The Impact of Crude oil Price and Exchange Rate on Economic Growth in Nigeria for the Period of 1981 To 2020

Atoyebi Kehinde .O.[1], Otsaki Dennis[2], Usman D. I.[3], Ogunsona-Abari Titilola[4], Nicodemus Gilbert Fiberesima[5]

Department of Economics, Faculty of Social Science, Lagos State University, Nigeria.

ABSTRACT: This study investigates the impact of oil price and exchange rate on economic growth in Nigeria over the period from 1980 - 2020. Crude oil price (COP), Exchange rate (EXR), and inflation rate (INFL) were used as independent variables while real gross domestic product (RGDP) was used as the dependent variable. Annual time series data on our targeted variables were obtained from secondary sources including the Central Bank of Nigeria annual statistical bulletin, and World Bank development indicators. The Eview9 Statistical Software was employed to analyze the data empirically. The Unit root test shows that oil price, exchange rate and real gross domestic product are all stationary after first difference I(1) while inflation rate was stationary at level I(0). The data were analyzed using the Autoregressive distributed lag (ARDL). The results of the ARDL estimates indicate that crude oil price and exchange rate have significant positive impact on economic growth in both the long-run and the short-run periods. The findings suggest that crude oil price and exchange rate which are the focal points of the study, could affect economic growth in both the long-run and the short-run. Hence, whenever oil price falls below the threshold, there is a negative effect on the country's economic growth. The study recommends amongst others that the federal government of Nigeria should come up with stringent measures that will guard against oil bunkering and other thefts in order to boost oil production which would in turn increase real gross domestic product (economic growth) in Nigeria.

 Keywords: Crude Oil Price, Exchange Rate, Economic Growth, Nigeria.

----

1.   INTRODUCTION

Crude oil and changes in its price have significant effects on economic growth and the wellbeing of the population around the world. Crude oil is one of the most important driving forces of the world economy (Mgbame, et al. 2015). The highly unstable prices of crude oil have great impact on economic growth and development and it arouses many controversies among the policy makers and researchers. Some economic researchers like Aliyu (2009), among others argue that it will promote economic growth. It was observed in oil exporting countries that increase in oil prices will increase national income of exporting countries.

Crude oil has a major source of foreign exchange earnings and the dominant source of revenue for the Nigerian economy. The Nigerian economy has been completely reliant on oil and the basis upon which government budgeting, revenue distribution and capital allocations are determined. Volatility in oil price is an

upward and downward movement of oil prices globally. This assertion thus translates that these oil prices are exogenous because it's determined by external influences that somewhat stagnate the Naira and Nigeria cannot moderate the causes of these oil price fluctuations. Nigeria's exports of oil at a time of peak prices have enabled the country to post merchandise trade and current account surpluses in recent years. Reportedly, 80% of Nigeria's energy revenues flow to the government; 16% cover operational costs, and the remaining 4% go to investors (Ifeanyi and Ayenajeh, 2016).

Several factors have been responsible for oil price fluctuations in the global energy market. Some factors include; fluctuations in the world markets, policy changes in countries, conflicts between oil-producing countries, cuts in production quota by cartels like OPEC and natural disasters like the Covid-19, the epidemic coronavirus and a few others. The fluctuation in oil prices affects the economic activity differently in countries depending on whether a country is a net-exporter or net-importer of petroleum products. Where a country is a net exporter of oil, and there is an increase in oil price, the government may enjoy an increase in revenue from oil sales attendant effect on the country's level of consumer prices, exchange rate and balance of payments (Gershon et al. 2019). On the other hand, where a country is a net importer of oil, a positive oil price fluctuation will increase the cost of importation of oil with attendant effect on production costs, national output, employment, inflation, exchange rate and balance of payments.

After Nigeria recorded economic growth and due to significant reforms and improved political system, demonstrated by successful democratic dispensation, the economy declined due to the drastic fall in oil and political disorder arising from insurgence attacks and regional agitation for emancipation. The fall in oil prices have sent the Nigerian currency plunging, advancing long-standing widespread and abject poverty together with infrastructural decay. This has affected both the cost and standard of living of the vulnerable poor which constitute the larger part of the population (Charles, 2019).

Nigeria is an oil-producing and exporting nation and an importer of oil products. As a net exporter, Nigeria relies heavily on oil revenue to sustain the economy. The country's dependence on oil is so strong that many commentators see it as a mono-product economy. CBN (2019) indicate that government revenue from oil exports accounts for over 70% of the total collectable revenue annually (Okonkwo & Mojekwu, 2018).

According to Gravito (2016), Nigeria is blessed with vast natural resources with arable land and entrepreneurial population. However, 82% of the Nigerian populations are poor and lives on less than $2 per day, when compared with 26% in South Africa. As such, there has been increasing suffering exacerbated by high level of unemployment caused by little or no job creation due to over dependency on oil

Although several writers have tried to examine the effect of oil price fluctuations on the country's economic performance, not many studies have attempted to investigate the impact of crude oil price and exchange rate on economic growth in Nigeria, this the gap this study seeks to fill.

Therefore, the objective of this study is to empirically investigate the impact of crude oil price and exchange rate on the economic growth of Nigeria.

2. LITERATURE REVIEW

2.1 Conceptual Clarifications

Crude Oil Price: Crude oil price changes affects numerous economic variables such as interest rates, investment decisions, economic growth, investors' confidence etc. these variables have been documented to affect both the stock market and exchange rate market. Again, crude oil prices are expressed in US dollars in the international market; hence, the dollar exchange rate may affect the price perceived by oil producing nations (Roubaud & Arouri, 2018). The decline in oil price causes a weigh down in the stock prices. The assertion is such that a typical price of crude is exogenously determined; hence, the movement in stock price follows that of crude prices. As price drops, economic agents are concerned about deflation, which is, actually, an unusual phenomenon, since what is usually observed in an economy is inflation. Stock markets perceive a sustained drop in oil price as a measure of deflation, which could cause general downward trend in the prices of consumer and capital goods, and ultimately causing the stock market to go down. Thus, low price of crude oil and the crash in the domestic market give concern to investors and vice versa. Another school of thought

suggests that low oil price is indeed good for the economy, including the capital market, and by this same token, rising crude oil price can have adverse impact on the stock market. This is so because rising oil price have inflationary effect that would be worrisome to the investors given that this would reflect in the corporate earnings. With a rise in crude price, for example, firms in the upstream sector will make more profit. The downstream however, is adversely affected because of the attendant higher cost. To the extent that the downstream companies have more impact on consumer and business sub-sector, the ultimate effect may be bad for the market and company earnings being adversely affected.

Exchange Rate : Exchange rate is the most important price variable in an economy and performs the twin role of maintaining international competitiveness and serving as nominal anchor to domestic price (Mordi 2006). Swings or fluctuations in the exchange rates over a period of time or deviations from an equilibrium exchange rate is referred to exchange rate volatility. Where there is multiplicity of markets parallel with the official market there could be deviations from the equilibrium exchange rate. Volatility over any time period interval tends to increase when supply, demand or both are likely to respond to large random shocks and when the elasticity of both supply and demand is low price volatility tends to be low (Obadan 2006) The exchange rate is subjected to variations when it is not fixed, thus floating exchange rate tends to be more volatile. Economic essentials affect the level of volatility and the extent to which exchange rate stability is maintained. Favourable economic circumstances and outcome which in turn would appreciate the currency and maintain stability is caused by strong fundamentals. (Mordi 2006)

Economic Growth: Economic growth can be defined as an increase in value of goods and services produced in a country. Growth implies an increase in real GNP per unit of labor input. This refers to changes in labor productivity over time. Economic Growth is conventionally measured as the rate of increase in Gross Domestic Product (GDP). Growth is usually calculated in real terms (netting out the effect of inflation on the price of the goods and services product). Growth improved the standard of living of the people in that particular country. Economic growth is measured by the Gross Domestic Product (GDP) in Nigeria, economic growth is the rise in the gross domestic product (GDP) as the major quantitative measure of production for one year, whereas economic development includes both quantitative and qualitative improvements in a country's economic position **(**Ivic, 2015). Acemoglu and Robinson (2010), defined economic growth as a society's ability to enhance its human capital, physical capital, and technological capital over a certain period. Economic growth, as it is often and interchangeably used for sustainable development, is defined as economic development that feeds the hunger of the present generation without jeopardizing the yearnings of future generations. Ite (2003), sees it as a catalytic engine in which the direction of investments, institutional reform, resource exploitation, and technical development orientation is made relevant to future as well as existing demands. It is also an alternate development mechanism for improving human living standards without jeopardizing society's worth. Economic growth is defined in the context of this study as a sustainable increase of the production of a country over time.

2.2 Theoretical Framework

The Harrod-Domar theory of Economic Growth

Harrod and Domar sought to know the rate of income growth needed for the smooth and uninterrupted running of the economy. The model showed that growth is directly related to savings and indirectly related to the capital/output ratio. According to the model, growth (G) can be written symbolically as: G= s/k, Wherek-incremental capital-output ratio and; s- The average propensity to save. The model indicated that saving affect growth directly, while the incremental capital/output ratio affects growth indirectly or inversely. The theory also explained that investment is capable of creating income and capital stock, therefore, if investment activities are increasing, real income and output will continue to expand. If crude oil price increases, the crude oil exporting country will earn more income and if the received income is retained and channeled to investment, that will create more income and capital stock and continue to expand output. The Keynesian theory opposed the classical theory basically because it discards the view that there is a proportional relationship between the quantity of money and prices. Rather, the reformulated theory establishes an

indirect and non-proportional relationship between the quantity of money and prices, working through the interest rates. Jhingan (2005) posited that in establishing such a relationship, Keynes theory integrates the monetary theory on one hand and the theory of output and employment through the interest rates on the other hand. Thus, when the quantity of money increase, the rate of interest falls, leading to an increase in the volume of investment and aggregate demand, thereby raising output and employment. The increase in income leads to an increase in investment and employment which leads to greater output. Crude oil price volatility could visibly have a significant impact on the economies of the world. Theoretically, crude oil price increase leads to a transfer of income from importing countries to exporting countries through a shift in the terms of trade, Majidi (2006). In economic reasoning, the higher the crude oil price increase and the longer higher prices are sustained, the higher the macroeconomic impact. In net crude oil-importing countries, higher crude oil prices lead to inflation, reduce real gross domestic product, reduce employment and unfavourable exchange rate.

Keynesian Theory of Output Growth

John Maynard Keynes propounded the theory of output growth in 1936. Keynesian views which support the view that so long as an economy has not reached the level of full employment, any increase in money supply or the price would exhaust itself in raising the level of employment and output and not the general price level in the economy, Nigeria being a country that has not attained full employment will not experience high inflation as a result of crude oil price increase, rather it increases money supply in the society and currency appreciates in this regard. Kaldor's economic growth theory also agree with the Keynesian growth theory that whenever an economy has not attain full employment level, the amount of money in the system will not be proportional to the price level, rather as the money increases in the system, it will lead to increase in the economic activities. In this case, as the income increases, investment will increase and that leads to increasing output. Kaldor postulates "the technical progress function" which is a joint product of two tendencies: growth of capital and growth of productivity. Crude oil is related to almost all economic activities, be it production, transportation, etc. therefore rising price of crude oil could lead to price rise in all other inputs. Rising crude oil prices leads to higher energy costs and lower usage of crude oil. It is generally argued that for net crude oil exporting countries, a price increase directly increases real national income through higher export earnings; though part of this again would be later offset by losses from lower demand for exports, generally due to the economic recession suffered by trading partners.

The Purchasing Power Parity

The theory of purchasing power parity (PPP) was propounded by Gustav Cassel in 1918. The theory illustrates the relation between prices and exchange rates. Even though the origins of the PPP concept is traceable to the Salamanca School back in 16th-century Spain, its modern use as a theory of exchange rate determination began with the work of Gustav Cassel who recommended PPP as a means of amending pre–World War I exchange rate parities for countries resolved to return to the gold standard system after the conflicts ended. Some modification was necessary because countries that left the gold standard in 1914 witnessed extensively different rates of inflation during and after the war. As a principle of exchange rate determination, the easiest and powerful form of PPP (i.e. absolute PPP) is based on an international multi-good edition of the law of one price. Absolute PPP envisages that the exchange rate should adjust to equate the prices of national baskets of goods and services between two countries because of market forces driven by arbitrage.

2.3 Empirical Review

This section presents the various studies done and the results obtained. Jebbin and Osu (2012), examined the oil prices and exchange rate fluctuation in Nigeria between 1986 to 2010 using VAR-based co-integration and ADF. The study found out that real exchange rate fluctuation in the Nigeria is significantly influenced by oil price fluctuations.

Peplin and Mubaris (2013) accessed the impact of crude oil price changes on output growth by employing ordinary Least Square Method on a monthly time series data from 1990:1- 2012:3. The results show that crude oil price increases have clear negative effects on output growth, the impact of crude oil price decline is significant, and similarly, crude oil price increases have positive and significant effects on inflation in Turkey which is a crude oil importing nation. This implies that the reverse will be the case for Nigeria as a crude oil exporting nation. Akinleye and Ekpo (2013) employed VAR model to investigate crude oil price shocks and macroeconomic performance in Nigeria covering 1970 to 2010, using oil price shocks, oil revenue, real gross domestic product, inflation rate and external reserves as variables. The results show that neither positive nor negative shocks changed external reserves but impacted significantly on real gross domestic product.

Osuji (2015) examined the international oil prices and exchange rate in Nigeria for the period 2008 to 2014 using OLS by considering exchange rate and foreign reserves as economic indicators. The results revealed that crude oil prices on a relative basis affect foreign reserves and exchange rate. In another development, Audu, et al (2015) also investigated the impact of crude oil price shocks on external reserves, exchange rate, gross domestic product, inflation rate, international trade and money supply in Nigeria with quarterly data from 2000 to 2014 using GARCH and VAR model. The results revealed that crude oil price fall do negatively affect external reserves and international trade. But crude oil shocks did not pose significant inflationary threat to Nigerian economy at the short run, rather it improves the gross domestic product.

Abraham (2016), investigates the effects of crude oil price movement and exchange rate policy on the Nigerian stock market over the period spanning 2012 to 2015. After applying ARDL the results show that oil prices are positively and significantly related to the performance of the Nigerian stock market and exchange rate is found to be effective in cushioning the effect of crude oil price decline on the stock market. The result from the granger causality test suggested that the policy measure may not be potent as expected. Terfa (2016) assessed the impact of crude oil price movement on the Nigerian stock market and the role of exchange rate as a plausible counter cyclical policy tool in Nigeria between two periods, 2008 to 2009 and 2012 to 2015 using daily data set on crude oil prices, stock returns and exchange rate using ADL model. The results revealed that crude oil fluctuation has significant impact on stock performance.

Al- Zanganee (2017), investigates the impact of crude oil price volatility on the levels of economic activity in Iraq over the periods of 2003 to 2015. Using multivariate autoregressive regression (VAR) model, the results revealed a highly significant impact of volatility of crude oil price on the level of gross domestic product in Iraq. Using generalized autoregressive conditional heteroscedasticity (GARCH), component generalized autoregressive conditional heteroscedasticity (CGARCH) and exponential generalized autoregressive conditional heteroscedasticity (EGARCH) to examines the macroeconomic effects of exogenous oil price shock in Nigeria. The study showed that oil price volatility has significant positive effect on exchange rate, foreign external reserves, government revenue, capital importation and, symmetric and persistent of oil price shock in Nigeria.

Adegbemi, et al. (2019), examined the effect of crude oil price volatility on Nigeria economy and the national income over a period covering 1995 to 2017. Using descriptive and inferential (regression) statistics revealed that oil price volatility has a negative and insignificant combined effect on gross domestic product, gross national product and per capita income. They recommended that Nigeria should adopt policies that will address negative oil price shocks so that the budgetary system and national income will not be affected.

Akinsola & Odhiambo (2020) examined the nonlinear relationship between oil prices and economic growth. They found that there was an asymmetric nonlinear relationship between the variables. While an oil price increase elicited an adverse impact on economic growth, a decrease in oil price stimulated growth. In a similar study and deploying the panel (NARDL) for ASEAN. Charfeddine & Barkat (2020) employed the SVAR and NARDL approach to examine the effect of oil prices and gas revenue on real GDP and the economic diversification for both the short run and long run. Their findings reveal that oil prices and gas revenue shocks on real GDP were more negative than positive. Besides, the long-run impact of NARDL analysis confirmed the presence of asymmetry. In other related studies, there is consensus that natural resource abundance,

renewable energy and urbanization affect the development of the oil producing, open and small economy like Nigeria.

3. METHODOLOGY

3.1 Model Design
The method adopted in this study is quasi-experimental design called correlational research design which according to Hassan (1995), aims at establishing relationships between variables and to know if the relationship that exist is significant. Another justification for the use of quasi-experimental research design is that the study is descriptive and analytical on the basis of stochastic statistics and the variables are not under the control of the researcher.

Model Specification
The functional form on which the econometric model will be built is expressed as:

RGDP = F (OP, EXR, BOP, INFL)   Where RGDP= Real gross domestic product, OP = Oil price, EXR = Exchange rate, BOP = Balance of payment, INFL = Inflation rate, F = Functional notation RGDP is a dependent variable while OP, EXR BOP and INFL are the explanatory variables.

The linear regression models base on the above functional relation is expressed as:

$$RGDP = \beta_0 + \beta_1 OP + \beta_2 EXR + \beta_3 BOP + \beta_4 INFL + U \qquad 2$$

$$\Delta RGDP_t = \alpha_{0i} + \beta_{1i} OP_{t-1} + \beta_{2i} EXR_{t-1} + \beta_{3i} BOP_{t-1} + \beta_{4i} INFL_{t-1} + \sum_{i=1}^{q} \alpha_1 \Delta RGDP_{t-1} + \sum_{i=1}^{p1} \alpha_2 \Delta OP_{t-1} + \sum_{i=1}^{p2} \alpha_3 \Delta EXR_{t-1} + \sum_{i=1}^{p3} \alpha_4 \Delta BOP_{t-1} + \sum_{i=1}^{p4} \alpha_5 \Delta INFL_{t-1} + et \qquad 3$$

ECM

$$\Delta RGDP_t = \alpha_{0i} + \sum_{i=1}^{q} \alpha_{1i} \Delta RGDP_{t-1} + \sum_{i=1}^{p1} \alpha_{2i} \Delta OP_{t-1} + \sum_{i=1}^{p2} \alpha_{3i} \Delta EXR_{t-1} + \sum_{i=1}^{p3} \alpha_{4i} \Delta OP_{t-1} + \sum_{i=1}^{p4} \alpha_{5i} INFL_{t-1} + \lambda ECT_{t-1} + et \qquad 4$$

$\beta_1 \geq 0, \beta_2 \geq 0, \beta_3 \geq 0, \beta_4 \geq 0, , \beta_5 \geq 0,$

Where β_0 is the regression constant or intercept, $\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 are the regression coefficients or parameters and U is the random variable. All other terms are as earlier defined.

3.2 Results and Discussions

Table 3.1. Augmented Dickey Fuller and Philips Perron Unit Root Test

Variable	ADF					PP				
	Level		1st Diff		I(.)	Level		1st Diff		I(.)
	Coeff.	5% CV	Coeff.	5% CV		Coeff.	5% CV	Coeff.	5% CV	
RGDP	-2.231	-2.936	-2.413	-3.558	I(1)	-3.563	-3.530	-4.032	-3.568	I(1)
BOP	-3.416	-2.939	---	---	I(0)	-3.416	-2.939	---	---	I(0)
EXR	-0.658	-2.936	-5.207	-2.937	I(1)	-0.531	-2.935	-5.278	-2.937	I(1)
COP	-4.015	-2.935	---	---	I(0)	-3.827	-2.935	---	---	I(0)
INFR	-3.685	-2.937	---	---	I(0)	-3.030	-2.935	---	---	I(0)

Source: Computed from E-view

Table 3.1, shows the result of unit root test conducted with both Augmented Dicky Fuller Test (ADF) and Philips Perron Test (PP). To get a robust result for this empirical study, we adopted the outcome of Philip Perron statistics due to the robustness of the result in point of structural breaks. In line with the prepositions of Jenkins and Box (1970). Variable that are not stationary at levels would be made stationary after first difference. The following variables in the model were made stationary after first difference, RGDP and EXR while BOP, COP and INFL rate were stationary at level.

Autoregressive Distributed Lag (ARDL) Model and Bounds Test for Co-integration the (ARDL) model approach of Shin and Smith (2001) is applied to investigate the relationship between trade liberalization, trade openness and economic growth in Nigeria. The ARDL model is chosen because of the inbuilt co-integration procedure called the bounds test for co-integration or long-run relationship. The ARDL bounds test is more flexible when compared to other co-integration methods. The ARDL bounds test is used to test the null hypothesis that there is no Co-integration among the variables against the alternative hypothesis. If the calculated F-statistics is greater than the upper bound then the null hypothesis is rejected in favor of the alternative hypothesis and if it is below the lower bound then there is no co-integration.

Table 3.2: Bound Test for RGDP Model

ARDL Bounds Test
Date: 04/10/23   Time: 14:36
Sample: 1986 2022
Included observations: 37
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	18.92626	4

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Computed from E-view

The result presented in table 3.2, shows that the calculated F-statistics of 18.92626 is higher than the upper bound critical value of 4.01 at 5% significant level. Based on this result, it is concluded that a long run relationship exists among the variables of RGDP model. So, there is a long run co-integration amongst the variables in the model.

Table 3: ARDL-ECM Short-run Results for RGDP model

ARDL Co-integrating And Long Run Form
Dependent Variable: RGDP
Selected Model: ARDL(1, 3, 1, 0, 2)
Date: 04/10/23   Time: 14:38
Sample: 1981 2022
Included observations: 37

Co-integrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BOP)	13.909448	12.099921	1.149549	0.2612

D(BOP(-1))	-23.006120	11.553351	-1.991294	0.0575
D(BOP(-2))	-41.199251	12.171510	-3.384892	0.0024
D(EXR)	-2.794067	6.828091	-0.409202	0.6859
D(INFR)	-7.843345	8.716881	-0.899788	0.3768
D(COP)	1695.662053	681.308780	2.488830	0.0198
D(COP(-1))	-1347.209715	689.070117	-1.955113	0.0618
CointEq(-1)	-0.178653	0.035478	-5.035629	0.0000

Cointeq = RGDP - (485.8734*BOP + 107.3005*EXR -43.9028*INFR + 12808.2630*COP -15585.5558)

Source: Computed from E-view

Explanation of estimated short run for RGDP model

The result of the short – run dynamic regression of the model is presented in table 3.3. The regression result indicates that in the short run, BOP coefficient have negative relationship with RGDP but only statistically significant in lag two. The coefficients of EXR and INFR are negatively signed but not statistically significant, which means exchange rate and inflation rate do not pose any threat to economic growth in the short run. The coefficient of crude oil price (COP) has a positive relationship with real gross domestic product and it is also statistically significant in the short run. It thus means that increase in oil price brings about increase in real gross domestic product (economic growth) in the short run all things be equal.

The ECM turned up with a negative value of -0.178653 as the ECM coefficient which suggests 17% speed of adjustment. This means that approximately 17% of discrepancy in the previous year is adjusted for the current year.

Table 3.4: ARDL Long Run Regression for RGDP Model

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BOP	485.873359	139.898932	3.473031	0.0019
EXR	107.300492	18.801670	5.706966	0.0000
INFR	-43.902759	50.210268	-0.874378	0.3902
COP	12808.2629	4032.122972	3.176556	0.0039
C	-15585.5557	10424.730792	-1.495056	0.1474

Source: Computed from E-view

Explanation of the Estimated Long-run for the Model

The result of the long run regression estimates for RGDP model is presented in table 4. The regression estimates indicate that all the coefficients; balance of payment (BOP), exchange rate (EXR) and crude oil price (COP) are positively signed and statistically significant while the coefficient of inflation rate (INFR) is negatively signed and statistically insignificant. It means that balance of payment, exchange rate and crude oil price have positive relationship with real gross domestic product (economic growth) in the long run. This is in agreement with the findings of Alola & Olanipekun (2020) but in variance with the findings of Akinsola & Odhiambo (2020), that examined the nonlinear relationship between oil prices and economic growth. They found that there was an asymmetric nonlinear relationship between the variables. While an oil price increase elicited an adverse impact on economic growth, a decrease in oil price stimulated growth.

Tables 3.5. Residual Diagnostics Test for RGDP

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.876116	Prob. F(2,23)	0.1759
Obs*R-squared	5.189569	Prob. Chi-Square(2)	0.0747

Source: Computed from E-view(2023)

The null hypothesis states that there is no serial correlation. Since each of the F-statistics probability value is greater than five percentage we cannot reject the null hypothesis of no serial correlation. It means that the result is good for prediction.

Heteroskedasticity Test: Breusch-Pagan-Godfrey

|			
F-statistic	1.211432	Prob. F(11,25)	0.3298
Obs*R-squared	12.86479	Prob. Chi-Square(11)	0.3023
Scaled explained SS	5.176570	Prob. Chi-Square(11)	0.9223

Source: Computed from E-view
The null hypothesis states that there is no heteroskedasticity. Since each of the F-statistics probability value is greater than five percentage we cannot reject the null hypothesis of no heteroskedasticity. It thus means that the result of the model can be taken seriously, that is the result is good for forecast.

4.2 Stability Tests for RGDP
The test is meant to test the appropriateness and stability of the estimated ECM model. This is to check if the coefficients of the model are stable and can be used for prediction. The stability test was conducted using the cumulative sum (CUSUM) and cumulative sum of square (CUSUMSQ) tests. If the plot of the CUSUM and CUSUMSQ for the model lies within the 5 percent critical bound it is suggestive that the model is stable. From our results, the model is stable.
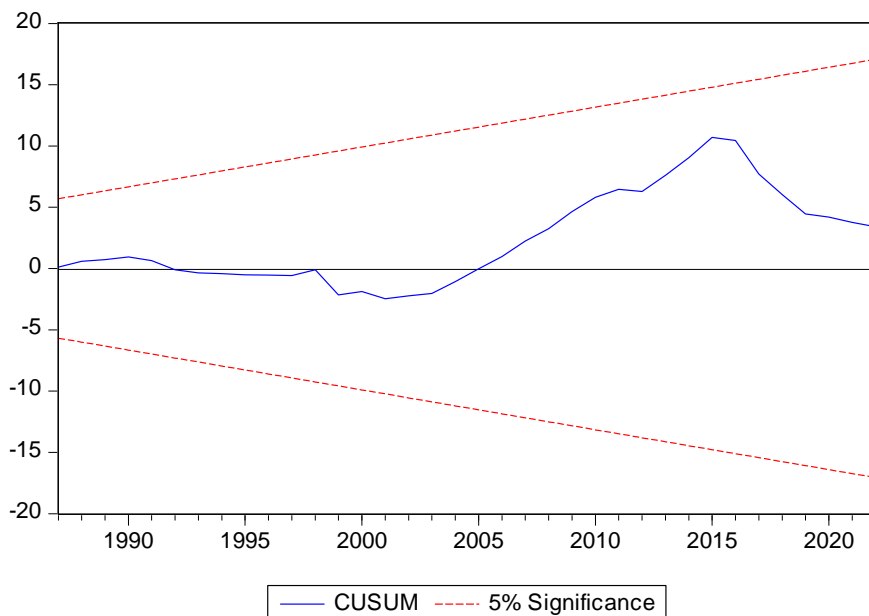
Figure 1: Cumulative sum for the Model
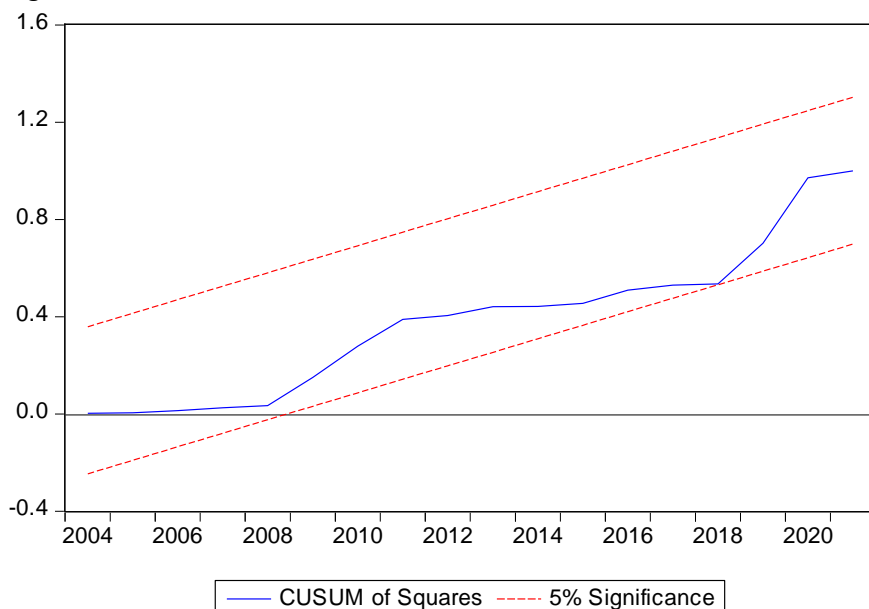
Figure 2: Cumulative sum of Square for the Model

Conclusion/Recommendations

This paper empirically investigated the impact of crude oil price on economic growth in Nigeria from the period 1980 to 2020. The study investigated the long run and short run relationship between the variables by using Autoregressive distributed lag (ARDL). The empirical results show that Real gross domestic product (RGDP) is influenced negatively by balance of payment and statistically significant only in lag two but the coefficient is positively signed and also statistically significant in the long run. The coefficient of exchange rate was only found to be statistically significant in the long run. The exchange rate coefficient has a positive relationship with real gross domestic product. Although inflation rate coefficient was negatively signed in both the long run and short run however, it was not statistically significant. The coefficient of crude oil price is positively signed in both long run and short run but it is only statistically significant in the long run. The study recommends as follows: The federal government of Nigeria should come up with stringent measures that will guard against oil bunkering and other thefts in order to boost oil production which would in turn increase real gross domestic product (economic growth) in Nigeria. It also recommends that the funds earned from crude oil when prices are high in the international market should be set aside so that during the low moments the revenue so set aside would be used to cushion expenditure effects. The federal government of Nigeria should ensure that corrupt practices are checked so that the oil revenue generated is channeled properly towards economic development.

4. REFERENCES

1. Abraham, T.W. (2016). Exchange rate policy and crude oil prices: Effect on the Nigerian stock market. CBN Journal of Applied Statistics, 7, 111-123.

2. Acemoglu, D. &Verdier, T. (2010). The choice between market failures and corruption. American Economic Review, 90, 194-211.

3. Adegbemi, F.F., Akintoye, I.R. and Olayinka, O.G. (2019). Evaluation of petroleum crude oil price volatility on Nigeria national income and Nigerian economy. European Journal Accounting and Finance Research, 7, 65-83.

4. Akinsola, M. O. & Odhiambo, N. M. (2020). Asymmetric effect of oil price on economic growth: Panel Analysis of Low-income Oil-importing Countries. Energy Reports, 6(5), 1057 – 1066. DOI: 10.1016/j.egyr.2020.04.023.

5. Al-zanganee, S.A.M. (2017). Impact of crude price volatility on levels of economic activities evidence from Iraq. European Scientific Journal (Special Edition), 530-545.

6. Central Bank of Nigeria Statistical Bulletin 2019. http://www.cbn.gov.ng

7. Aliyu, S. (2009). Impact of oil Price shock and exchange rate volatility on economic growth in Nigeria: An empirical investigation. Journal of International Studies, 11, 4-5. https://doi.org/10.2139/ssrn.1346418

8. Audu, I., Husseini, G. D., and Ejiemenu, S. C. (2015). Modeling the impact of crude oil price shocks on some macroeconomic variables in Nigeria. American Journal of Theoretical and Applied Statistics, 4(5), 359-367

9. Charfeddine, L. & Barkat, K. (2020). Short-and long-run asymmetric effect of oil prices and oil and gas revenues on the real GDP and economic diversification in oil-dependent economy. Energy Economics, 86, DOI: 10.1016/j.eneco.2020.104680.

10. Charles, O.M., Felicia, C.A., Jonathan, E.O. and Okoro, E.U.O (2019). Oil price fluctuation, oil revenue and well-being in Nigeria. International Journal of Energy Economics and Policy, 9, 346-355.

11. Gershon, O.; Ezenwa, N. E. & Osabohien, R. (2019). Implications of oil price shocks on net oilimporting African countries, Heliyon, 5(8), DOI: 10.1016/j.heliyon.2019.e02208.

12. Gravito, L., Peter, M., Ruizo-Cabrero, J. and Boer, W. (2016). Unlocking Nigeria's potential: The path to well-being.

13. Ifeanyi, O.N. and Ayenajeh, M.E. (2016). Impact of crude oil pruce volatility on economic growth in Nigeria. IOSR Journal of Business and Management, 18, 10-19.

14. Ite, U. E. (2003). Sustainable African development: Issues and Challenges for the 21st Century"

15. Ivic, M. M. (2015). Economic growth and development. Journal of Process Management – New Technologies, International, 3(1), 55–62.

16. Hassan, T. (1995). Understanding research in education. May field publishing company.

17. Jebbin, M., and Osu, A. K. (2012). Oil prices and exchange rate fluctuation in Nigeria. African Journal of Social Sciences, 2(4), 97-102

18. Jenkins, G. M. & Box G. E. P. (1970). Time series analysis, forecasting and control: San Francisco, Holding-Day.

19. Jhingan, M. L. (2005). The economics of development and planning (38th ed.). Delhi, India: Vrinda Publications

20. Majidi, M. (2006). Impact of oil on international economy. International Economics course: Centre for Science and Innovation Studies.

21. Mgbame, C.O., Donwa, P.A. and Onyeokweni, O.V. (2015). Impact of oil price volatility on economic growth: Conceptual perspective. International Journal of Multidisciplinary Research and Development, 2, 80-85.

22. Mordi, C. N. and Adebiyi, M. A. (2010). The asymmetric effects of oil price shocks on output and prices in Nigeria using a structural var model. Central Bank of Nigeria Economic and Financial Review, 48(1)

23. Obadan, M. I. (2006). Overview of exchange rate management in Nigeria from 1986 to date. CBN statistical bulletin, . 3, (July-September).

24. Okonkwo, I. V. & Mojekwu, K. O. (2018). Crude oil price fluctuations and Nigeria economic growth: International Journal of Research in Business, Economics and Management, 2(2).

25. Olanipekun, I. O. & Alola, A. A. (2020). Crude oil production in the Persian gulf amidst geopolitical risk, cost of damage and resources rents: Is there asymmetric inference?, Resources Policy, 69. https://doi.org/10.1016/j.resourpol.2020.101873

26. Osuji, E. (2015). International oil prices and exchange rate in Nigeria.International Journal of Academic Research in Economics and Management Sciences, 4(3), 11-22.

27. Pelin, O. G., and Mubariz, H. (2013). The effects of oil price changes on output growth and inflation in Turkey.Journal of Economics and Behavioral Studies, 5(11), 730-739

28. Roubaud, D., & Arouri, M. (2018). Oil prices, exchange rates and stock markets under uncertainty and regime-switching. Finance Research Letters, 27, 28-33.

29. Terfa, W. A. (2016), " Exchange rate policy and falling crude oil prices: Effect on the Nigerian stock market", CBN journal of applied statistics. 7(1), 111-123.