Macroeconomic Impacts of Oil Price Shocks on the Nigerian Economy

Ologbenla Patrick

***Abstract* — The study investigates 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 while oil price is the main exogenous variable. The VAR technique of analysis is adopted and the 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. Evidence of Dutch Disease in Nigeria is also confirmed from the study which further shows the high level of dependency of Nigerian economy on oil.**

***Index Terms* — Oil price, Macroeconomic variables, Economic growth.**

I. Introduction

Oil has been a major commodity perturbing different economies in the World and particularly, the oil price change has generated macroeconomic reactions from various economies across the globe [1]. The case of oil producing country is unique in the sense that it is believed that since they are producers there should be limit to the macroeconomic instability that they will be suffering as a country, but unfortunately this is not the case [2]. The case of Nigeria stands out among other oil producing countries in that they are affected both at the demand and supply sides of oil as a commodity [3].

From the demand side Nigeria accounts for the largest oil output in the continent of Africa and this has been translating to huge foreign exchange earnings. In the last two decades oil revenues have taken the lead among the foreign exchange contributors in Nigeria, ,accounting for 79.9% in 2011, 69.8% in 2013, 67.5% in 2014, 55.4% in 2015, 48.0% in 2016, 52.6% in 2017 and 58.1% in 2018 [4]. This reality suggests that the Nigeria's macroeconomic performance is strongly tied to the oil sector. Consequently, the economy is highly susceptible to oil price shocks. Between 2013 and 2016, the country recorded declining growth rates that have severally been attributed to fall in oil prices and exacerbated by civil tension in the Niger delta region which ushered in pipeline vandalism and oil theft. Currently, a constellation of forces -price disagreement between Russia and Saudi Arabia and the corona virus pandemic- has impacted seriously on the oil market translating into a sharp drop in oil price which appears to threaten the economy [1].

On the supply side Nigeria is the largest importer of the refined oil in Africa despite having the largest oil output. Refined oil importation constitutes a substantial part of the Nigerian import bill and this has constituted heavy leakage in the government revenue. The total value of refined oil imports in Nigeria between 2015 to 2019 stood at about $264.57bn which is an increase of about 14,7% over that of period prior to 2014 [5].

This implication of the situation above is directly noticed on the exchange rate. This has affected the naira value owing to the increasing outflow of dollar payment for refined oil purchase. Apart from the exchange rate, inflation rate is another macroeconomic variable that has been seriously affected. The attendant impacts of all these macroeconomic instabilities fall on the Nigeria economic growth. However, the effect oil price shocks on growth have been a subject of debate over the years.

For instance, some argue that oil price fluctuations enhance output thus driving growth and on the other hand, others posit that variations in price will result in a reduction in output, thus impeding growth. Amuzeger [6] and Akpan [7] contend that an increase (decrease) in the price of oil which represents a positive (negative) shock will increase (decrease) the revenue base of oil rich countries since that will mean a higher (lower) export (foreign exchange) earnings. The increased (decreased) export earnings translates into increased(decreased) national output.

In addition, some authors posited that the level of influence of oil price shocks on economic growth depends on the macroeconomic responses. Although, there have been a proliferation of papers on oil price and macroeconomic behaviour, a greater shunk of the literature has been committed to the study of the dynamics in the oil importing industrially developed economies. In the same vein, only a limited number of studies have been devoted to developing countries and these few studies that were done on Nigeria are not recent and they are mostly associated with periods when the country's macroeconomic environment was more regulated and centralized, however, the economy has been more liberalized, open and deregulated, which may have affected the behaviour of her macroeconomic fundamentals.

Based on the foregoing, the main objective of the study is to investigate the macroeconomic effect of oil price shock on the Nigeria economy. The remaining part of this paper is divided into literature review, methodology, results and discussion, conclusions.

II. Literature Review

Aleksandrova [8] studied the effects oil price fluctuation has on Azerbaijan. The study utilized monthly data for 1999:1 to 2009:4 and the vector autoregressive (VAR)

Published on September 30, 2020.
Ologbenla Patrick, Obafemi Awolowo University, Nigeria.
(corresponding e-mail: ologbenlapatrick@gmail.com)

model. The result shows that oil price fluctuations have a significant effect on that economy and argued that it was due to government's heavy reliance on oil revenues. Despite the external shock volatility in the economy, oil price fluctuation did not affect government spending. However, fluctuations in oil price granger cause inflation and impacted inflation positively. Nevertheless, the study failed to examine the influences of negative oil price which was seen to be more important factor determining the performance of the oil exporting economies. This result might not fully represent the situation in Nigeria. This might give wrong interpretations if used for policy-making in Nigeria.

Oriakhi and Osaze [9] studied the impacts and relationship between oil price movements and some selected macroeconomic variables focusing on real GDP in Nigerian using quarterly data between 1970 and 2010. The analysis was made using variance autoregressive (VAR) model. The result shows that oil price movement granger cause real GDP. They found that oil price movement affects growth through other variables like real exchange rate and real government expenditure. This signifies that level of government spending is determined by oil price at the prevailing exchange rate. The study equally observed that oil price movement has a direct impact on the Nigeria exchange rate because the earning from crude oil form larger chunk of the Nigeria foreign reserve and foreign exchange. Unfortunately, according to the study, Nigeria foreign reserve decreased from about $ 60 billion in 2008 to about $ 30 billion in 2015. Though, the study was conducted in Nigeria, the study used the regular SVAR which does not have the capacity to capture negative shocks. SVAR is programmed to measure positive responses of the different variables in an economy.

Apere and Ijomah [10], the effects of oil price shock on monetary policy in Nigeria using structural cointegrated VAR model between 1970 and 2010. The result showed that there is a long run relationship involving oil prices, inflation rate, treasury bill rate, exchange rate, interest rate and money supply in Nigeria. They also found that an unexpected oil price shock is followed by an increase in inflation rate and a decline in exchange rate and interest rate in Nigeria which is consistent with the findings of Olomola [11].

Olomola and Adejumo [12] examined the effects of oil price shocks on output, inflation, real exchange rate and money supply in Nigeria using quarterly data from 1970 to 2003. Using VAR methodology, they find that oil price shocks do not have any substantial effect on output and inflation. Oil price shocks only significantly determine the real exchange rate and in the long run money supply.

Adusei and Georg [13] examined the relationship between the world oil price and aggregate demand in a developing country, Ghana, via the interest rate channel by means of cointegration analysis. Results of the study revealed that oil price by impacting the price level positively indirectly negatively impacts real output. The results also showed that monetary policy is initially eased in response to a surge in the price of oil in order to lessen any growth consequences, but at the cost of higher inflation.

III. METHODOLOGY

A. The Theoretical Frame Work and Model Specification

The model for this study is generated from the national income identity of Keynsian economics which is expressed thus:

$$Y= C+I+G+(X-M) \tag{1}$$

where *Y* is the national income, *C* is aggregate consumption expenditure, *I* is aggregate investment, *G* is the aggregate government expenditure and (*X-M*) is the external balance or net income from abroad where *X* is export and *M* is import.

In equation 1, this study focuses on the external balance since that is where export which is the major variable through which oil is relevant to the Nigeria economy is represented. A vital part of the Keynesians growth theory that takes into account the external balance (*X-M*) is the external gap theory. From the external gap theory, the foreign exchange gap model of Findlay [14] is analyzed. According to Findlay, national income or economic growth is a function of export growth and propensity to import. Such that:

$$Y = f(Xe^{gt}, mY) \tag{2}$$

where *Y* is national output, *X* is export, *gt* is the growth rate of export while *m* is the marginal propensity to import.

A change in *Y* overt time that is $\frac{dY}{dt}$ which is economic growth (y) can be expressed as follows according to Findlay [14]:

$$\frac{dY}{dt} = \alpha[Xe^{gt} - mY] \tag{3}$$

This can be re-written using y as the growth rate as follows:

$$y = \alpha[Xe^{gt} - mY] \tag{4}$$

Equation 4 shows that economic growth is a function of the growth of the net income from abroad.

However, Nigeria is an oil dependent economy where the major foreign exchange earning commodity is oil and it contributes more than 80% to the foreign exchange earning of the country. Consequently, export in Nigeria is majorly divided into oil (*oilX*) and nonoil exports (*NoilX*) [16] such that:

$$X= (oilX, NoilX) \tag{5}$$

Equation 5 can be substituted in equation 4 to become:

$$y = \alpha[(\text{oilX}, \text{NoilX})e^{gt} - mY] \tag{6}$$

According to [5] since oil export is the major source of foreign exchange earnings and our interest in this study the model expressed in equation 6 is re-written as follows:

$$y = \alpha[\text{oilX}e^{gt} - mY] \tag{7}$$

Equation 7 is an indication that the growth rate of Nigerian economy can be expressed as a function of oil export growth which is ultimately determined by oil price (*oilp*) [16]. Consequently, we re-specified the model such that:

$$y = \alpha[olip, \delta] \quad (8)$$

where *y* is the economic growth, *oilp* is the oil price and δ represents other shift factors of economic growth which may include macroeconomic variables as well as propensity to import.

Considering the shift factor variable δ , this study apart from the GDP growth rate which is the dependent variable, include exchange rate and inflation rate as major macroeconomic variables which are very important to Nigerian economic performance as an oil dependent country [17]. According to [1] inflation and exchange rate are very key macroeconomic variable in any oil dependent economy because they play major roles in determination of macroeconomic stability of the economy. Again, many of oil dependent countries are bedevilled with the phenomenon of "Dutch Disease" which is highly linked to domestic economy imbalance as a result of the roles of exchange rate and inflation rate [18]. On this note equation 8 is expanded further and stated more explicitly to accommodate these two macroeconomic variables:

$$y = \alpha[olip, exr, inf] \quad (9)$$

where *exr* and *inf* are exchange rate and inflation rate respectively. All other variables are as defined before.

B. Description of Variables and Sources of Data

The variables included in equation 9 are defined in Table 1. In addition, their sources are also included in the table.

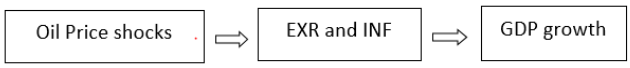
TABLE 1: VARIABLES DESCRIPTION AND SOURCES OF DATA

Variables	Description	Measurement	Source
y	GDP growth rate	Annual percentage growth rate of GDP at market prices based on constant local currency. ggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.	World Bank, 2019
Oilp	Oil Price	This is the average annual oil price in the international market. The annual Brent crude oil price is used since it is the type of crude oil produced in Nigeria.	World Bank and EEA, 2019
EXR	Exchange rate	It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar).	World Bank, 2019
INF	Inflation rate	measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.	World Bank, 2019

C. Method of Data Analysis (Vector–Autoregression (VAR) Model

Econometrics literature has identified VAR as a veritable means of studying the interactions among variables especially in the short and medium terms [19], [20]. Formulation of VAR model is strongly dependent on shocks identification in the VAR model and this often depends on the objectives of the researcher as well as literatures. In this study we are interested in studying the interaction between oil price, macroeconomic variable in the Nigerian economy.

A flow chart for the Nigerian economy within the VAR framework using the variables identified in equation 9 is as follows:



VAR models are seen as independent large scale macro econometric model that do not rely on unrealistic assumptions [19]. The foremost theoretical framework of VAR analysis as proposed by Sims [21] used Choleski decomposition to get impulse responses.

The construction of our VAR model follows the conventional method where the initial model is specified thus:

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + , \dots \dots \dots . + A_p y_{t-p} + \mu_t \quad (10)$$

where:

y_t represents an (nx1) vector containing n endogenous variables, A_i(*i=1, 2….p)* are (n x n) matrices coefficients, and μ_t is an (n x 1) vector containing error terms.

Though the error is $\mu_t \sim iid\ N(0, \Omega)$ but errors do possess tendency of correlating contemporaneously in all the equations. There exist pn^2 Parameters in the A matrices**.** Equation 10 can be written in other form with the usage of the lag operator L which is selected through $L^k x_t = x_{t-k}$. the equation becomes:

$$A(L) y_t = \mu_t \quad (11)$$

where: $A(L) = A_0 L^0 - A_1 L^1 - A_2 L^2 - \cdots \dots \dots - A_p L^p$, A_0= I (identity matrix) it is required that *A(L)* lies outside the unit circle for stationarity to be ensured.

D. Generalized Impulse Response Function for VAR

The generalized impulse response function refers to the reaction of any dynamic system in response to some external shocks or changes. In a VAR framework, the impulse response function traces out the reaction of the endogenous variable to shocks to each of the other individual variables. To assist this study, the impulse response function will be used to investigate the interaction between oil price and macroeconomic variables in Nigeria. The process through which the oil price shocks transmit in the economy will be the focus in our context and the cumulative impulse response function to help in the interpretation of the overall effects of shock upon dependent variable in a given period.

According to Stock and Watson [22] the analysis of the impulse response function traced out the effects of a one-

unit shock to a variable's error term on the dependent variables that made up the VAR model. Wouter [23] identifies three types of structural shocks as; productivity shock, preference shock and monetary policy shock. According to his definition, "the impulse response function gives the Jth-period response when the system is shocked by a one-standard-deviation shock through a sequence of shock and alternative series of shocks". Impulse response function can be analyzed in different ways, but this study follows the multivariate extension of factorization technique of the Cholesky Orthogonalization approach as it is consistent with previous studies of Cheng [24] that are related to this study.

E. Variance Decomposition for VAR

This is another application of multivariate time series analysis that will be used in the interpretation of VAR and is known as Forecast error variance decomposition (FEVD). It explains how each variable contribution to other variables in a regression model by determining the rate at which the forecast error variance of each variable is explained by the exogenous shocks to other variables and further considers the portion of the observed variation that is attributed to the orthogonalized shock in a variable. According to Stock and Watson [22] the variance decompositions explain the fraction of the observed variable that can either be ascribed to that variables been affected by shock or that of another endogenous variable. The application of this analysis will assist in analyzing the behaviour macroeconomic variables in Nigeria to oil price shocks

F. Diagnostics

Some pre and post estimation tests are necessary for the application of VAR. These, are discussed under this section

1. Unit root test

As a pre-condition for VAR analysis is the unit root testing for the time serious data. A unit root indicates that the time series under investigation is non-stationary while the absence of a unit root means that the time series data is stationary. To determine the order of series, this study will use two different unit root tests; the Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test. These tests shall be conducted at the individual intercept and the individual intercept plus trend in order to compare and validate the results and further ensure consistency. The condition is that all variables that will be included in the VAR model must be stationary [22].

2. Serial correlation and Heteroskedatictiy test

The bench mark null hypotheses that are tested for the serial correlation and heteroskedasticity test are:

- $H_0: \alpha = 1$, no serial correlation and heteroskedasticity in the model.
- $H_1: \alpha < 1$, there is serial correlation and heteroskedasticity in the model.

Serial correlation means similarity between observations as a function of the time lag between variables. It is a mathematical tool for finding repeating patterns, such as the presence of a periodic signal obscured by noise or identifying the missing fundamentals in frequencies. Heteroskedasticity on the other hand refers to the circumstance in which the variability of a variable is unequal across the range of values of a second variable that predicts it.

3. Stability Test

Based on the Recursive Chow test, the benchmark for the VAR model is expected to be stable over the sample period. The graphical CUSUM and CUSUM of squares tests will be used to determine whether the model is stable or not. At 5percent confidence interval, the benchmark hypotheses to be tested are:

$H_0: \alpha = 1$, the model is stable.
$H_1: \alpha \neq 1$, the model is non-stable.

4. Normality test

This test is necessary to investigate the distribution of the residual of the estimated panel model. For a robust estimated model, it is expected that that the residual should be normally distributed. This will clear any issues relating to biasedness of the observations used in the model. The JARQUE BERRA statistics Is used in the study to test for the normality. A probability value that is greater than 5% indicates that the residual of the estimated panel model is normally distributed and otherwise it is not normally distributed.

IV. Results And Discussions

This aspect of the paper presents. Interprets and discusses the results of the empirical analysis. The process of VAR starts with the test for stationarity. The unit root test is conducted using the Augmented Dickey Fuller approach and the results are presented in Table 2.

TABLE 2: Unit root test

Variable	ADF T Staistics	Philip Perron Z(t) statistics	Order of Integration
LGDP	-6.360	-6.341	I(1)
LOILP	-7.404	-7.405	I(1)
LINF	-4.926	-4.913	I(0)
LEXR	-5.945	-5.991	I(1)

Source: Authors computation.

The results from the unit root test show that all the variables are stationary after the first difference except inflation rate that is stationary at levels. Consequently, all the variables are either I(1) or I(0). On this note one of the conditions for application of VAR has been fulfilled.

The second step is the selection of lag length order for the variables included in the VAR model. These include the GDP, EXR.INF and OILP. The result is presented in Table 3

The result in Table 3 shows the optimal lag length for each of the variables included in the VAR model. The lag selection order indicates that all the variables are better in lag one. The AIC criterion is used to determine the lag length and it has selected lag one as the appropriate lag to use in running the VAR model. The next step is to estimate the basic VAR model as specified in the methodology. However, since the study is about the relationships between oil price and macroeconomic variables as they affect the Nigerian economy, the GDP model in the VAR result is our focus. The results of the VAR model is presented in Table 4.

TABLE 3: OPTIMAL LAG LENGTH DETERMINATION

Lag	LL	LR	df	P	FPE	AIC	HQIC	SBIC
0	-1091.64				2.4e+12	39.8413	39.8978	39.9873
1	-871.052	441.17	16	0.000	1.4e+09*	32.4019*	32.6841*	33.1318*
2	-862.439	17.226	16	0.371	1.8e+09	32.6705	33.1786	33.9844
3	-846.651	31.576*	16	0.011	1.9e+09	32.6782	33.4121	34.5761
4 |	-835.941	21.42	16	0.163	2.4e+09	32.8706	33.8303	35.3524

Source: Author's computation.

TABLE 4: VAR BASIC MODEL ESTIMATION (GDP MODEL)

		Coefficient	Standard Error	z	P(z)	95% confidence. interval	
LGDP	Loilp						
	L1	0.2849472	0.1246822	2.29	0.022	0.0405746	0.5293198
	L2	-0.0224401	0.1314728	-0.17	0.864	-0.280122	0.2352418
	Lexr						
	L1	-0.1000908	0.1206581	-0.83	0.407	-0.3365764	0.1363947
	L2	0.1517684	0.119965	1.27	0.206	-0.0833586	0.3868954
	Linf						
	L1	-0.0380442	0.0506085	-0.75	0.452	-0.137235	0.0611466
	L2	0.0173895	0.0449787	0.39	0.699	-0.0707672	0.1055463
	Lgdp						
	L1	0.7962799	0.1508638	5.28	0.000	0.5005923	1.091967
	L2	-0.0509146	0.1374739	-0.37	0.711	-0.3203584	0.2185293
	cons	0.2102178	0.1958543	1.07	0.283	-0.1736495	0.594085

Author's Computation.

The result on Table 4 shows that each of the macroeconomic variable namely exchange rate and inflation rate as well as the oil price have some forms relationship with the GDP. The result indicates that oil price at lag one that is lag (1) have significant impact on the Nigeria GDP. It should also be noted that the optimal lag order for the model is lag (1). Apart from the oil price, only the lagged value of the GDP also has significant impact on the GDP. The implication of the result is that oil price is an important determinant of Nigeria GDP. However, the two macroeconomic variables namely exchange rate and inflation rate appear not to have significant short run relationship with the GDP. After the estimation of the basic VAR, the granger causality test is conducted to further confirm the level of short run and medium term association among the variables.

TABLE 5: GRANGER CAUSALITY TEST

Equation	Excluded	chi2	Df	Prob > chi2
LOILP	LEXR	.0496	2	0.976
LOILP	LINF	.55113	2	0.759
LOILP	LGDP	2.8816	2	0.237
LOILP	ALL	4.7762	6	0.573
LEXR	LOILP	10.114	2	0.006
LEXR	LINF	1.2187	2	0.544
LEXR	LGDP	.22362	2	0.894
LEXR	ALL	14.549	6	0.024
LINF	LOILP	.52659	2	0.769
LINF	LEXR	1.1086	2	0.574
LINF	LGDP	.54886	2	0.760
LINF	ALL	1.5375	6	0.957
LGDP	LOILP	6.5857	2	0.037
LGDP	LEXR	7.2298	2	0.027
LGDP	LINF	.56596	2	0.754
LGDP	ALL	12.029	6	0.061

Author's Computation.

The result in Table 5 shows that oil price and exchange rate are the most important variables that can cause the GDP. With the probability values of 0.037 and 0.027 for oil price and exchange rate respectively, oil price is further affirmed as an important variable determining the GDP of Nigeria. Exchange rate also is another important variable among the macroeconomic variables that determines Nigeria GDP. Furthermore, on the Causality test of exchange rate equation the result shows that oil price is an important variable that determines the Nigerian exchange rate. With the probability of 0.006, Oil price has been shown from the causality test as the main causative factor of exchange rate in Nigeria. The general implication of the result here is that oil price mostly affects GDP and exchange rate in Nigeria. The next step is to assess the validity of the VAR estimates by performing some diagnostics.

A. Diagnostics

Some post estimation tests are necessary for the VAR estimates this will confirm the extent of the reliability if the estimated parameters in the VAR model. The first is the autocorrelation test.

TABLE 6: LM TEST FOR SERIAL CORRELATION

lag	**chi2**	**Df**	**Prob > chi2**
1	13.6026	16	0.62829
2	22.6946	16	0.12215

Author's Computation.

Table 6 shows that the P values at both lag one and lag two are 0.62829 and 0.12215 respectively. The implication is that the null hypothesis of no autocorrelation is accepted at 5% significant level. Therefore, the estimated VAR model is not having the problem of serial correlation which might render the results questionable. The next test is the stability test.

TABLE 7: STABILITY TEST FOR THE ESTIMATED VAR MODEL

EIGENVALUE	MODULUS
.9971203	.99712
.8661663	.866166
.3119409 + .3553196i	.47282
.3119409 - .3553196i	.47282
.3677947 + .1078958i	.383294
.3677947 - .1078958i	.383294
.03572096 + .1341379i	.138813
.03572096 - .1341379i	.138813

Author's Computation.

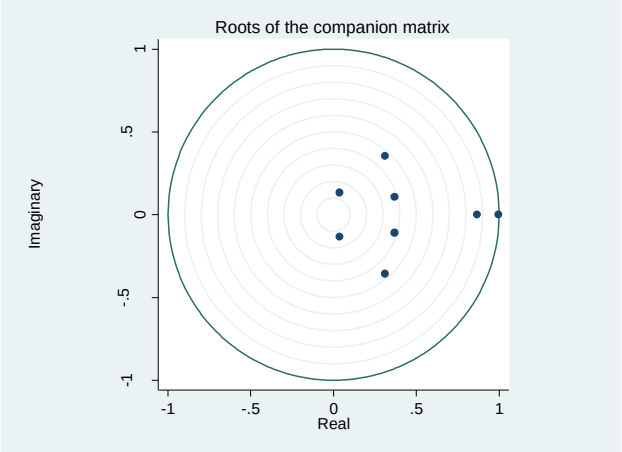


Fig. 1. Stability test for the estimated VAR model.
Author's Computation.

Both the Fig. 1 and Table 7 show the Eigenvalue stability condition of the estimated VAR model. The result shows that none of the values lies outside the circle. By virtue of the fact, that all the Eigenvalues lay inside the circle, then we conclude that the estimated VAR model is stable and suitable for empirical inference. To further explore the VAR result on the relationships among the variables the impulse response function us performed and the result is presented in Fig. 2.

The results from the impulse response function show that exchange rate and GDP are the two variables that respond significantly to oil price shocks. The impulse response explains the responses of responses of variables to one per cent standard deviation in another variable. For instance, in figure 2 the last sets of rectangles represent the responses of macroeconomic variables to 1% standard deviation in oil price which is known as oil price shocks. In the first rectangle exchange rate responds significantly to the oil price shocks. It caused the currency to appreciate significantly. The implication is that a sudden upsurge in the oil price will cause the exchange rate of Nigeria to fall significantly which means the naira appreciates significantly when there is oil price shock.

In the second rectangle of the last row the response of GDP is explained. The result shows that the GDP rises significantly to the oil price shock. The implication is that whenever there are oil price shocks in Nigeria the GDP rises. It is evident from the figure that the response is also significant like the response of exchange rate to oil price shocks.

Generally, from the impulse response function, these are the most important responses noticed in Fig. 2 other responses that are significant are the own responses. The next step is the forecast error variance decomposition FEVD. The result is presented in Table 8.

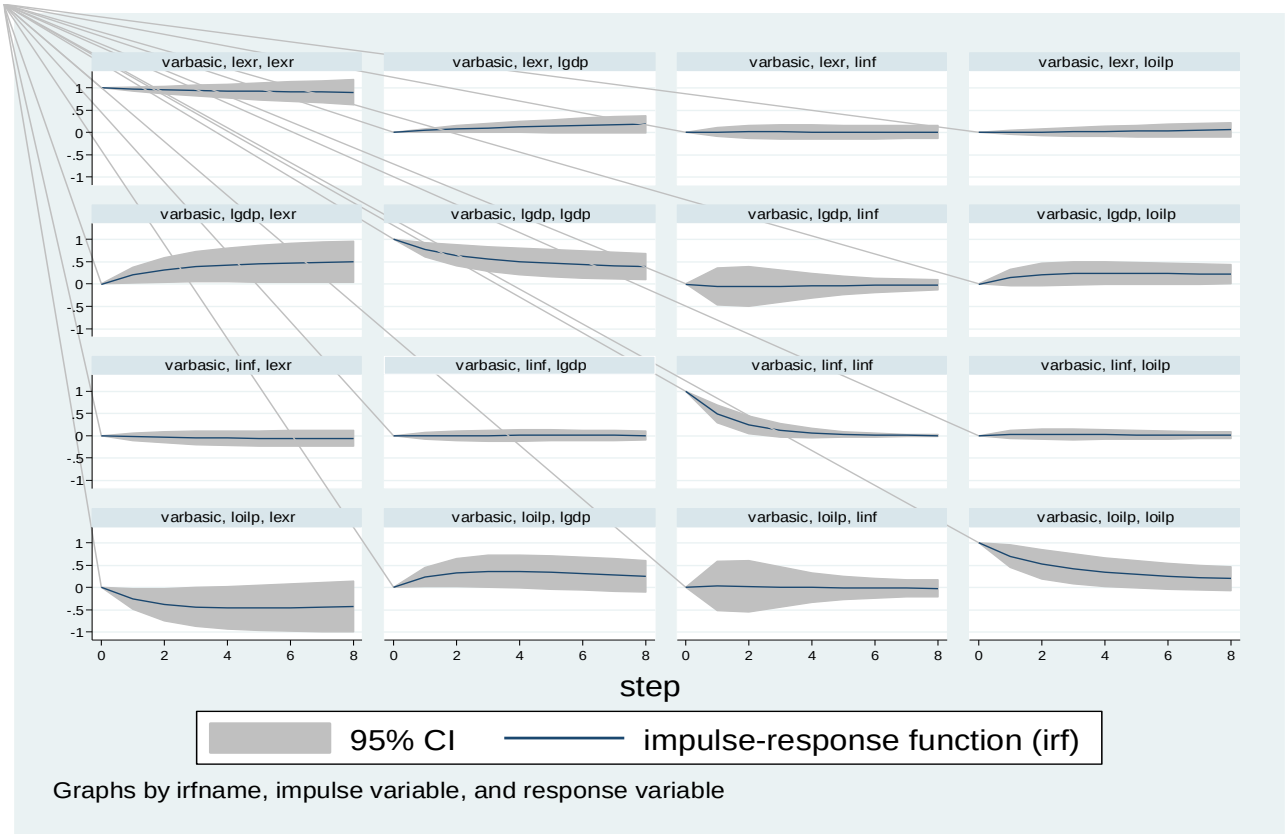


Fig. 2. Impulse response function IRF. Author's Computation.

TABLE 8: FORECAST ERROR VARIANCE DECOMPOSITION FEVD FOR OIL PRICE SHOCK CONTRIBUTIONS

Period	GDP	EXR	INF
1	0.380609	0.036478	0.011765
2	0.525845	0.187788	0.013498
3	0.619866	0.22246	0.014653
4	0.66392	0.221992	0.014583
5	0.685239	0.213638	0.015073
6	0.695889	0.203758	0.015531
7	0.700626	0.1938	0.015697
8	0.701652	0.184189	0.015733

Author's Computation.

Table 8 shows the contributions of oil price shocks to the behaviours of each of the macroeconomic variables. Considering the figures, it is obvious that GDP has the highest figures follow by exchange rate and inflation rate. The result is supporting the findings from the IRF which shows that both GDP and the exchange rate respond significantly to the shock from the oil price**.**

V. CONCLUSIONS

Results from the analysis have shown that oil price is an important variable affecting the macroeconomic variables in Nigeria and by extension the Nigerian economy in general. Firstly, the result shows that oil price have significant impact on the GDP of Nigeria. The result is also in line with the findings of Omolade and Ngalawa [25] where it was established that the most important exogenous variable determining the behaviour of the Nigerian economic growth is oil price. Although the study did not establish a direct relationship, the study establish pass through from exchange rate to the GDP and consequently concluded that oil price is an important factor perturbing the Nigerian economy.

Furthermore, the results show that oil price shock caused the GDP to rise. This is an indication and confirmation of the Dutch Disease existence in Nigeria [26]. It speaks volume of the affirmation of the consensus of some studies such as [27] that the resource curse theory is evident in Nigeria economy. From the findings of this study, Nigeria economy is oil dependent.

Secondly, the result confirms that there exists a significant response form exchange rate whenever there are oil price shocks in Nigeria. The implication of this is that Nigeria exchange rate is very responsive to oil price shocks. The shock caused the exchange rate to appreciate significantly. The combination of the reactions of the GDP and exchange rate to the oil price shock further confirms the existence of Dutch Disease in Nigeria. The study has shown oil price is a major dominant factor that affects the behaviour of major macroeconomic variables such GDP and exchange rate in Nigeria. According to [28] who shared the same findings with this study in their empirical paper, it was concluded that the Nigeria economy is suffering from the grip oil price changes due its effect on the exchange rate. This is the main reason why the value of naira is very vulnerable to external shocks like oil price. Currently the oil price is at its lowest ebb of 26 USD per barrel within the past two decades and the naira is also at its worst value of 430 naira to 1 USD due to the negative effect of COVID-19 on global oil market [29].

Thirdly, inflation rate has been shown as a macroeconomic variable that is not directly influenced by oil price shocks. This conclusion is in line with [2] where it was concluded that inflation rate is not directly influenced by the oil price shocks but via the reactions of other variables in the monetary transmission channels. However, this is not to say that domestic prices in Nigeria are not affected by oil price, but the effect might not be direct.

Finally, a strong association has been established between exchange rate and GDP of Nigeria. One of the major determinants of GDP according to the findings from this study is exchange rate. This further underscore the vulnerability of the Nigerian economy to changes in the foreign exchange market. From the work of [17] resource dependent economies across the globe usually have their local currencies value highly subservient to activities in the foreign exchange market because the price of the commodity they depend on is fixed at the international market . In other words, they do not as a producer determine the price of their commodities. This singular reason makes their economy generally highly susceptible to external shocks. This scenario is the same with Nigeria as an oil dependent economy according to the findings of this study.

REFERENCES

[1] Udeaja, E. A., & Isah, K. (2019). Revisiting the Accuracy of Inflation Forecasts in Nigeria: The oil Price Exchange Rate Perspectives. Working Papers 065, Centre for Econometric and Allied Research, University of Ibadan.
[2] Ayadi, O. F. (2005). Oil price fluctuations and the Nigerian economy. OPEC review, 29(3), 199-217.
[3] Baldwin, R. E., & Forslid, R. (2000). Trade liberalisation and endogenous growth: A q-theory approach. Journal of International Economics, 50(2), 497-517.
[4] Central Bank of Nigeria CBN (2019) Annual Statistical Bulletin. Volume 12, issue 6.
[5] Mesagan, P., Unar, A., Idowu, J., & Alamu, A. (2019). Oil resource abundance in Nigeria and Iran: contrapuntal effect on social and economic welfare. BizEcons Quarterly, 4, 3-22.
[6] Amuzegar, J. (2001). OPEC as Omen. Foreign Affairs, 95-111.
[7] Akpan, E. (2009) oil price shocks and Nigeria's macroeconomy, journal of economics, Ibadan, 4(2), 12-19.
[8] Aleksandrova, H (2016) Oil price shocks and macroeconomic performance in Nigeria. Economía Mexicana Nueva Época, volumen Cierre de época, número II de 2013, pp 565- 624.
[9] Oriakhi, D. E., & Osaze, I. D. (2013). Oil price volatility and its consequences on the growth of the Nigerian economy: An examination (1970-2010). Asian economic and financial review, 3(5), 683.
[10] Apere. O., & Ijomah I. A. (2013). The effects of oil price shocks on monetary policy in Nigeria. International Review of Social Sciences and Humanities, 5(1), 58-66.
[11] Olomola, P. A. (2006). Oil price shock and aggregate economic activity in Nigeria. African Economic and Business Review, 4(2), 40-45.
[12] Olomola, P. A., & Adejumo, A. V. (2006). Oil price shock and macroeconomic activities in Nigeria. International Research Journal of Finance and Economics, 3(1), 28-34.
[13] Adusei-Asante, K and George, Y. (2007). Towards aid effectiveness: Contested theories and concepts: A case study of Ghana's community–based rural development project.
[14] Findlay, Ronaid (1984), "Intermediate Imports and Macro-Economic Policy under Flexible Exchange Rates". The Canadian Journal of Economics, Vol. 10, 1977, pp. 208-221.
[15] Chuku, C. A., Akpan, U. F., Sam, N. R., & Effiong, E. L. (2011). Oil price shocks and the dynamics of current account balances in Nigeria. OPEC Energy Review, 35(2), 119-139.
[16] Kilishi, A. A. (2010). Oil price shocks and the Nigeria economy: A variance autoregressive (VAR) model. International Journal of Business and management, 5(8).

[17] Iwayemi, A., & Fowowe, B. (2011). Impact of oil price shocks on selected macroeconomic variables in Nigeria. Energy policy, 39(2), 603-612.
[18] Van Wijnbergen, S. (1984). Inflation, employment, and the Dutch Disease in oil-exporting countries: A short-run disequilibrium analysis. The quarterly journal of economics, 99(2), 233-250.
[19] Elbourne, A. (2007). The UK housing market and the monetary policy transmission mechanism: An SVAR approach. Journal of Housing Economics, 17 (8), 65–87.
[20] Mordi, C.N.O., Adebiyi, M.A. (2010). The Asymmetric effects of oil price shocks on output and prices in Nigeria using astructural VAR model. Centarl Bank of Nigeria Economic and Financial Review, 48 (1), 1–32.
[21] Sims, C.A. (1980). Macroeconomics and Reality. Econometrica, 48 (1), 1–48.
[22] Stock, J. H., & Watson, M. W. (2001). Vector autoregressions. Journal of Economic perspectives, 15(4), 101-115.
[23] Wouter. J. (2011). The cyclical behavior of debt and equity finance. American Economic Review, 101(2), 877-899.
[24] Cheng, H (2006). Oil prices and real exchange rates. Energy economics, 29(3), 390-404.
[25] Omolade, A., Nwosa, P., & Ngalawa, H. (2019). Monetary Transmission Channel, Oil Price Shock and the Manufacturing Sector in Nigeria. Folia Oeconomica Stetinensia, 19(1), 89-113.
[26] Sala-i-Martin, X., & Subramanian, A. (2013). Addressing the natural resource curse: An illustration from Nigeria. Journal of African Economies, 22(4), 570-615.
[27] Opeyemi, A. Y. (2012). Empirical analysis of resource curse in nigeria. Economics and Management Sciences, 1(6), 19-25.
[28] Ogundipe, O., Ojeaga, P., & Ogundipe, A. (2014). Oil price and exchange rate volatility in Nigeria. Journal of Economics and Finance (IOSR), 5(4), 01-09.
[29] IMF (2020). International Monetary Fund economic report: Africa focus. Special Issue No. 49, 1–29.