Global Academic Journal of Economics and Business

Available online at https://www.gajrc.com
DOI: 10.36348/gajeb.2023.v05i04.004

OPEN ACCESS

ISSN: 2706-9001 (P)
ISSN: 2707-2584 (O)

Original Research Article

Oil Price and Output Growth in Nigeria

Ogiogwa Chioma[1]*, Aderinto Esther[1]
[1]Department of Economics, Lead City University, Ibadan, Oyo State, Nigeria

***Corresponding Author**
Ogiogwa Chioma
Department of Economics, Lead City University, Ibadan, Oyo State, Nigeria

Article History
Received: 05.07.2023
Accepted: 07.08.2023
Published: 18.08.2023

Abstract: The study examines the effect of oil price on output growth in Nigeria, while comparing real output with potential output. While employing secondary data from 1980 to 2020, the Auto-regressive Distributed Lag (ARDL) method which analyses long and short run relationships among variables was used. For the effect of oil price on real output growth, long run estimates show that all variables employed do not exert significant influence on real output growth. Short run estimates reveal that all variables except the two lagged value of GDP, current value of labour, one and three lagged value of human capital have significant effect on real output growth. It was established that oil price in the current, one, two and three lagged periods positively affect real output growth. For oil price and potential output, the study was able to establish a positive effect of oil price on potential growth in the short and long run. The study concludes that Nigeria as an oil-exporting country is highly sensitive to changes in oil prices. Therefore, economic policies that will regulate the country in a way that eliminates the economy's dependence on oil production and direct the country to more sustainable growth is recommended.

Keywords: Real output, Potential output. Oil price, capital, Labour.

INTRODUCTION

Crude oil is one of the most important sources of energy in the world and it has a vital impact on the growth of various economies. Crude oil price has witnessed intricate shocks and this implies that for the performance of most of the macroeconomic variables, it poses many challenges, both monetary and fiscal for making policies. Oil price fluctuations have macroeconomic outcomes in nations that import and export oil and it shows that crude oil which is an integral source of income contributes significantly to the economic growth of countries. A transmission channel mechanism has been created to explain how oil prices affect real economic activity. Notably, two channels, supply and demand have dominated the literature, whereas other proposed channels such as economic policy reaction, value and asymmetric response channels have been deemed unclear. The supply side effects are related to the fact that crude oil is a basic component in production and therefore an increase in oil price increases production and distribution cost, thereby causing firms to reduce output. Oil price fluctuations have demand side consequences on consumption and investment. Changes in oil prices also affect foreign currency exchange markets, causing panics in the stock markets, interest rates appreciating, inflation, and ultimately financial and monetary instability. In addition, higher oil prices result in the transfer of revenues from importing countries to exporting countries as a result of changing terms of trade. The magnitude of the direct effect of a given price increase depends on how much of the cost of oil the nation's economy depends on, how much oil is imported, and how easily consumers can reduce their consumption and change to other fuels.

Nigeria is an interesting case, particularly because she epitomizes a highly developing economy with a huge dependence on oil without a considerable level of diversification. Since its discovery in tradable quantities in 1956, oil has become the mainstay of the Nigerian economy, and has tended to dictate her economic direction as national budgets have always been hinged on the oil price benchmark. The importance of this product ensures that the market for oil is subject to the market forces of supply and demand, which in turn makes the price, fluctuate. Following its discovery, crude oil has become major source of income and foreign exchange for Nigeria, thereby contributing to over 80% of the federal government's revenue (Anthony and Olusanya, 2020). Crude oil as known is one of the most important natural resources in the world and its commodity market in the world is unarguably the largest. Crude oil unlike other commodities can be said to be one of the few inputs of production in which its effects on economic growth can have both asymmetric and symmetric effects. The Nigerian economy relies heavily on export of crude oil to generate foreign exchange earnings and government revenues. This is particularly true as oil accounts for 95% of export earnings and 85% of government revenues. Its contribution to GDP in 2015 was 9%and 8 percent in 2016. Nigeria's oil statistics show that the country has an estimated 36.2 billion barrels of oil reserves which places the country as the second largest in terms of oil reserve on the African continent (Omotosho, 2019). Given the fragile nature of the Nigeria macroeconomy and the heavy dependence on crude oil proceeds and since Nigeria's dependence on crude oil exports have significant consequences for the Nigerian economy, as oil prices can vary widely in the international oil market. It is important to study the effect of oil prices on output growth of the Nigerian economy. While most studies have examined the effect of oil price on different macroeconomic variables, this study differs from others by analyzing the effect of oil price on output growth, while comparing real output and potential output for Nigeria. The impact of oil price changes on macroeconomic indicators is a big issue for countries that export oil, and understanding how these changes affect the Nigerian economy is important. The study spans from 1980 to 2020, given that the country has experienced different episodes of oil price changes over this period.

LITERATURE REVIEW

There appears to be enormous work analyzing the relationship between oil price shocks and the macroeconomy. As earlier mentioned, the consequences from these range of research are combined (while some advocate a negative relationship, others established a positive association). Nyangarika (2019) analysed the effect of oil price shocks on the Russian economy from 1991-2016 year to cover all of oil price shocks. The vector autoregressive technique was used to investigate the long-run and the short-run relationships between variables. Findings established a positive and significant long-term relationship between oil prices and Russian GDP dynamics. Similarly, Ahmed *et al.* (2019) examined the impact of oil price shocks on key macroeconomic variables (i.e., real GDP, interest rate, inflation and exchange rate) for five SAARC countries (i.e., India, Pakistan, Bangladesh, Sri Lanka and Bhutan) using the impulse response function (IRF) and forecast error variance decomposition method (FEVDM) in the structural vector autorepression (SVAR) setting. While employing data from 1982 to 2014, empirical findings of IRF explained significant variation among all underlying macroeconomic variables in response to exogenous oil price shocks at different time horizons. Charfeddine and Barkat (2020) explored the short- and long-run asymmetric impact of oil prices shocks real GDP, and the level of economic diversification of the Qatar economy. While employing the structural vector autoregressive method, results show that, in the short-run, the responses of both total real GDP and non-oil real GDP to negative shocks on real oil prices and real oil and gas revenues are higher than the impact of positive shocks, indicating evidence for the existence of asymmetric impact of shocks in the short-run.

Nasir *et al.* (2019) also analysed the influence of oil price shocks on the macroeconomy of the Gulf Cooperation Council (GCC) member countries (Bahrain, Kuwait, KSA, Oman, Qatar and UAE). By employing a structural Vector auto-regression (SVAR) model for period 1980–2016, findings suggest that there are significant positive effects of oil price shocks on the GDP, inflation and trade balance of those countries. In a study for SSA countries, Akinsola and Odhiambo (2020) analysed the impact of oil price on economic growth in seven low-income oil-importing sub-Saharan African (SSA) countries, namely Ethiopia, Gambia, Mali, Mozambique, Senegal, Tanzania and Uganda. Using panel-Auto Regressive Distributive Lag (panel-ARDL), results show that oil price does not have a significant impact on economic growth in the short run for the group, but has a negative significant impact in the long run. Using the Non-linear Autoregressive Distributed Lag (NARDL) model, the study also examined the asymmetric effect of oil price on economic growth by decomposing oil price into negative and positive changes. It was established that a decrease in oil price has a positive and significant impact on growth, while oil price increase has a significant negative effect. Wang *et al*. (2022) examined the relationship among oil price volatility, inflation rate, and economic growth among oil

importers and exporters countries. While employing various panel data estimation techniques including fixed impacts, bias-corrected least squares dummy factors (LSDVC), generalized methods of moments (GMM), feasible generalized least squares (FGLS), and random coefficients (RC) on data from 1990 to 2019, findings indicate that oil price volatility has a negative and measurable huge effect on the financial development and economic growth of oil importer and exporter countries.

Yasmeen et al (2019) investigated the short-run and long-run relationship between oil price fluctuation and real sector growth in Pakistan., by disaggregating the real sector manufacturing, electricity, transport and communication, and livestock. The Auto regressive distributed lag (ARDL) method was employed to study the relationship between economic sectors and oil price fluctuation. Empirical results indicate that changes in oil price adversely affect manufacturing, livestock and electricity sectors in short-run and long-run, while significant positive impact was found on transportation and communication. In a study for Nigeria, Ikechi and Anthony (2020) examined the effect of oil price on economic growth in Nigeria using data from 1990 to 2019. The findings of the study indicate that, in the short run, there was sufficient evidence to show that oil price changes have a significant effect on economic growth. In another study for Nigeria, Alenoghena, (2020) examined the effect of oil price shocks on the macroeconomic performance covering the period from 1980 to 2018. The effect of oil price shocks is investigated on macroeconomic variables like output growth, inflation, interest rate, exchange rate and industrial production index using the structural vector autoregression (SVAR) approach. The results of the investigation reveal that oil price shocks have significantly and negatively affected economic growth and industrial output.

Jibril and Halac (2019) also examined the relationship between oil price shocks and selected macroeconomic variables in Nigeria using the Global Vector Autoregressive (GVAR) model to include Nigeria's major trade partners. While employing quarterly data spanning the period 1979Q2 to 2013Q1, findings of the study reveal that an upsurge in oil price leads to increase in real output, money supply as well as a mild increase in the real effective exchange rates of Nigeria while inflation and short-term interest rate fall. Magali and Singla (2020) investigated the impact of oil price shocks on exchange rate and economic growth in Nigeria using annual time series data from 1981-2019. Results from the ARDL model for the GDP equation depict a significant positive relationship between oil price and GDP both in the short run and long run. The result implies that a persistent rise in oil prices by 1% will lead to a 0.85% increase in the GDP. Ologbenla (2020) investigated the macroeconomic impacts of oil price shocks in Nigeria. The study which covers a period from 1980 to 2019 made use of macroeconomic variables such as exchange rate, inflation rate, GDP. Using the VAR model, result shows that oil price shocks do not have direct effect on the GDP but via macroeconomic variable especially exchange rate. The study indicates that exchange rate is the main intermediate variable that passes oil price shocks effect to the Nigerian economy. Omolade *et al.* (2019) investigated the influence of crude oil price shocks on the macroeconomic performance of Africa's oil-producing countries. Eight major net oil producers, namely, Algeria, Nigeria, Egypt, Angola, Gabon, Equatorial Guinea and Congo Republic were included in the study between 1980 and 2016, A Panel Structural Vector Auto-Regression model was adopted for analysis. The results show that the reaction of output to sharp increases and declines in oil prices differ. It was also observed that structural inflation accompanies sharp declines in oil prices more than monetary inflation, since both outputs and investment decline significantly.

Baba (2020) investigated the effect of oil price volatility on economic growth in Nigeria. An The study used VAR and Granger causality to analyze the. The study concludes that in Nigeria, both GDP Growth and Oil Price volatility, can affect each other. The findings imply that oil price volatility leads to a decline in household welfare and increase in poverty and that with the increase in elasticity of substitution of demand for imports to domestically produced crude oil, welfare loss for household groups increase. Darma *et al.* (2022) investigated the nexus between oil price shocks, government expenditure and economic growth in Nigeria for the period 1986 to 2018. Using the Generalized Methods of Moments (GMM) and Vector Error Correction (VECM) techniques, results indicate a direct and significant relationship between oil price and both government expenditure and economic growth. The exchange rate and exports channels are the intermediaries that transmit oil price shocks to the economy.

METHODOLOGY

The study hinges on the Neoclassical growth theory that posits that the economic growth hinges on three major factors, which are availability of capital**,** availability of labour and technology. The Neoclassical growth theory which was introduced by Robert Solow and Trevor Swan has been the model for long-run economic growth. The economic growth enjoyed by a country and the equilibrium of the economy is determined by using the neoclassical growth theory. The model used to estimate the neoclassical growth theory is;

Y = AF (K, L).

Y represents GDP, **L** represents labour, **K** represents capital and **A** symbolizes the level of technology. A modified version of the neoclassical growth model is adopted in assessing the effect of oil prices on output growth in the Nigerian economy.
The model is therefore specified as:

$Y = f(lab, HC, GFCF, OIP)$…… (3.1)

$PG = f(lab, HC, GFCF, OIP)$…… (3.2)

The econometric representation of the first model becomes

$LNY_t = \alpha_0 + \alpha_1 lab_t + \alpha_2 LNhc_t + \alpha_3 LNgfcf_t + \alpha_4 LNoip_t + \mu_t$ … … …. (3.3)

$PG_t = \alpha_0 + \alpha_1 lab_t + \alpha_2 LNhc_t + \alpha_3 LNgfcf_t + \alpha_4 LNoip_t + \mu_t$ … … …. (3.4)
where: LNY is the natural logarithm of real output, PG is Potential output growth measured by the Hodrick-Prescort Filtered trend of Real GDP, LAB is labour force participation rate, LNhc = the natural logarithm of human capital, LNgfcf is the natural logarithm of gross fixed capital formation, LNOIP is the natural logarithm of oil price.

In analyzing the effect of oil price on macroeconomic performance in Nigeria, an Autoregressive Distributed Lag (ARDL) model framework is employed. The ARDL approach yields consistent estimates of the long-run coefficients that are asymptotically normal, irrespective of whether the underlying regressors are I(1) or I(0), and also works well with small samples. Similarly, the test is based on a single ARDL equation, rather than on a VAR, thus reducing the number of parameters to be estimated. Finally, it estimates simultaneously the long-run and short-run parameters. Three ARDL models are estimated in analyzing the effect of oil price on macroeconomic performance in Nigeria. If there is evidence in support of a long run relationship or cointegration among the variables, the long run models will be estimated as:

$LNY_t = \alpha_0 + \alpha_1 LAB_{t-1} + \alpha_2 LNHC_{t-1} + \alpha_3 LNGFCF_{t-1} + \alpha_4 LNOIP_{t-1} + \mu_{t-1}$ … …(3.5)

$PG_t = \beta_0 + \beta_1 LNOIP_{t-1} + \beta_2 LNEXC_{t-1} + \beta_3 INT_{t-1} + \beta_4 LNGDP_{t-1} + \mu_{2t-1}$…..(3.6)

While the short run error correction ARDL model will be specified as:

$LNY_t = \alpha_0 + \alpha_1 \Delta LAB_{t-1} + \alpha_2 \Delta LNHC_{t-1} + \alpha_3 \Delta LNGFCF_{t-1} + \alpha_4 LN\Delta OIP_{t-1} + \alpha_4 ECM_{t-1}$(3.

$\Delta PG_t = \alpha_0 + \alpha_1 \Delta LAB_{t-1} + \alpha_2 \Delta LNHC_{t-1} + \alpha_3 \Delta LNGFCF_{t-1} + \alpha_4 \Delta LNOIP_{t-1} + \alpha_4 ECM_{t-1} + \mu_{4t-1}$ … …(3.9)

Table 1: Data Sources and Definition

S/N	Variables	Label	Description	Source
1.	Dependent Variable	Potential Growth	The highest level of economic activity that can be sustained over the long term.	HP Filtered trend of real GDP obtained from WDI
2.	Dependent Variable	Output Growth	*It* is the growth rate of monetary value of all finished goods and services made within a country during a specific period.	WDI
4.	Independent Variable	Oil price	Spot price of bonny Light Crude oil	Energy Information Administration (EIA)
5.	Control variable	Human Capital	The economic value of a person's abilities and the qualities of their labor that influence productivity. It is measured by government expenditure on education	WDI
6.	Control variable	Gross fixed capital formation	Defined as the acquisition of produced assets (including purchases of second-hand assets), including the production of such assets by producers for their own use	WDI
7.	Control variable	Labour Force	Refers to persons who fulfil the requirements for inclusion among the employed or the unemployed It is measured by labour force participation rate	WDI

RESULTS AND DISCUSSION

Preliminary Tests

Some preliminary tests are conducted to summarize the data, give information about the order of integration of the variables employed as well as test whether or not cointegration exists among the variables.

Descriptive Statistics

Table 2: Descriptive statistics

	Potential	Labour	GFCF	Human K	Oil P	GDP
Mean	0.046056	30.48222	8.46E+12	89.87472	53.72091	40184.48
Median	0.037559	30.95700	8.25E+12	89.7366	41.16000	35020.55
Maximum	0.082227	32.48300	1.40E+13	102.1081	117.7000	71387.83
Minimum	0.015058	23.85500	5.67E+12	78.66348	13.62000	15263.93
Std. Dev	0.021969	1.979131	1.41E+12	6.499149	35.93168	20799.06
Skewness	0.355900	-1.938762	0.174857	0.165233	0.481121	0.343645
Kurtosis	1.739345	6.234998	3.20304	2.232181	1.827308	1.478556
Jarque-Bera	3.056537	37.18809	0.888778	1.019016	3.355797	4.064607
Probability	0.216911	0.00000	0.641216	0.600791	0.186766	0.131033

Source: Author's Computation (2022)

This is done to summarize the basic features of the data. The results are presented in Table 2. From the summary statistics presented above; it is evident that all the variables have positive mean values. Gross Domestic Product (GDP) has the highest mean value of 40184.7.68. The table also shows some variables are exemplified by a marked disparity, given their maximum and minimum values, Inflation, human capital, oil price, exchange rate, GDP and interest rate, all have high values in some years and abysmally low values in other years. In terms of their disparity from the average points, the standard deviation values are relatively low for potential output, labour force participation and gross fixed capital formation. The table also presents the result of other statistics like the skewness, Kurtosis and Jarque–Bera tests. Skewness is a measure of asymmetry of the distribution of the series around its mean. The skewness of a normal distribution is zero, while positive and negative skewness imply long right tails and long left tails respectively. The skewness test shows that all the variables, except labour force are positively skewed. For the kurtosis test, it measures the presence of outliers in the dataset. The results indicate that most of the variables are not normally distributed as they failed to comply with the benchmark of 3.0 for the Kurtosis statistic. Potential output, human capital, oil price and GDP are statistical distributions less than 3(platykurtic) and other variables are statistical distributions which are greater than 3 (leptokurtic).

Unit Root Test

The unit root test is essential in order to ensure that the variables are estimated in their stationary forms to avoid spurious result. To do this, the Augmented Dickey-Fuller (ADF) is employed. The essence is to test the null hypothesis of unit root or non-stationary stochastic process. To reject this, the ADF statistic must be more negative than the critical values at 5% significance level.

Table 3: Unit Root Test

Variable	ADF Test Statistic at level (I_0)	ADF Test Statistic at first difference (I_1)	Decision Value
GFCF	-5.703	--------	I(0)
Human Capital	-2.298	-4.871	I(1)
Labour	-3.615	-------	I(0)
Oil Price	-2.364	-7.766	I(1)
Potential Growth	-3.638	-------	I(0)
GDP	-2.674	-4.934	I(1)
Critical Values			
1%	-3.615	-3.621	
5%	-2.941	-2.943	
10%	-2.609	-2.610	

Source: Author's Computation (2022)

Table 3 shown above reports unit root test for all our variables using the ADF Test. This justifies our choice of ARDL methodology as variables exhibit a mix of integration order 1(0) and 1(1).

Table 4: Bound Test Result for Model I and II

F-Statistic	9.19***	5.452	
Critical Values	1%	5%	10%
Lower Bound	3.29	2.56	2.2
Upper Bound	4.37	3.49	3.09

Source: Author's Computation (2022)

Note:*** indicates significance and rejection of the null hypothesis of no co-integration at 1% significance level.

Table 4 reported above shows the Bound-Test for linear co-integration for the first analyzed model. This approach is used for testing whether or not there is long-run relationship (co-integration) between the variables employed. The criterion for rejecting the null hypothesis of no co-integration is that the F-Statistic should be greater than the lower and upper bound at 5%. Since the calculated F-Statistic (9.19) is greater than the upper bound at 5%, we therefore establish long-run relationship between the variables.

ARDL Estimation Results

The short and long-run estimates for all variables are presented using the ARDL framework.

Table 5: ARDL results to examine the effect of oil price on real output.

Dependent Variable: OUTPUT GROWTH **Selected Model: 4, 3, 4 ,4, 4**				
Variable	**Coefficient**	**Standard Error**	**T-Statistics**	**Probability**
Long Run Estimates				
LNLAB	5.567	14.391	0.387	0.710
LNGFCF	7.802	15.015	0.519	0.619
LNHUMANK	-3.137	8.348	-0.376	0.718
LNOILP	-0.233	1.644	-0.142	0.891
C	-227.271	458.659	-0.495	0.635
Short Run Estimates				
D(LNGDP(-1))	-0.292	0.140	-2.082	0.076*
D(LNGDP(-2))	-0.068	0.126	-0.541	0.605
D(LNGDP(-3))	-0.428	0.117	-3.670	0.008***
D(LNLAB	-0.024	0.090	-0.262	0.801
D(LNLAB(-1))	0.471	0.128	3.682	0.008***
D(LNLAB(-2))	-0.333	0.124	-2.692	0.031**
D(LNGFCF)	-0.337	0.064	-5.276	0.001***
D(LNGFCF(-1))	-0.147	0.047	-3.165	0.016**
D(LNGFCF(-2))	-0.226	0.047	-4.843	0.002***
D(LNGFCF(-3))	-0.165	0.041	-4.056	0.005***
D(LNHUMANK)	0.203	0.064	3.171	0.016**
D(LNHUMANK(-1))	0.135	0.072	1.866	0.104
D(LNHUMANK(-2))	-0.300	0.076	-3.940	0.006***
D(LNHUMANK(-3))	-0.137	0.079	-1.747	0.124
D(LNOILP)	0.075	0.016	6.039	0.000***
D(LNOILP(-1))	0.097	0.016	6.039	0.000***
D(LNOILP(-2)	0.087	0.019	4.522	0.002***
D(LNOILP(-3)	0.109	0.019	5.612	0.000***
CointEq(-1)*	-0.051	0.007	7.489	0.000***
R^2 = 0.937 Adjusted $R^{2.}$ = 0.844 D.W. Statistics = 2.556				

The ARDL result shown above depicts the short and long run relationship existing among the variables. In the long run, all variables employed do not exert significant influence on real output growth. Short run estimates reveal that all variables except the two lagged value of GDP, current value of labour, one and three lagged value of human capital have significant effect on real output growth. A negative and significant relationship is established between real GDP in the immediate past and three lagged periods. A percentage increase in GDP in these periods will reduce current GDP by 0.29 and 0.43 percent. One lagged value of labour has a positive relationship with real GDP, while two lagged value of labour has a negative relationship with real GDP growth. A percentage increase in labour in these periods will affect real output growth by 0.02 and 0.47 percent respectively. Gross fixed capital formation in the current, one, two and three past periods have negative effects on real GDP. A

percentage increase in gross fixed capital formation in these periods will reduce real output growth by 0.34, 0.15, 0.23 and 0.16 percent respectively. Human capital in the current period has a positive effect on real output, while human capital in the two lagged period has a negative effect on real output growth. A percentage increase in human capital in these periods will increase real output growth by 0.20 percent and reduce real output growth by 0.30 percent respectively. Oil price in the current, one, two and three lagged periods positively affect real output growth. This means that a percentage increase in oil price in these periods will increase real output by 0.07, 0.09, 0.08 and 0.11 percent respectively. The error correction term is statistically significant, negative and less than one. This means that the speed of adjustment from short-run to long –run equilibrium given any shock in the model is about 5 percent.

Table 6: ARDL Result for Model II

Dependent Variable: POTENTIAL OUTPUT **Selected Model: 3,4,4,3,3**				
Variable	**Coefficient**	**Standard Error**	**T-Statistics**	**Probability**
Long Run Estimates				
LNLAB	-0.0105	0.0552	-0.1904	0.8528
LNGFCF	-0.5871	0.1196	-4.9077	0.0006***
LNHUMANK	0.1093	0.0813	1.3440	0.2086
LNOILP	0.1705	0.0324	5.2573	0.0004***
C	16.4339	3.4118	4.8168	0.0007***
Short Run Estimates				
D(Potential_Growth (-1)	1.3305	0.0639	20.7959	0.0000***
D(Potential_Growth (-2)	-0.7040	0.0396	-17.7789	0.0000***
D(LNLAB)	-0.0035	0.0008	-4.2280	0.0017***
D(LNLAB(-1))	-0.0061	0.0011	-5.4388	0.0003***
D(LNLAB(-2))	-0.0015	0.0012	-1.2201	0.2504
D(LNLAB(-3))	-0.0027	0.0013	-2.0546	0.0670*
D(LNGFCF)	0.0032	0.0005	6.5959	0.0001***
D(LNGFCF(-1))	-0.0075	0.0011	-6.9616	0.0000***
D(LNGFCF(-2))	-0.0030	0.0007	-4.4718	0.0012***
D(LNGFCF(-3))	-0.0018	0.0006	-3.1768	0.0099***
D(LNHUMANK)	-0.0011	0.0007	-1.5498	0.1522
D(LNHUMANK(-1))	-0.0019	0.0006	-3.2707	0.0084***
D(LNHUMANK(-2))	-0.0009	0.0006	-1.4275	0.1839
D(LNOILP)	-0.0008	0.0001	-4.5080	0.0011***
D(LNOILP(-1))	0.0023	0.0004	6.2901	0.0001***
D(LNOILP(-2)	0.0008	0.0002	4.2481	0.0017***
CointEq(-1)*	-0.0228	0.00251	-9.0960	0.0000***
R^2 = 0.999 Adjusted $R^{2.}$ = 0.998 D.W. Statistics = 2.129				

Note: ***, ** and * indicate probability value at 1%, 5% and 10% respectively.
Source: Author's Computation (2022)

The ARDL result shown above depicts the short and long run relationship existing among the variables. In the long run, physical capital measured with gross fixed capital formation and oil price have significant effect on potential growth at one percent. An increase in physical capital by 10 percent, will reduce potential growth by 5.87 percent. Conversely, an increase in oil price by10 percent, will increase potential growth by 1.7 percent. This does not conform with a-priori expectation as higher oil price is likely to reduce output level due to an increase in cost of production. An increase in oil price reduces aggregate supply since high oil prices mean that firms will purchase less of the commodity. As a consequence, the productivity of capital and labor will decline and lead to potential output loss (Adenuga *et al.,* 2012; Inyiama and Ekwe, 2014; Maghyereh et al., 2019). This dampening effect on potential output growth can be particularly strong in less diversified economies. Short run estimates reveal that all variables except the two lagged value of labour, current value of human capital and two lagged value of human capital have significant effect on potential growth. A 10 percent increase in one and two lagged values of potential growth will increase the current value of potential growth by13.3 percent and reduce potential growth by 7 percent respectively. An increase in the current value, one lagged value and three lagged value of labour force by 10 percent will reduce potential growth by 0.03, 0.06 and 0.02 percent respectively.

The current value of physical capital also has a positive effect on potential growth as an increase of physical capital in its current value by 10 percent is seen to increase potential growth by 3percent. Conversely an increase in the one, two and three lagged values of physical capital by 10 percent, reduces potential growth by 0.07, 0.03 and 0.02 percent respectively. One lagged value of human capital has a significant effect on potential growth, with a 10 percent increase, leading to a 0.1 decrease in potential growth. An increase in the current value of oil price by 10 percent, reduces potential growth by 0.008 percent. Conversely, a increase in the one and two lagged values of oil price by 10 percent increase potential growth by 0.02 and 0.008 respectively. An increase in oil price in these periods leads to an increase in potential growth. Given that potential output is determined by the size and skills of the labor force, the accumulated capital stock, and the available technology, long run results on physical capital and short run estimates on labour deviates from a-priori expectation because an increase in capital and labour is expected to increase potential output. The error correction term is statistically significant, negative and less than one. This means that the speed of adjustment from short-run to long – run equilibrium given any shock in the model is about 2 percent.

Post Estimation Diagnostic Test on Model I & II

Some diagnostic tests are carried out after estimating the ARDL result to validate findings.

Breusch-Godfrey Serial Correlation Test

Table 7: Breusch-Godfrey Serial Correlation Test

F-Statistic (Model I)	2.235	Prob. F (2,5)	0.202
F-Statistic (Model II)	1.2843	Prob. F (2,8)	0.3283

Source: Author's Computation (2022)

Since the probability values of (0.202 and 0.3283) are greater than 0.05, we conclude that there is no evidence of serial correlation in the model.

Breusch-Pagan Godfrey Heteroskedasticity Test

Table 8: Breusch-Pagan Godfrey Heteroskedasticity Test

F-Statistic (Model I)	0.593	Prob. F(23, 7)	0.838
F-Statistic (Model II)	1.6237	Prob. F(21,10)	0.2164

Source: Author's Computation (2022)

Since the probability value (0.838 and 0.216) are greater than 0.05, we conclude that there is no evidence of heteroskedasticity in the model.

CONCLUSION AND RECOMMENDATION

The study analysed the effect of oil price on output growth in Nigeria, while disaggregating output growth into real and potential output within the ARDL framework. For the effect of oil price on real output growth, long run estimates show that all variables employed do not exert significant influence on real output growth. Short run estimates reveal that all variables except the two lagged value of GDP, current value of labour, one and three lagged value of human capital have significant effect on real output growth. It was established that oil price in the current, one, two and three lagged periods positively affect real output growth. An increase in oil price is good news for oil producing countries like Nigeria because it will increase in their revenue. It can be explained by the fact that Nigeria is a major exporter of crude oil. Hence, an increase in oil price will achieve higher economic growth as a result of its immense reserve of crude oil, as well as exports that accounted for over 90% of overall exports. For oil price and potential output, the study was able to establish a positive effect of oil price on potential growth in the short and long run. Other control variables employed in the model such as human capital, gross fixed capital formation, and labour force exhibited different effects on potential growth in the long and short run. The study concludes that Nigeria as an oil-exporting country is highly sensitive to changes in oil prices. Therefore, economic policies that will regulate the country in a way that eliminates the economy's dependence on oil production and direct the country to more sustainable growth is recommended. Policies that will develop a private sector-oriented, diversified, less oil-dependent economy should be implemented. Similarly, there should be a deliberate collaboration between the government and the private sector towards building a conducive and enabling environment that promotes capital investment in the economy. Human capital development should be strengthened by the government through increased expenditure in education, as this will further promote potential growth.

REFERENCES

- Adenuga, A.O., Hilili, M.J., & Evbuomwan, O.O. (2012). Oil price pass–through into inflation:

Empirical evidence from Nigeria*. CBN Economic and Financial Review 50,* pp 1-28.

- Ahmed, K., Bhutto, N. A., & Kalhoro, M. R. (2019). Decomposing the links between oil price shocks and macroeconomic indicators: Evidence from SAARC region. *Resources policy*, *61*, 423-432.
- 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*, 1057-1066.
- Alenoghena, R. O. (2020). Oil Price Shocks and Macroeconomic Performance of the Nigerian Economy: A Structural VAR Approach. *Facta Universitatis-Economics and Organization*, *17*(4), 299-316.
- Baba, S. (2020). A vector autoregressive analysis of oil price volatility and economic growth in Nigeria (1997-2017). *Journal of International Business, Innovation and Strategic Management*, *4*(1), 29-46.
- 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*, 104680.
- Darma, N. A., Magaji, S., & Amase, J. (2022). Macroeconomic Impact of Oil Price Shocks on Government Expenditure and Economic Growth in Nigeria. *SDMIMD Journal of Management*, 97-112.
- Ikechi, K. S., & Anthony, N. (2020). Global oil price shocks and effects on economic growth: An econometric Investigation of Nigeria. *International Journal of Innovation and Economic Development, Inovatus Services Ltd*, *6*(4), 7-26.
- Inyiama, O. I., & Ekwe, M. C. (2014). Exchange rate and inflationary rate: Do they interact? evidence from nigeria. *International journal of economics and finance*, *6*(3), 80-87.
- Jibril, N. U., & Halaç, U. (2019). Oil Price Shocks and Macroeconomic Instability in Nigeria: Evidence from GVAR. *International Journal of Contemporary Economics and Administrative Sciences*, *9*(1), 94-118.
- Magaji, M., & Singla, S. (2020). The Impact of Oil Price Shocks on Exchange Rate and Economic Growth in Nigeria: An ARDL Bound Test Cointegration Approach. *Journal of Economics and Environment*, *1*(2), 24-39.
- Maghyereh, A. I., Awartani, B., & Sweidan, O. D. (2019). Oil price uncertainty and real output growth: New evidence from selected oil-importing countries in the Middle East. *Empirical Economics*, *56*, 1601-1621.
- Nasir, M. A., Al-Emadi, A. A., Shahbaz, M., & Hammoudeh, S. (2019). Importance of oil shocks and the GCC macroeconomy: A structural VAR analysis. *Resources Policy*, *61*, 166-179.
- Nyangarika, Anthony (2019). Influence oil price towards macroeconomic indicators in Russia.
- Ologbenla, P. (2020). Macroeconomic impacts of oil price shocks on the Nigerian economy. *European Journal of Business and Management Research*, *5*(5).
- Omolade, A., Ngalawa, H., & Kutu, A. (2019). Crude oil price shocks and macroeconomic performance in Africa's oil-producing countries. *Cogent Economics & Finance*.
- Omotosho, B.S. (2019). Oil Price Shocks, Fuel Subsidies and Macroeconomic (In) stability in Nigeria. *CBN Journal of Applied Statistics, 10*(2).
- Wang, G., Sharma, P., Jain, V., Shukla, A., Shabbir, M. S., Tabash, M. I., & Chawla, C. (2022). The relationship among oil prices volatility, inflation rate, and sustainable economic growth: Evidence from top oil importer and exporter countries. *Resources Policy*, *77*, 102674.
- Yasmeen, H., Wang, Y., Zameer, H., & Solangi, Y. A. (2019). Does oil price volatility influence real sector growth? Empirical evidence from Pakistan. *Energy Reports*, *5*, 688-703.