz (2016) the impact of oil price fluctuations in the economy Norway since the 1980s. They showed that oil price fluctuations have contributed to sizable volatility in the economy variables over the period starting from the 1980s. In like manner, Wei and Guo (2016) an empirical analysis of the relationship between oil prices and the Chinese macroeconomic from 1996 to 2014. They found that Interest rate and output responds dramatically to the shocks in oil price. Oil prices changes are found to be useful for forecasting the China's exports in the periods shorter than about two years.

Mgbame, Donwa and Onyeokweni (2015) based on the empirical review found that there is a significant and positive relationship between oil price volatility (OPV) and Nigeria economic growth. They believe that oil price changes determines government expenditure level, rate of inflation, level of unemployment, which in turn determines the growth of the Nigerian economy.

Kiliçarslan and Dumrul (2017) conducted a similar study in Turkey and deployed SVAR analysis for the period from 2005Q1 to 2017Q2. The evidence confirmed that a rise in the price of crude oil elicited a decline in economic growth and increased crude oil prices, inflation and real exchange rate.

Ftiti, Guesmi, Teulon and Chouachi (2016) studied the degree of interdependence between oil price shocks and economic growth for (United Arab Emirates, Kuwait, Saudi Arabia, and Venezuela) in OPEC during the period from 2000 to 2010 with the use of co-integration test. The result showed that, oil price shocks in short-term and medium-term periods of fluctuations in financial turmoil and the global business cycle impacted on economic growth in Organization of the Petroleum Exporting Countries. Although, the effect of the medium-term effects was greater than that of the short-term effects. Also, Nwanna and Eyedayi (2016) investigated the impact of crude oil price volatility on economic growth of Nigeria during period of 1980-2014. The results revealed that there is a positive and significant relationship between oil price and economic growth. Based on the findings, the researchers concluded that oil price volatility does not have a positive impact on the economy.

Nusair (2016) examined the impact of oil prices on the economies of the Gulf Cooperation Council (GCC) countries. The study found that positive oil price changes have a considerably larger effect on real GDP than negative changes. Also, Rahma, Perera and Tan (2016) examined the impact of oil prices on Sudan's GDP growth and unemployment rates, using (VAR) model for the period 2000-2014. They found that the decrease in oil price has a greater impact on gross domestic product growth. The decrease in oil price has a significant positive effect on the unemployment rate.

Mukhtarov, Mammadov and Ahmadov, (2019) studied oil price shocks and inflation in Azerbaijan by utilizing VECM technique on data covering the period 1995 to 2017. They found that a 1% increase in oil prices and



exchange rate causes inflation to increase by 0.58% and 1.81%, respectively. Bala and Chin (2018) investigated the asymmetric effect of oil price shocks on inflation in small oil exporting economies like Nigeria, Libya, Algeria and Angola. Utilizing the NARDL dynamic panels, they observed that both the positive and negative oil price changes affected the level of inflation. Also, Bai and Koong (2018) examined the relationship among inflation, oil prices and exchange rate by comparing the differences in the impact of oil shocks on the exchange rates of China and the US. They showed that oil shocks negatively impact the US dollar. Also, Jiranyakul (2016) investigated Thailand data from 1993 to 2015 using the Johansen cointegration test and Granger causality tests. The study concluded that an oil price shock causes inflation index to rise while oil price uncertainty has no effect on the increase in inflation.

Basnet (2015) used the Autoregressive Distributed Lags (ARDL) method to study the pass-through effect of oil prices in Malaysia's consumer prices. The results indicated that oil prices and inflation have a positive relationship. Ferrucci, Jiménez-Rodríguez and Onorante (2010) examined the long run impact of oil export and food production on inflation in African OPEC member countries. Found that oil exports have positive and significant impact connected to inflation meanwhile increases in food production has negative impact related to inflation.

3. Methodology

The study is designed to quantitatively ascertain the research objectives. Thus, it adopted the quasi-

Model One: Crude Oil Price Shocks and GDP

$$\Delta GDP_t = \alpha_1 + \sum_{i=1}^p \beta_{11} \Delta GDP_{t-1} + \beta_{12} \Delta COP_t + \sum_{i=1}^p \beta_{12} \Delta COP_{t-1} + \varepsilon_{1t} \quad (1)$$

$$\Delta COP_t = \alpha_1 + \sum_{i=1}^p \beta_{21} \Delta COP_{t-1} + \beta_{22} \Delta GDP_t + \sum_{i=1}^p \beta_{22} \Delta GDP_{t-1} + \varepsilon_{2t} \quad (2)$$

Model Two: Crude Oil Price Shocks and Inflation Rate

experimental and ex-post facto design as a result of the fact that this work is interested in cause-effect relationship of (oil price shocks and macroeconomic variables), using already existing empirical data without manipulation. Specifically, the paper utilized the unit root test, test proposed by Dickey and Fuller (1979), vector autoregression (VAR) model with emphasis on the impulse response function (IRF). This study utilized annual time series data on the selected variables, covering the study period between 1980 and 2019. The data was collected from secondary sources, which include Statistical Bulletin and Annual Report and Statement of Accounts of the Central Bank of Nigeria as well as the annual abstracts of statistics (2018) published by the National Bureau of Statistics (NBS)

Model Specification

Sequel to the arguments presented in the theoretical framework and empirical literature, the model for this study was built on the model proposed by Ijomah (2015) whose model on oil price shocks and macroeconomics aggregates is in this form of simple regression model; derived as $GDP = f(ROP)$; Where, GDP is gross domestic product and ROP is real oil price. But the current model modified this model by incorporate one more macroeconomic variable in order to ascertain the nature of shocks between crude oil price and the selected macroeconomic variables (GDP and inflation rate).



$$\Delta INF_t = \alpha_1 + \sum_{i=1}^p \beta_{11} \Delta INF_{t-1} + \beta_{12} \Delta COP_t + \sum_{i=1}^p \beta_{12} \Delta COP_{t-1} + \varepsilon_{2t} \quad (3)$$

$$\Delta COP_t = \alpha_1 + \sum_{i=1}^p \beta_{21} \Delta COP_{t-1} + \beta_{22} \Delta INF_t + \sum_{i=1}^p \beta_{22} \Delta INF_{t-1} + \varepsilon_{2t} \quad (4)$$

Where; GDP= Gross Domestic Product, COP= Crude Oil Price, INF= Inflation Rate, α_s and β 's are parameter estimates, Δ = Change, t-1= Time Lag, ε_t = Disturbance Term, \sum = Summation

4. Results and Discussion

Table 1: Descriptive Statistics for Underlying Series

	GDP	INF	COP
Mean	338.3643	18.63775	0.450323
Std. Dev.	204.7047	15.98357	0.307373
Skewness	0.636137	1.786845	1.075824
Kurtosis	1.924554	5.451712	2.995647
Jarque-Bera	4.625440	31.30359	7.716014
Probability	0.098992	0.000000	0.021110
Sum Sq. Dev.	1634256.	9963.512	3.684640
Observations	40	40	40

Source: Authors' Computation from (E- view 12)

Note: GDP= Real gross domestic product, INF= Inflation rate and COP= Crude oil price

The analysis of descriptive statistics of the series in Table 1 indicated that; the approximate mean of real gross domestic product (GDP) is 338.36%; while the corresponding standard deviation is 204.7%. On the other hand, the approximate mean of inflation rate (INF) is 19%; while the corresponding standard deviation is 16%. The approximate mean of crude oil price (COP) is 0.45%, while the corresponding standard deviation is 0.31%. Based on the analysis above, the standard deviation of GDP, INF and COP were not higher than their respective mean; thus, the variables are normally distributed. Similarly, the Skewness test result showed positive values for all the variables. Moreover, based on the analysis of the kurtosis; all the variables except INF were platykurtic relative to normal, since the approximate values for kurtosis which were less than 3. This suggested that the variables have short and thin tails, and their central peaks

are lower and broader. However, the probability of Jarque-Bera statistics suggested that the null hypotheses of normal distribution for INF and COP were accepted at 5% level while the null hypothesis of GDP was rejected at 5% level. Therefore, it was concluded from the statistical properties of the time series that the variables were largely not normally distributed, which may have resulted from the problem of unit root. This necessitated stability via ADF unit root test.

4.2 Multicollinearity Test

The essence of multicollinearity test is to ascertain the existence of high correlation between two or more explanatory or predictive variables. That is, it mainly helps to determine whether or not the explanatory variables can be regressed together. The degree of multicollinearity is usually denoted by high coefficient of determination. Thus, the study employed correlation matrix to determine the existence of multicollinearity in the estimated models. The correlation matrix result is presented in Table 2

Table 2: Multicollinearity Test for the Series

Variables	GDP	INF	COP
GDP	1.00000	-0.32237	0.75873
INF	-0.32237	1.00000	-0.38021
COP	0.75873	-0.38021	1.00000

Source: Authors' Computation from (E- view 12)

Note: GDP= Real gross domestic product, INF= Inflation rate, and COP= Crude oil price,

The result presented in Table 2 showed that the relationship between each of the independent variables as well as the dependent variable is approximately between



the range of 0.32 and 0.74. Specifically, GDP and COP showed a positive correlation of 0.74. Also, INF and COP showed a negative correlation of -0.38. Given the existence of moderate correlation coefficient between the variables, the variables can be regressed together without the problem of serial correlation and multicollinearity.

4.3 Stationarity Test Results

This unit root test conducted via the Augmented Dickey Fuller (ADF) established the order of integration or stationarity of the variables. The ADF test was conducted based on constant and time trend; at level and first difference at 5 percent critical values. The stationarity status of the data series are presented in Table 3.

Table 3: Results of ADF Unit Root Test for the Estimated Models

Variables	Unit Root Test @ Level		Unit Root Test @ First difference		Order of integration
	ADF Statistics	5% Critical Value	ADF Statistics	5% Critical Value	
COP	-1.338760	-2.94114	-5.314571	-2.94114	1(1)
GDP	1.710305	-2.94114	-7.318775	-2.94114	1(1)
INF	-2.222937	-2.94114	-8.220104	-2.94114	1(1)

Source: Authors' Computation from E-Views 12.

Note: GDP= Real gross domestic product, INF=Inflation rate and COP= Crude oil price

The test of stationarity via the Augmented Dickey Fuller (ADF) unit root test for the variables in the estimated model showed that none of the variables were stationary at level or order zero. This is because the ADF test statistic values were than the critical value at 5%. However, variables were differenced once and became stationary at first differences; 1(1). Given that the variables were integrated at order one; the requirement to fit in a VAR/IRF model.

4.4 Impulse Response Functions Results of Crude Oil Price Shocks and Selected Macroeconomic Variables in Nigeria, 1980-2019

The impulse response function traces the reaction of a dynamic system in response to an exogenous impulse. It gives the i^{th} period response of each variable when the system is shocked by one standard deviation shock. In the analysis of the impulse response, the impulse variable is crude oil price (COP), while the response variables are the GDP and inflation rate. The black line indicated the impulse function while the two red lines is the 95% confidence interval. Also, the impulse response function line must always lie within 95% confidence interval lines.



4.4.1 Crude Oil Price Shocks and Gross Domestic Product

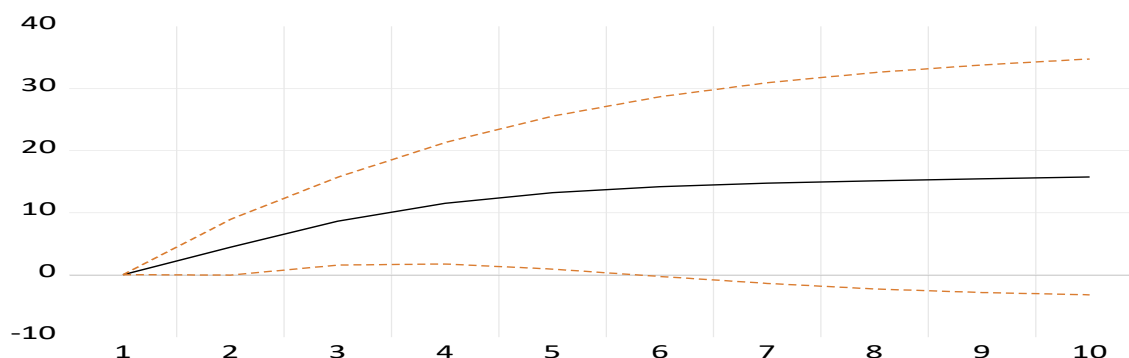


Figure 1: Response of GDP to Crude Oil Price.

The impulse response analysis using Cholesky (d.f. adjusted) factors showed that, the responses of GDP to crude oil price (COP) shocks in the periods 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are 0, 4, 9, 12, 13, 14, 15, 15, 15 and 16 respectively. From the figure above, a one standard deviation (SD) shock (COP) innovation to GDP has no noticeable impact on GDP in the first period. From the 2nd period, the response gradually to the 6th period. It then hit the stable state in the 7th period and continues to the 9th period and thereafter increases in the 10th period. Thus, a one standard deviation (SD) shock (COP) innovation to GDP has an increase positive impact on GDP for the 10

periods. Meaning that, shocks of COP will have a positive or symmetric impact on GDP both in the short and long runs. Thus, innovations and responses are consistent with intuition, economic theory or a priori expectations. For instance, the result is consistent because with increase in crude oil price, there will be corresponding increase in gross domestic product (GDP). The result is in line with the empirical work of scholars such as Ijomah (2015); Akpan, (2009) as well as Alliyu (2009) who argued that oil price shock promotes economic growth.

4.4.2 Crude Oil Price Shocks and Inflation Rate

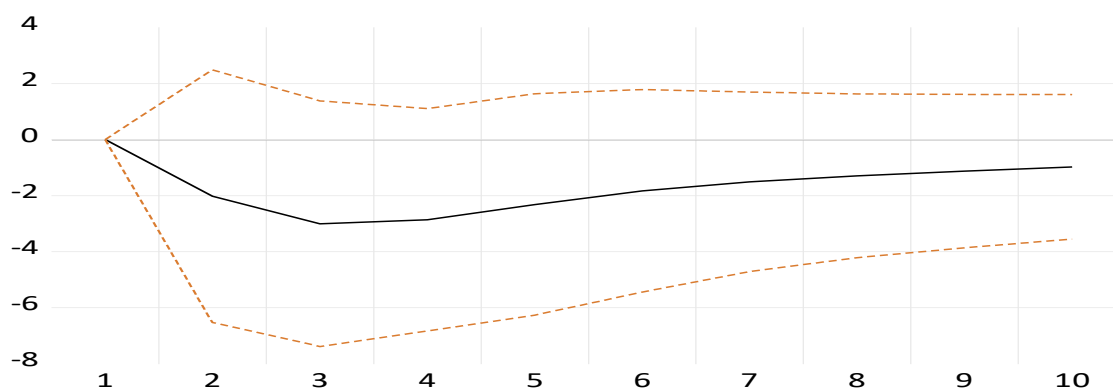


Figure 2: Response of Inflation Rate to Crude Oil Price



The impulse response analysis using Cholesky (d.f. adjusted) factors showed that, the responses of inflation rate (INF) to crude oil price shocks in the periods 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 are 0.0, -2.0, -3.0, -2.9, -2.3, -1.8, -1.3, -1.3, -1.1 and -1.0 respectively. From the figure above, a one standard deviation (SD) shock (COP) innovation to inflation rate (INF) has no noticeable impact on inflation in the first period. But from the 2nd periods to the 5th periods, there was steady and gradual decrease in the response. But between the 6th and the 10th periods, there was a decrease, but the decrease was higher than what was obtained between the second and the fifth periods. Thus, a one standard deviation (SD) shock (COP) innovation to INF decreases over the periods. Thus, the decrease from the second to the tenth periods goes below the 0.0 point. Meaning that, the values do not remain in the positive region. Thus, there is negative response or asymmetry shock between COP and INF. Thus, innovations and responses are consistent with intuition, economic theory or a priori expectations.

Meaning that, lower crude oil price also reduces inflation rate, with the magnitude depending in part on the extent of labour market flexibility (Ijomah, 2015). Even a small fall in prices of oil may lead to a substantial increase in financing needs, as their exports are not diversified and oil revenue accounts for larger portion of their total revenue. Similarly, the result supports the empirical work of Ali (2020) who used nonlinear auto regressive distributed lag model (NARDL) approach to examine the asymmetric impact of oil prices change on inflation in Egypt and found that, there is a negative long run relationship between inflation and oil price in Egypt.

4.5 Post Estimation Tests Results

The study employed the Breusch-Godfrey (B-G) Lagrange Multiplier (LM) test for serial correlation and normality test, heteroschedasticity test, Wald test, stability test and normality test as the post-estimation tests to validate the ARDL short and long run estimations tests.

Table 5: Results of Serial Correlation, Heteroschedasticity and Stability Tests

Test type	Test Stat.	GDP Model I	INF Model II	Critical Value
		p-value	p-value	
Serial Correlation	Chi Square (X^2)	0.5482	0.1781	0.0500
Heteroscedasticity	Chi Square (X^2)	0.4383	0.1031	0.0500
Stability	t-Statistics	0.8981	0.2856	0.0500

Source: Authors' Computed Result from (E-views 12)

The various diagnostic test results conducted to validate the estimated VAR/IRF model in the estimated models are presented in Table 5. Based on the serial correlation test using Breusch-Godfrey test LM test to test the null hypothesis of no serial correlation against the alternative hypothesis of serial correlation in the estimated short run and long-run models at 5% level. The result showed that, serial autocorrelation does not exist in the e ARDL models. This is because the chi-square p-values for both

the three models which are; 0.5482 and 0.1781 respectively are greater than the critical value probability of (0.05). In the same way, Heteroskedasticity test which determine whether or not the variance of the residuals in an estimated model is homoscedastic. This was carried out on the estimated models using the Autoregressive Conditional Heteroskedasticity (ARCH) test. The Autoregressive Conditional Heteroskedasticity (ARCH) result presented in the table above showed that,



heteroskedasticity is not a problem in the estimated models. This is because the chi-square p-values for the estimated models which are; 0.4383, and 0.1031 respectively are greater than the critical value probability of (0.05). Also, the stability test results showed that the estimated ARDL models are stable. This is because the t-statistic p-values in models are greater than the critical value probability of (0.05).

4.5.1 Normality Test Results for the Estimated Models

The Jarque-Bera statistic is applied to examine whether the error term in the model is normally distributed. Thus, the probability of Jarque-Bera statistic is compared with the critical p-value at 5 per cent significance level. The null hypothesis is upheld if the probability of the Jarque-Bera statistic is greater than the critical p-value at 5 per cent significance level.

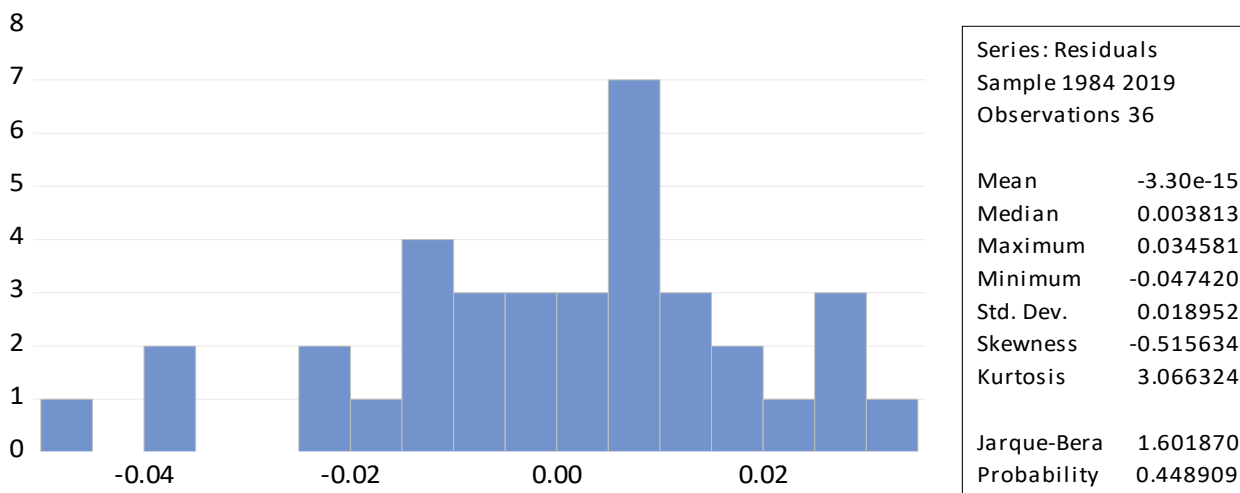


Figure 4: Normality Test for GDP Model

The normality test result in Figure 4 showed that, the error term is normally distributed at 5% level of significance. This is because, the probability value of the Jarque-Bera statistic is 0.4489; and this value is greater than 5% critical value. Meaning that, the Jarque-Bera statistic hypothesis of normally distributed residuals in the model is accepted.

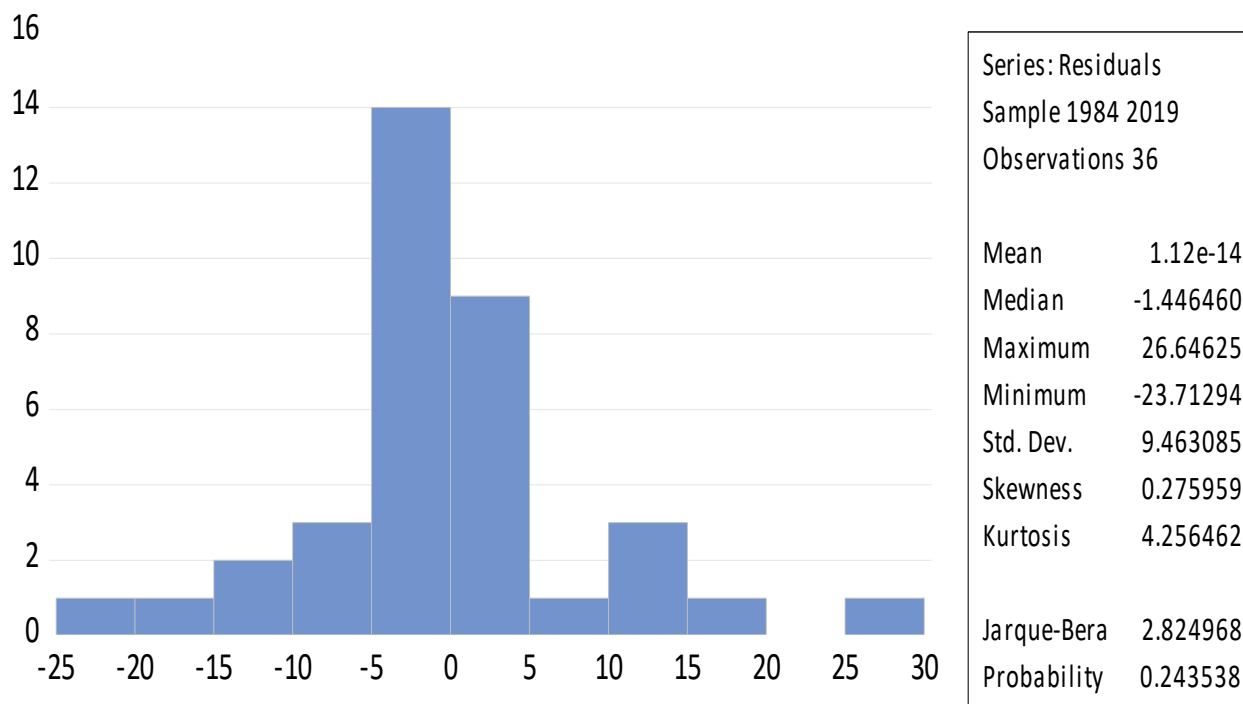


Figure 4: Normality Test for Inflation Rate Model

The normality test result in Figure 5 showed that, the error term is normally distributed at 5% level of significance. This is because, the probability value of the Jarque-Bera statistic is 0.2435; and this value is greater than 5% critical value. Meaning that, the Jarque-Bera statistic hypothesis of normally distributed residuals in the model is accepted.

5. Conclusion and Recommendations

The study examined crude oil price shocks and selected macroeconomic variables in Nigeria from 1980-2019. The study was motivated by the changes in oil prices which have been found to affect most macroeconomic variables of economies in Nigeria. While oil production would benefit the Nigerian economy through revenue earnings from oil sales, it may also have long term effect on the structure and composition of the country's total output and significantly affect inflation rate. Since the study is secondary in nature, annual data were collected from

CBN statistical bulletins and World Development Index (WDI). The main technique of analysis is the Impulse Response Function (IRF). The empirical results showed that; there is positive long-run and short run relationship between oil price shocks and gross domestic product. But, there is a negative and significant relationship between crude oil price shocks and inflation rate in Nigeria during the period of study. Meaning that lower crude oil price also reduces inflation rate. Thus, innovations and responses are consistent with intuition, economic theory or a priori expectations. It can therefore be said that the responses of GDP to crude oil price shocks is symmetry while that of inflation is asymmetry. Based on the findings of this work, the following policy recommendations were suggested:- (i) The findings on the symmetric effects of oil price shocks revealed that positive shocks to crude oil price stimulate growth in the Nigerian economy in the short run and long run. The



implications of the findings suggest the need for proper coordination of fiscal and monetary policy for sustainability of macroeconomic variables in terms of unemployment and real gross domestic product. (ii) There is the need for proper coordination of fiscal and monetary policy to ensure that while growth potential is embedded in positive shocks to oil price, the downside risks from inflation rate deserve immense attention.

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