

OIL PRICE, OIL PRODUCTION AND MACRO ECONOMIC PERFORMANCE IN NIGERIA

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Abstract

This study examines the impact of oil price and oil production change on the macroeconomic performance of Nigeria. Oil price (OILP), Oil production (OILPD) and Real exchange rate (REXCH) were used as independent variables and Gross Domestic Product (GDPGR) was used to capture macro economic performance. The Vector Error Correction Model was one of the statistical techniques used on data collected on the dependent and independent variable. The findings showed that GDPGR was notably susceptible to fluctuations in oil prices and oil production causing a significant negative impact on macro economic performance in Nigeria for the period under review. The findings supported the recommendation that the Nigerian government should strengthen her crude oil refining capacity so that an increase will boost oil production and export earnings

Keywords: Oil price, Oil production, Gross Domestic Product, Real Exchange rate

Introduction

Crude oil has been regarded as the most significant source of energy in the world since the mid 1950's. It has become a very essential source of economic growth for many countries as it serves as an engine for industrialisation (Mehmood & Murshed, 2021).

Crude oil is considered to also be vital to human civilizations because it is required for numerous activities of humans in their daily lives. These activities range from production to routine household activities. Shao and Hua (2022) considered crude oil production a crucial strategic source in world politics. The importance of oil in production, transportation and other socio-economic and even economic activities still prevails till date amidst the increasing discoveries of substitute renewable energy sources and ever advancing technologies; oil price, production and its reserves are pertinent for economic growth.

The volatile nature of oil price has misconstruing implications for countries that have oil and those that don't have oil. The volatile nature has been characteristic of this essential raw material and this has been unrelenting for years, although the implication of its volatility on economies differs depending on how tough or vulnerable the economies are (Iyke, 2019).

There are various reactions and opinions in economic literature on the effects of oil prices on macro-economic performance of a country. On one side, the opinion is that oil price changes increase production output thereby increasing economic growth, on the other side they posit that changes in oil price will result to decrease in production output which will stifle economic growth.

Ogusakin and Oloruntuyi (2017) posits that an increase in the oil price represents a positive shock and this should increase the revenue of oil producing countries because this translates to higher export earnings and vice versa. The increase or decrease in export earnings of a country converts to an increase or decrease in economic growth; the case is not the same for countries that import oil.

More also, oil price fluctuations cause wealth transfers between countries importing and countries exporting it further causes a significant macroeconomic impact that affects production, transportation, politics, general prices triggers uncertainty in the world economy (Abdelsalam, 2020).

Miamo and Achuo (2020) noted that the major source of business fluctuation particularly in countries that are oil dependent in trade is shocks from the volatility of oil prices and

exchange rate. The fluctuations in these variables were identified to be a dominant factor for global macroeconomic instability. Oil price and exchange rate form a key component in the design (planning) and implementation of fiscal and monetary policies in developed and developing countries.

Khan, Khan and Khan (2020) observed that macro-economic performance captured in economic activities like industrial output investments, international commerce, production, households purchasing power, consumer products, consumer services etc are all directly affected by the prices of crude oil.

A high price of crude oil creates future uncertainty and diverts consumer spending on capital goods and investments which has a detrimental effect on macro-economic performance and growth. Basically, high oil prices would result in a rise in production cost and thus impede economic growth. This effect goes through the channel of inflationary pressures and subsequent variations in industrial structures.

Changes in oil price and exchange rates have varying effects on economies that import or export. Subsequently, for a country like Nigeria which has her major source of revenue from the oil sector has become exposed to internal and external shocks which have in many times negatively affected her macroeconomic performance. The shocks suffered by the Nigerian economy during economic recessions are attributed to oil price changes and this has accumulated into the acceleration of unemployment rate, inflation rate and budget deficits problems.

Presently, one of the fundamental problems that exists due to oil price, increases/fluctuation is the increase of transportation costs and production costs, this becomes a burden on individual earnings, corporate earning and even government earnings. The profitability of the firm, stability of prices and the stability of a country financial system are also affected by the volatility in the oil price. Despite the huge revenue gotten from oil, the shocks on the prices and production of oil has aggravated the looming problems saddling the country, problems like declining manufacturing production, high rising level of unemployment and poverty, poor infrastructural development, low per capita income and the negligence of the agricultural sector.

As rightly observed also by Adeosun, Mosab and Anagreh (2022), fluctuations in oil prices create uncertainty in the production capacity of

the productive sectors in any economy, this is the case of Nigeria; this has in turn destabilized the effectiveness of the government fiscal management of crude oil revenue.

In addition, increases in the oil price over time have caused increases in production costs, import bills and increase in the price of petroleum products begetting the ever present increase in general price level (inflation), therefore, this increase has given rise to a decline in productivity and this consequently has led to a further decline in investments and eventually a decrease in economic growth.

The dismal macro-economic performance of the Nigerian economy rekindles the study on the expected and observed impact of oil price and oil production on macro-economic performance; this therefore forms the major objective of this study.

Literature Review

Conceptual Issues

Oil over the years has become the pricing source of revenue for Nigeria since the discovery of tradable capacity in 1954. Oil being the major source of Nigeria's revenue has become the dictator of her economic activities and economic decisions as national budgets and based on the oil price criterion (Azad, 2020). Nigeria is a very fascinating case study because she typifies an economy that is a highly oil dependent developing economy, this is so because there is no significant level of diversification in her production and exportation.

Rising oil price is expected to increase the foreign exchange earnings of oil producing countries like Nigeria. This also leads to accumulation of foreign reserves, an increase in the supply of foreign exchange, moderation of demand pressure in the foreign exchange market, and likely appreciation of the domestic currency. However, a decline in oil prices results in a fall in foreign exchange earnings leading to a fall in the supply of foreign exchange. The resultant excess demand in the foreign exchange market would put pressure on the exchange rate leading to the depreciation of the domestic currency.

Theoretical Review

In the existing literature on economic growth, there are a number of growth theories that attempt to establish the relationship between oil price instability and the macroeconomy or some parts of the economy. The Renaissance growth theory is considered an expansion of the symmetric relationship theory of economic

growth. The Renaissance growth theory attempts to study the relative effect of oil price changes on the level of economic activity of a country during a given time frame. Along this line, Lee (1998) concludes that oil price change affect economic growth negatively, but the effect of changes in oil prices wears out immediately after one year.

The Dutch disease theory of economic growth hypothesizes that higher oil prices would by and large change the production structure of the oil-exporting country so as to make certain that it concentrates more on oil production and exploration while ignoring the growth of the other sectors of the economy. The total increased levels of oil revenues would lead to the appreciation of the country's local currency and also cause an increase in the type of consumer goods imported. This therefore will ultimately discourage local producers because the tendency for increased import of consumer goods would reduce the competitiveness. Therefore, the Dutch disease theory contends that an increase in oil prices will not eventually benefit the economy of an oil exporting country (Corden & Neary, 1982).

Empirical Review

The impact of changes in oil prices and oil production have been examine by a number of researchers over time; Adeosun, Mosab and Anagreh (2022) re-examined the causal relationship between oil and economic performance in seven selected advanced economies; using Granger causality for fifteen year period, the findings of their study indicate bidirectional causality between oil price and economic performance for at least one month across all sample countries within notable global events such as the global financial crisis and the covid-19 pandemic.

The relationship between oil prices and economic growth was examined by Mo, Chen, Nie and Jiang (2019), and study concluded that increase in oil prices stimulates economic growth in the long run which is the positive effect while in the short run a negative effect of increase in oil price on economic growth is observed. Their results was similar to the research study done by Miamo and Achuo (2021) who from their study discovered a two-way causal relationship between GDP and the price of crude oil. This finding triggered their recommendations that the government should promote economic diversifications expand the oil sector, managerial revenues effectively so that economic growth is stimulated (increased).

Using the wavelet-based quartile regression model Khan, Khan and Khan (2020) studied the relationship between will crude oil prices and individual production with natural gas prices. The study revealed that crude oil has a positive relationship with industrial production in the short term while natural gas had a negative relationship.

Phan, Tran, Nguyen and Le (2020) after their investigations, reported an inconsistent relationship between the volatility in crude oil prices and the performance of firms at aggregate levels. Jang and Liu (2021) also revealed that the unpredictability in crude oil prices has an asymmetric impact on shock prices this was found out using NRDL models

Magazzino, Mihai, Mele and Sarkodie (2021), in their study on energy consumption and economic growth posited that energy consumption has a much stronger effect on economic growth at lower frequency bands, while causality from economic growth to energy consumption is fortified at higher frequency bands.

Alenoghena (2020) examined the effect of oil price shocks on the macro economic performance of the Nigeria economy. The result from his investigations using a structure VAR approach shared that oil price shocks have significant and negative effects on economic growth and industrial output. Furthermore, the results show that oil price shocks have a significant positive effect on inflation.

Iyke (2019) studied the ambiguity of oil prices and oil production output in Nigeria and the results from the study reports that an increase in oil prices will lead to decrease in the actual level of production. The results affirm the uncertainty in the relationship between oil prices and oil production.

In summary the studies reviewed above establish that change in oil price and oil production all have effects on the macro economic performance of a country. They posit that stability in oil price and the production of oil will help improve the macro economic performance of a country. This study however seeks to examine the Nigeria case on the effects the change in oil prices and oil production has on macro economic performance using gross domestic product growth rate as a measurement for economic growth.

Model Specification and Methodology

Using secondary data sourced from Central Bank of Nigeria statistical Bulletin, World Bank data base for the period of 1982 to 2022; the study employed the Vector Error Correction

Model (VECM) regression technique to investigate the effects of oil price and oil production and its variations on macro economic performance in the long run and short run. This is because VECM enables use of cointegrated non stationary data for interpretations. Also it allows for the estimation of short run as well as long run coefficients. Correlation Matrix statistical tool was carried out on the dependent and independent variables to ascertain the nature of their relationships. Thus, the model equation of our study is specified below.

$$GDPGR = F(OILP, OILPD, REXCH)$$

Explicitly specified as

$$GDPGR = \beta_0 + \beta_1OILP + \beta_2OILPD + \beta_3REXCH + u_i \quad (1)$$

Where: GDPGR = Gross Domestic Product growth rate (used as a proxy to capture macro economic performance), OILP = Oil Price, OILPD = Oil Production and REXCH = Real Exchange Rate (control variable)

Results of the Findings

Descriptive statistics

Table 1 presents the descriptive statistics on the selected variables captured in this study. The aim of the descriptive statistics was to depict the performance of the variables over the course of time of this study. As depicted in the table, the

TABLE 1 Descriptive statistics result

	GDPGR	OILP	OILPD	REXCH
Mean	3.697500	44.58175	1806.475	9.889259
Median	3.900000	28.62000	1832.000	9.282401
Maximum	15.30000	109.4500	2412.000	27.81473
Minimum	-10.90000	12.28000	1138.000	0.031034
Std. Dev.	4.478123	30.84359	320.6675	9.319206
Skewness	-0.408384	0.833865	-0.272302	0.392054
Kurtosis	4.915320	2.378721	2.194959	1.780283
Jarque-Bera	7.225936	5.278847	1.574473	3.504226
Probability	0.026972	0.071402	0.455101	0.173407
Sum	147.9000	1783.270	72259.00	395.5704
Sum Sq. Dev.	782.0898	37101.76	4010278.	3387.056
Observations	40	40	40	40

Source: E-view 10.0 econometric software

From the E-view result, the skewness values of -0.40, 0.83, -0.27 and 0.39 for gross domestic product growth rate (GDPGR), oil price (OILP),oil production (IOLPD) and real exchange rate (REXCH) mirrored a negatively skewed distribution, implying that the distribution for these variables set had a long left tail with higher values than the sampled mean. Kurtosis measures the peakedness or flatness of the data relative to the normal distribution.

mean values of the variables were: 3.69 percent for gross domestic product growth rate (GDPGR); 44.58 dollars for oil price (OILP); 1806.47 b/d per day for oil production (OILPD); and 9.88 percent for real exchange rate. The minimum values of the variables were: -10.90 percent for gross domestic product growth rate (GDPGR); 12.28 dollars for oil price (OILP); 1138 b/d per day for oil production (OILPD); and 0.03 percent for real exchange rate.

The maximum values of the variables were: 15.30 percent for gross domestic product growth rate (GDPGR); 109.45 dollars for oil price (OILP); 2412.00 b/d per day for oil production (OILPD); and 27.81 percent for real exchange rate. The standard deviation of the variables were: 4.47 percent for gross domestic product growth rate (GDPGR); 30.84 dollars for oil price (OILP); 320.66 b/d per day for oil production (OILPD); and 9.31 percent for real exchange rate.It is worthy of note that the measurement of normality measures whether the data set is normally distributed or otherwise. The measures of normality considered by this study were skewness and kurtosis. Skewness measured the degree of asymmetry of the series. The series may be normally skewed, positively skewed or negatively skewed.

A kurtosis value less 3.0000 is platykurtic or negative kurtosis, meaning that it has a flatted curve and that it produced lower values than the sample mean. From the result obtained in Table 1, the kurtosis values of 2.32, 2.19 and 1.78 for oil price (OILP), oil production (OILPD) and real exchange rate (REXCH) respectively were less than 3.0000 required for a normal distribution. Hence, the data for these variables had flatted curve and produced lower values than the sample mean. On the other hand, the coefficient of the kurtosis value for gross

domestic product growth rate was 4.91 and was found to be greater than 3.0000 required for a normal distribution. It therefore, means that these datasets were leptokurtic as they produced higher value than the normal.

The Jarque-Bera (JB) test measures the difference of the skewness and kurtosis of the series with those from the normal distribution. The null hypothesis for the JB statistics is that the series is normally distributed. Given the result in Table 1, the JB values of 5.27, 1.57 and 3.50 with their respective p-values of 0.07, 0.45 and 0.17 greater than 0.05 meant that the null hypotheses for all the variables were not rejected. It, therefore, meant that the dataset was normally distributed; on the other the JB values of OILP, OILPD and REXCH were normally distributed.

Correlation matrix

The correlation matrix was used to determine the relationship among the variables of this study. Table 2 presented the correlation matrix result of the study variables; the correlation coefficient of the relationship between gross domestic product growth rate and oil price was positive and non-significant following its correlation coefficient of 0.2244 and p-value of 0.1638. The correlation coefficient of the relationship between gross domestic product growth rate and oil production was positive and significant following its correlation coefficient of 0.4422 and p-value of 0.0043. On the other hand, the correlation coefficient of the relationship between gross domestic product growth rate and real exchange rate was positive and non-significant following its correlation coefficient of 0.0936 and p-value of 0.5655.

TABLE 2 Correlation matrix

Covariance Analysis: Ordinary

Correlation Probability Observations	GDPGR	OILP	OILPD	REXCH
GDPGR	1.000000 ----- 40			
OILP	0.224474 0.1638 40	1.000000 ----- 40		
OILPD	0.442284 0.0043 40	0.004812 0.9765 40	1.000000 ----- 40	
REXCH	0.093640 0.5655 40	0.683139 0.0000 40	-0.082363 0.6134 40	1.000000 ----- 40

Source: E-view 10.0 econometric software

Furthermore, the correlation coefficient of the relationship between oil price and oil production was positive and non-significant following its correlation coefficient of 0.0048 and p-value of 0.9765. The correlation coefficient of the relationship between oil price and real exchange rate was positive and significant following its correlation coefficient of 0.6831 and p-value of 0.0000. Lastly, correlation coefficient of the relationship between oil production and real exchange rate was negative and non-significant following its correlation coefficient of -0.0823 and p-value of 0.6134.

Vector error correction model (VECM) test: long run estimates

Since the optimal lag length for the study has been determined; the presence of stationarity of series (variables) at the same order of integration, and the existence of one or more cointegrating justify the use and adoption of vector error correction model (VECM) to measure short run as well as long run behaviour of the variables. As an extension of the vector autoregressive (VAR) model, VECM helps to capture and forecast inter-dependency of the non-stationary trends in levels. It introduces the concept of long run relationships and error

correction methods of how deviations from the long run relationship are deemed corrected.

The VECM long run estimates in Table 3 showed that, gross domestic product growth rate (GDPGR) which measures of the level of economic growth will decrease in the long-run as a result of the oil price and oil production controlled by real exchange rate in Nigeria. The constant coefficient of the VECM showed that, the level of economic growth in Nigeria (GDPGR) will be retarded by 203.00 per cent as result of the interactions between oil price (OILP) and oil production (OILPD) controlled

by inflation rate (INFL) in the long run. Further analysis of the long run estimates in the equation

$$GDPGR = 203.00 + 10.51*OILP+22.88*OILPD-1.47*REXCH \quad (2)$$

The equation reveals that, the total value of oil price (OILP) controlled by real exchange rate (REXCH) will increase the level of economic growth (GDPGR) in Nigeria in the long run by 10.51 per cent; and was found to be significant at five percent significance level, all things being equal.

TABLE 3 Vector error correction model (VECM) result

Vector Error Correction Estimates

Standard errors in () & t-statistics in []

Cointegrating Eq:	CointEq1			
GDPGR(-1)	1.000000			
LOILP(-1)	10.51043 (2.76334) [-3.80352]			
LOILPD(-1)	-22.88125 (9.02906) [-2.53418]			
LREXCH(-1)	1.479526 (1.12582) [1.31418]			
C	203.0056			
Error Correction:	D(GDPGR)	D(LOILP)	D(LOILPD)	D(LREXCH)
CointEq1	0.096955 (0.12660) [0.76582]	0.025752 (0.00979) [2.63053]	0.009273 (0.00297) [3.12506]	-0.020252 (0.02863) [-0.70735]
D(GDPGR(-1))	-0.669229	-0.052557	-0.001545	0.031470

	(0.19943)	(0.01542)	(0.00467)	(0.04510)
	[-3.35566]	[-3.40815]	[-0.33048]	[0.69778]
D(GDPGR(-2))	0.110045	-0.023767	-0.000965	0.077990
	(0.16903)	(0.01307)	(0.00396)	(0.03822)
	[0.65106]	[-1.81846]	[-0.24349]	[2.04030]
D(LOILP(-1))	4.902619	0.243805	0.066507	-0.542266
	(2.58192)	(0.19965)	(0.06052)	(0.58389)
	[1.89882]	[1.22119]	[1.09897]	[-0.92871]
D(LOILP(-2))	-0.588643	0.203547	0.091463	-0.781213
	(2.76055)	(0.21346)	(0.06470)	(0.62429)
	[-0.21323]	[0.95357]	[1.41356]	[-1.25136]
D(LOILPD(-1))	-7.510616	-0.507002	0.127632	2.077726
	(7.83369)	(0.60574)	(0.18361)	(1.77157)
	[-0.95876]	[-0.83700]	[0.69511]	[1.17282]
D(LOILPD(-2))	-5.395770	-0.836359	-0.349074	2.717645
	(7.73970)	(0.59847)	(0.18141)	(1.75031)
	[-0.69715]	[-1.39750]	[-1.92423]	[1.55266]
D(LREXCH(-1))	-1.468810	0.005224	0.001803	-0.450031
	(0.73793)	(0.05706)	(0.01730)	(0.16688)
	[-1.99044]	[0.09155]	[0.10423]	[-2.69671]
D(LREXCH(-2))	-0.835397	-0.096160	-0.009576	-0.456908
	(0.70695)	(0.05467)	(0.01657)	(0.15988)
	[-1.18168]	[-1.75908]	[-0.57793]	[-2.85789]
C	0.294667	0.060371	-0.006125	0.288680
	(0.60485)	(0.04677)	(0.01418)	(0.13678)
	[0.48718]	[1.29082]	[-0.43206]	[2.11048]
R-squared	0.523377	0.391259	0.402053	0.472887
Adj. R-squared	0.364502	0.188345	0.202737	0.297183
Sum sq. resids	329.2691	1.968736	0.180894	16.83965
S.E. equation	3.492156	0.270030	0.081852	0.789741
F-statistic	3.294280	1.928205	2.017164	2.691382
Log likelihood	-92.94094	1.769512	45.93337	-37.93786
Akaike AIC	5.564375	0.444891	-1.942345	2.591236
Schwarz SC	5.999758	0.880274	-1.506961	3.026619
Mean dependent	-0.070270	0.035399	-0.007447	0.141582
S.D. dependent	4.380631	0.299727	0.091670	0.942027
Determinant residual covariance (dof adj.)		0.002876		
Determinant residual covariance		0.000815		
Log likelihood		-78.43445		
Akaike information criterion		6.618078		
Schwarz criterion		8.533764		
Number of coefficients		44		

Similarly, the total value of oil production (OILPD) controlled by real exchange rate (REXCH) will increase the level of economic growth (GDPGR) in Nigeria in the long run by 22.88 per cent; and was found to be significant at five percent significance level, all things being equal.

Analysis of VECM short-run and error correction term (ECT) estimates

As depicted in the Table 3 under the GDPGR equation, the error correction variable does not have the expected negative coefficient and was also statistically non-significant. Thus, the magnitude of the coefficient of 0.0969 implies that approximately 9.69 per cent of the disequilibrium in the system could not be corrected each year; indicating a very low speed of adjustment towards the disequilibrium in the short run. Further analysis of the result showed that the estimated output model has a moderately good fit and moderately high explanatory power, given its R-squared value of 0.5233. In particular, the R-squared showed that about 52.33 per cent of the total variation in the dependent variable was attributed to variations in the independent and control variables.

Analysis of VECM estimates showed that the previous lagged period of oil price (OILP) controlled by real exchange rate (REXCH) impacted economic growth (GDPGR) in Nigeria positively and was found to be non-significant at five percent significance level in the short run; while the two previous lagged periods of oil price (OILP) controlled by real exchange rate (REXCH) impacted economic growth (GDPGR) in Nigeria negatively and was found to be non-significant at five percent significance level in the short run, *ceteris paribus*.

Lastly, the analysis of VECM estimates showed that the previous lagged period of oil production

(OILPD) controlled by real exchange rate (REXCH) impacted economic growth (GDPGR) in Nigeria negatively and was found to be non-significant at five percent significance level in the short run; while the two previous lagged periods of oil production (OILPD) controlled by real exchange rate (REXCH) impacted economic growth (GDPGR) in Nigeria negatively and was found to be non-significant at five percent significance level in the short run, *ceteris paribus*.

VEC residual serial correlation LM test

As a result of the findings from the VECM analysis, the VEC residual serial correlation LM test in Table 4 was conducted to determine whether the model was free from serial correlation. Based on the VEC residual serial correlation LM test result, it is shown that LM-stat probabilities are greater 0.05, hence, we accept the null hypothesis that, there is no serial correlation at lag order up to h. It is therefore concluded that, the VEC LM statistics result is free from the first, second and third order serial correlation. Hitherto, the stationarity of the VEC analysis is present. The implication is that the VEC model is sufficient enough to capture all the dynamics of the model.

VEC residual Portmanteau test for autocorrelations

The VEC residual Portmanteau test for autocorrelations was conducted to prove the validity of the VECM and LM-stats tests. The result in Table 5 revealed that, given the VAR lag of two, the residual up to lag h showed a probability value higher than 0.05 for the Q-stat and the Adj. Q-stat, implying that, there is no residual autocorrelations in the VECM model, hence, there is no problem of omitted variable(s).

TABLE 4 VECM residual serial correlation LM tests

Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	df	Prob.	Rao F-stat	Df	Prob.
1	20.58760	16	0.1949	1.336601	(16, 77.0)	0.1976
2	17.25437	16	0.3693	1.097379	(16, 77.0)	0.3725
Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	Df	Prob.
1	20.58760	16	0.1949	1.336601	(16, 77.0)	0.1976
2	33.19519	32	0.4087	1.045593	(32, 79.0)	0.4238

*Edgeworth expansion corrected likelihood ratio statistic.

Source: E-views 10.0 statistical software

TABLE 5 VECM residual Portmanteau tests for autocorrelations

Null Hypothesis: No residual autocorrelations up to lag h

Lags	Q-Stat	Prob.*	Adj Q-Stat	Prob.*	df
1	4.649324	---	4.774981	---	---
2	18.61022	0.9097	19.51148	0.8816	28

*Test is valid only for lags larger than the VAR lag order.

df is degrees of freedom for (approximate) chi-square distribution after adjustment for VEC estimation (Bruggemann, et al. 2005)

Source: E-views 10.0 statistical software

Impulse response function (IRF)

The impulse response function depicts the response of the dependent variable to one standard deviation shocks in itself and in other independent variables in the estimated model

for the period of time under investigation. The impulse response functions were analysed using the Cholesky one standard deviation innovation for the period of 10 years.

TABLE 6 Impulse Response Function

Period	Response of GDPGR:			
	GDPGR	LOILP	LOILPD	LREXCH
1	3.523463	0.000000	0.000000	0.000000
2	1.061503	1.152076	0.037673	-1.374870
3	1.459654	1.045386	-0.522940	-0.645595
4	1.009653	0.973442	-0.311490	-0.958303
5	1.106537	1.014567	-0.330702	-0.867370
6	0.988347	1.033325	-0.289666	-0.942260
7	0.995970	1.042925	-0.298735	-0.922047
8	0.965629	1.046364	-0.288423	-0.939189
9	0.964325	1.049449	-0.288901	-0.936187
10	0.956019	1.050961	-0.286177	-0.940480

Source: Researcher’s computation, 2023

The outcome of the impulse response function as depicted in Table 6 showed that gross domestic product growth rate responded positively to its own shock in the first year, second year, third year, fourth year, fifth year, sixth year, seventh year, eighth year, ninth year, and the tenth year. Furthermore, the result shown in Table 6 indicated that gross domestic product growth rate responded positively to shocks by oil price in the first year, the second year, the third year, the fourth year, the fifth year, the sixth year, the seventh year, the eighth year, the ninth year and the tenth year respectively.

Lastly, gross domestic product growth rate responded positively to shocks in oil production in the first year and second year respectively, but responded negatively to shocks in oil

production in the third year, the fourth year, the fifth year, the sixth year, the seventh year, the eighth year, the ninth year and the tenth year respectively.

Conclusion and Recommendations

In conclusion, the results from the study show that changes (shocks) in oil price and oil production have negatively affected gross domestic product growth rate as controlled by real exchange rate

Based on these findings, the study recommends that the Nigerian government should employ functional measures like increase in technology and technical skill to strengthen her crude oil refining capacity so that an increase will boost oil production and export earnings. Also, economic diversification should be encouraged

by the government of Nigeria; the diversification policy direction involves the cognizant development of other important producing sectors of the economy like agriculture and industry. This is expected to decrease the dependency of the country only on oil exportation.

References

- Adeosun, T. A., Mosab, I. T. & Anagreh, S. (2022) oil price and economic performance: Additional evidence from advanced economies. *Resource policy* 77, 2022 ISSN 3031-4207 <https://doi.org/10.1016/j.resourcepol.2022.102666> (<https://www.sciencedirect.com/science/article/pii/S0301420722001143>) 20/10/2023
- Abdelsalam M. A. M. (2020). Oil price fluctuations and economic growth: the case of MENA countries. *Rev. Econ. Political Sci.* 10.1108/REPS-12-2019-0162
- Alenoghena R.O. (2020) Oil shocks and macroeconomic performance of the Nigerian economy: A structural VAR approach *Economics and Organisation* 17(4) 299-316
- Ahmed K., Bhutto N. A., Kalhor M. R. (2019). Decomposing the links between oil price shocks and macroeconomic indicators: evidence from SAARC region. *Res. Policy* 61, 423–432. 10.1016/j.resourpol.2018.03.001 24/10/23
- Azad N. F., Serletis A. (2020). Oil price shocks in major emerging economies. *Energy Policy* 43, ssrn.3577378. 10.2139/ssrn.3577378
- Corden, W., & Neary, J. (1982). Booming Sector and De-Industrialisation in a Small Open Economy. *Economic Journal*, 92 (368), 825-848
- Iyke B. N. (2019). Real output and oil price uncertainty in an oil producing country. *Buletin Ekonomi Moneter dan Perbankan*. 22, 163–176. 10.21098/bemp.v22i2.1095
- Jiang W., Liu Y. (2021). The asymmetric effect of crude oil prices on stock prices in major international financial markets. *North Am. J. Econ. Finance*. 56, 101357. 10.1016/j.najef.2020.101357 18/10/2021
- Khan A., Khan M. Y., Khan A. Q. (2020). How do oil and natural gas prices affect U.S. industrial production? Utilizing wavelet nonlinear denoised based quantile analysis. *Energy Strategy Rev.* 32, 100550. 10.1016/j.esr.2020.100550
- Lee, K. (1998). Oil Price Changes and Volatility; A Correlation Analysis on the Economy of China. *Scholarly writers' publications*, 15 (4), 44-49.
- Miamo C. W., Achuo E. D. (2021). Can the resource curse be avoided? An empirical examination of the nexus between crude oil price and economic growth. *SN Bus. Econ.* 2, 5. 10.1007/s43546-021-00179-x
- Mo B., Chen C., Nie H., Jiang Y. (2019). Visiting effects of crude oil price on economic growth in BRICS countries: Fresh evidence from wavelet-based quantile-on-quantile tests. *Energy* 178, 234–251. 10.1016/j.energy.2019.04.162
- Magazzino, G. Mihai M. Mele, M. & Sarkodie (2021) Energy consumption and economic growth in Italy: A wavelet ISSN 2352-4847 (<https://www.sciencedirect.com/science/article/pii/S235284721001748>) 19/10/2023
- Mehmood H. and Murshed, M. (2021) Oil Price and Economic growth nexus in Saudi Arabia: Asymmetry Analysis *International Journal of Energy Economics and Policy* 11(1) 45-62
- Nguyen T. T., Nguyen V. C., and Tran T. N. (2020). Oil price shocks against stock return of oil- and gas-related firms in the economic depression: a new evidence from a copula approach. *Cogent Econ. Financ.* 8, 1799908. 10.1080/23322039.2020.1799908
- Okonkwo, I. V. & Mojekwu, K. O. (2018). Crude Oil Price Fluctuations and Nigeria Economic Growth: 1997-2015. *International Journal of Research in Business, Economics and Management*, 2 (2), 44-61,
- Ogunsakin, S and Oloruntuyi A.O. (2017), Oil price volatility and macroeconomic performance in Two top net oil producing countries in Africa *International Journal of economic research* 8(3) 59-79

- Phan D. H. B., Tran V. T., Nguyen D. T., Le A. (2020). The importance of managerial ability on crude oil price uncertainty-firm performance relationship. *Energy Econ.* 88, 104778. 10.1016/j.eneco.2020.104778
- Usman, A.; Madu, I. & Abdullahi, F. (2015). Evidence of Petroleum Resources on Nigerian Economic Development (2000-2009). *Business and Economics Journal*, 6(2), pp. 12-29.

