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IMPACT OF OIL PRICE SHOCKS ON SELECTED MACROECONOMIC VARIABLES IN FROM 1970-2016

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ABSTRACT

This study examines the impact of oil price shock on some selected macroeconomic variables in Nigeria within the period 1970 to 2016. Using annual data and employing the SVAR methodology, the study finds that oil price shock has significant effect on exchange rate, inflation rate and GDP both in the short and long run. The diagnostics teste on the estimated result suggests that the estimated robust and consistent with both economic theory and empirical evidence and there is no diagnostic problem. The study therefore, recommends that policy should be formulated by the Nigerian government against the happenings in the international oil market and design counteracting policies to cushion the effects that might emanate from the oil shocks. Also, Nigeria should diversify its economy from oil base to non-oil base.

Introduction

Oil is the most important global commodity, because it is a major source of energy for domestic and industrial consumption. Furthermore, Oil prices has profound impact on domestic macroeconomy of both exporters and importing countries. In Nigeria, since 1973 oil price shocks, Nigeria's fortunes heavily dependent on the revenues from oil exports for its economic wellbeing. It has over the past five decades contributed an average of about 25% to 40% of Nigeria's Gross Domestic Product (GDP), representing the highest contributor after crop production. It's also the largest export commodity both in quantum and value as well as largest foreign exchange earner for Nigeria. Moreover, the annual budgets of the country are carried out using oil price bench mark. According to organization of petroleum exporting countries (OPEC) statistical bulletin, 2018, the oil and gas sector accounts for about 35 percent of gross domestic product, and petroleum exports revenue represents over 90 per cent of total exports revenue in Nigeria.

Furthermore, given the importance of oil in the Nigerian economy, it is apparent that, oil price shocks exert great influence on macroeconomic variables in the country. An oil price shocks simply means an upward or downward deviation from the expected prices of oil in the international oil market. While, Macroeconomics variables is synonymous to macroeconomic aggregates these are indicators used in measuring the performance of the economy such as GDP, inflation, exchange rate, interest rate, etc. Measuring the impact of oil price shocks on macroeconomic variables is particularly relevant in the case of Nigeria. As a small open economy, it has no real influence on the world price of oil, whereas, it is greatly affected by the effect of oil price shock both as an exporter of crude oil and importer of refined petroleum products. It thus implies by simple reasoning that oil price shock whatever the nature (either a rise or fall) can both benefit and hurt the economy at the same time.

There are plethora of studies (Hamilton, 1983; Gisser & Goodwin, 1986; Mork, 1989; Ferderer, 1996, Kilian, 2009, etc) carried out on the impact of oil prices on macroeconomic variables, however, most of the research were on net importing countries, especially the United States and Organisation for Economic

Cooperation and Development (OECD) countries, whereas, very few concentrated on the net exporting countries, such as Nigeria, Therefore, this research work seeks to contribute to the existing literature on Nigeria through answering the following questions: i. What are the effects of oil price shocks on GDP, inflation and exchange rate? ii. Is there short run and long run impact of oil price shocks on the selected macroeconomic variables? The study is structured as follows, section two is the review of literature on oil price and macroeconomy, section three is the methodology of the study, section four is discussion of the estimated result, section is the conclusions from the findings of the study.

Literature Review

This section presents a general review of the previous empirical studies on oil prices and macroeconomic variables in both developed and developing countries. In an attempt to explain the impact of oil price shocks on macroeconomic variables of six oil importers and exporters MENA countries: Tunisia, Morocco, Algeria, Bahrain, Saudi Arabia and Iran by Brini, Jemmali and Farroukh (2016), from 2000: I to 2015:IIV (monthly) , using Structural Vector Autoregressive (SVAR) model. The impulse response functions (IRFs) reveal that, in the long run, oil fluctuations have the major impact on real exchange rate of oil-importing countries (Tunisia and Morocco) while the impact on inflation is smaller and absorbed by the rigidity of subsidized products prices. The Variance decomposition (VDC) result also asserts that oil price shocks do not explain notably the variance in the two considered variables in Algeria and Iran. They further identify an impact in two variables both statistically significant and economically large in the rest of the country. In the same vein, Nchor, Klepac and Adamec (2016), examine the dynamic relationship between oil price shocks and macroeconomic variables in the Ghanaian economy from 1980 – 2014, using Vector Autoregressive (VAR) and Vector Error Correction (VECM) models. The study reveals asymmetric effects of oil price shocks on the macroeconomic variables. Furthermore, Aimer (2016) examines the effect of fluctuations in oil prices on Libya's economic growth using annual data from 2000 to 2015, employing (VAR) model and co-integration techniques. The estimates suggest that higher oil price has a positive and statistically important impact on the economic growth of Libya. On the other hand, Taghizadeh-Hesary and Yoshino (2015), examine the impact of crude oil price movements on two macroeconomic variables, GDP growth rate and the consumer price inflation rate, in three countries, China (an emerging economy), Japan, and the United States (developed economies), N-variable SVAR model was used and the results suggest that the impact of oil price fluctuations on developed oil importers' GDP growth is much milder than on the GDP growth of an emerging economy. On the other hand, however, the impact of oil price fluctuations on the China's inflation rate was found to be milder than in the two developed countries that were examined.

To analyze the macroeconomic impact of oil shocks in four of the largest oil-consuming Asian economies, Cunado, Jo and de Gracia (2015) employ SVAR model. The main results suggest that economic activity and prices respond very differently to oil price shocks depending on their type. On the other hand, Shafi, Liu, Idrees, Satti, and Nazeer (2015), examine the impact of exchange rate volatility and oil prices fluctuations on economic growth in France from 1971 – 2012, employing Engle and Granger cointegration technique. The major finding indicates that relationship is significant in the long run and its error correction adjustment mechanism (ECM) in short run is significant and correctly signed for France.

Furthermore, Craveiro (2013), estimate the effects of oil shocks on GDP, employment and inflation for the Portuguese economy from 1984: I-2012: IV, using SVAR model. The results envisage a depressive effect on the level of GDP in the long run. As for the consumer prices, the results translate into higher inflation in the first two years subsequent to the shock, but, the effect shows to be temporary, since as from the third year, the impact reduces slowly, with a virtually nil long-term effect on the price level. In the same vein, Roach (n.d), examines the impact of oil price shocks on key Jamaican macroeconomic variables over the period 1997: I - 2012: VI, utilising SVAR models. The result also indicates that oil price shocks largely do not have a permanent effect on the Jamaican economy. Yoshizaki and Hamori (2013), investigate the effects of oil price shocks on the production, price level, and exchange rate of eight important industrialized countries, using SVAR models. The main finding reveal that, the effect of oil price shocks on exchange rates also depends on where the changes fundamentally come from. While, Yıldız and Ulusoy (2013), focus on the impact of oil price changes in Turkish macro economy from 2003: I to 2013: I. VAR Model is use. The

findings demonstrated the fragility of Turkish economy to oil price volatility with its significant results in the relationship between oil price and main macroeconomic indicators (Brent Oil Price, Gross Fixed Capital Formation, Interest Rate, US GDP and Inflation). Equally, Archanska, Creel and Hubert (2012), identify the main driving force behind oil price shocks in 1970–2006 by applying structural break test and time varying parametrs. The identification hypothesis states that supply-driven oil price shocks have a negative impact on the macroeconomic activity of countries, which are net consumers of oil while demand-driven oil price shocks do not have negative effects.

Another study conducted by Bouzid (2012), examines the causal relationship between oil prices and economic growth in Tunisia over a period from 1960 to 2009, employing granger casualty technique. The results show the existence of a long-term relationship between energy prices and economic growth and Granger pair wise causality test reveal unidirectional causality from real GDP to oil prices. In different manner, using SVAR and EGARCH models, Ahmed and Wadud (2011), examines the impact of oil price uncertainty on Malaysian macroeconomic activities and monetary responses from 1986-2009 (monthly). The EGARCH estimates show an important asymmetric effect of oil prices shocks on the conditional oil price volatility and the dynamic impulse response functions obtained from the SVAR model show a prolonged dampening effect of oil price volatility shock on Malaysian industrial production. Equivalently, Izraf and Abu Bakar (2011), also affirmed the asymmetric effects of oil price shocks on real economic activities in Malaysia from 1991 to 2007, (VAR) model. In another way, Mohaghegh and Mehrara (2011), examine the macroeconomic dynamics in oil exporting countries using Panel VAR approach. On the basis of IRF and Variance VDC analysis in a system included economic output, money supply, price index and oil price, they found that: oil shocks are not necessarily inflationary; money is not neutral in these countries; money is the main cause of macroeconomic fluctuations; oil shocks significantly affect economic output and money supply; though oil price is highly driven by its own shocks, domestic shocks, particularly output and money shocks, can sizably affect oil price in the world market.

In order to explore the role of oil in the Kazakh economy Gronwald, Mayr and Orazbayev (2009), analyse the effect of oil price declines on key macroeconomic variables such as real GDP, inflation and real exchange rates from 1994: I - 2007: IV using VAR models. The key findings are; that the price of oil is influenced by a large number of factors, which results in a considerable degree of volatility and all variables considered in the VAR model exhibit a strong negative significant reaction on oil price declines. In contrast, Ito (n.d), empirically examine the impact of oil prices on the macroeconomic variables in Russia from 1994: I to 2009: IV, using VAR model. The finding is that, a 1% increase (decrease) in oil prices contributes to the depreciation (appreciation) of the exchange rate by 0.17% in the long run, whereas it leads to a 0.46% GDP growth (decline). Likewise, in the short run (8 quarters) rising oil prices cause not only the GDP growth and the exchange rate depreciation, but also a marginal increase in inflation rate.

Papapetrou (2009), investigates the relationship between oil prices and economic activity in Greece from 1982: I to 2008: IIIV, a regime-switching model (RSR) and a threshold regression modeling (TA-R) The empirical evidence suggests that the degree of negative correlation between oil prices and economic activity strengths during periods of rapid oil price changes and high oil price change volatility.

Examining the relationship between oil price and economic growth in Nigeria for the period 1974-2014, Gummi, Buhari and Muhammad (2017), employing granger causality technique. The findings indicate that, there is no long-run relationship among the variables. However, granger causality test indicate a significant unidirectional causality running from oil price to economic growth in the short run. In addition, there is a significant positive unidirectional causality running from human capital to economic growth in Nigeria. Also, the findings indicate a significant positive unidirectional causality running from oil price to total exports in Nigeria. Equally, Ogboru, Rivi and Idisi (2017), empirically examine the impact of changes in crude oil prices on economic growth in Nigeria from 1986 to 2015. Granger Causality Test and the Vector Error Correction Model (VECM) are employed as techniques of analysis. The findings show the existence of co-integration among the variables (crude oil price, inflation rate, real effective exchange rate, fuel pump

price and GDP growth rate) while the empirical results suggest that the ECT coefficients have negative signs and are statistically significant in all VECMs. The study also finds out that a positive and unidirectional relationship runs from crude oil prices to GDP growth rates exists. Likewise, Chikwe, Ujah and Uzoma (2016), analyse the effect of oil price on Nigerian macroeconomic variables from 1990-2015, using multiple regression technique. The result reveals that there is significant relationship between international oil price and macroeconomic variables.

Similarly, Olanipekun (2016), examines the relationship between oil price shocks, exchange rate, external reserve and real GDP in Nigeria using data from 1971: I to 2014: IV and employing SVAR model. The findings reveal that oil price shocks had negative effect on external reserve, exchange rate and economic growth. The negative effect of oil price shocks on external reserves and economic growth tended to be more significant in the long run. It also reveals that oil price shocks had a deleterious effect on the macroeconomic performance of Nigeria. Providing analytical insight on modelling macroeconomic and oil price volatility in Nigeria, Alhassan and Abdulhakeem (2016), employ GARCH model and its variants (GARCH-M, EGARCH and TGARCH) with daily, monthly and quarterly data. The findings reveal that: all the macroeconomic variables considered (real gross domestic product, interest rate, exchange rate and oil price) are highly volatile; the asymmetric models (TGARCH and EGARCH) outperform the symmetric models (GARCH (1 1) and GARCH – M); and oil price is a major source of macroeconomic volatility in Nigeria. Similarly, Nwanna and Eyedayi (2016), investigate the impact of crude oil price volatility on economic growth of Nigeria spanning from 1980 to 2014, using multiple regression models. The findings reveal that there is a positive and significant relationship between oil price and economic growth.

Examining the macroeconomic implications of symmetric and asymmetric oil price and oil revenue shocks in Nigeria between the period of 1970 and 2010 with the use VAR estimation technique, Akinleye and Ekpo (2013), establish that positive rather than negative oil price shocks have a stronger short and long run effects on real GDP, and therefore triggering inflationary pressure and domestic currency depreciation as importation rises. In a different manner, ThankGod and Maxwell (2013), investigate the time-series relationship on the impact of oil price volatility on macroeconomic activity in Nigeria from 1970 – 2009, employing exponential generalized autoregressive conditional heteroskedasticity (EGARCH), IRF and lag-augmented VAR (LA-VAR) models. The findings reveal that, there is a unidirectional relationship exists between the interest rate, exchange rate and oil prices, with the direction from oil prices to both exchange rate and the interest rate. However, a significant relationship between oil prices and real GDP was not found. Similarly, using monthly data, Apere and Ijomah (2013), examine the impact of oil price volatility on macroeconomic activity in Nigeria during the period 1970-2009, using EGARCH model, IRF and Lag-Augmented VAR. The results indicate unidirectional relationship between interest rate, exchange rate and oil price with direction from oil prices. Also, oil price has no significant impact on real GDP.

Furthermore, Oriakhi and Osaze (2013), examine the consequences of oil price volatility on the growth of the Nigerian economy within the period 1970 to 2010, using quarterly data and employing a VAR methodology, the study finds that of the six variables employed, oil price volatility impacted directly on real government expenditure, real exchange rate and real import, while impacting on real GDP, real money supply and inflation through other variables, notably real government expenditure. This implies that an oil price change determines government expenditure level, which in turn determines the growth of the Nigerian economy. This result seems to reflect the dominant role of government in Nigeria. In another way, Taiwo, Abayomi and Damilare (2012), analyse the impact of crude oil price, stock price and some selected macro economics variables on the growth of Nigeria economy from 1980 to 2010. Johansen Cointegration Test and Error Correction Model are used. The findings indicate that crude oil price, stock price and exchange rate have significant influence on the growth of the Nigerian economy.

Finally, Adeniyi (2011), used Multivariate Threshold Autoregressive Model (MTAM) to examine the threshold effects and linkage between oil price shocks and output growth in Nigeria from 1985-2008, The findings established that oil price shock do not significantly affect movement of macroeconomic aggregates

in Nigeria. In the same degree, Iwayemi and Fowowe (2011), examine the effects of oil price shocks on a developing country oil-exporter, Nigeria from 1985: I – 2007: IV. The findings show that oil price shocks do not have a major impact on most macroeconomic variables in Nigeria. The results of the Granger-causality tests, IRFs, and VDC analysis all show that different measures of linear and positive oil shocks have not caused output, government expenditure, inflation, and the real exchange rate. The tests support the existence of asymmetric effects of oil price shocks because they find that negative oil shocks significantly cause output and the real exchange rate. In the same way, Chuku, Effiong and Sam (2010), study the linear and asymmetric impacts of oil price shocks on the Nigerian economy between 1970: I and 2008: IV, employing error correction mechanism and the Granger causality test. The results show that oil price shocks are not a major determinant of macroeconomic activity in Nigeria, and macroeconomic activities in Nigeria do not Granger cause world oil prices. Further, the results from non-linear specification reveals that the impact of world oil price shocks on the Nigerian economy are asymmetric.

METHODOLOGY

Introduction

This section deals with models specification, sources and methods of data collection as well as data analysis techniques.

Model Specification

Following the studies by Baumeister and Peersman (2013); Brini, Jemmali and Farroukh (2016), this study adopted structural vector autoregressive (SVAR) model as follows .

$$A_oX_t = A_1X_{t-1} + A_2X_{t-2} + \ldots + A_qX_{t-q} + \epsilon_t \quad (1)$$

Where $X_t = (\Delta OILP, \Delta EXR, \Delta INF, \Delta GDP)$ an (n*1) vector including oil price, exchange rate, inflation and GDP. A_i is the (4*4) matrix of coefficients for i = 0, 1, … , q and $\epsilon = (\epsilon_t^{OILP}, \epsilon_t^{EXR}, \epsilon_t^{INF}, \epsilon_t^{GDP})$ represents vector of structural disturbances. The reduced form of equation 1 is:

$$X_t = B(L)X_{t+t} \quad (2)$$

Where B(L) is $A_o^{-1} A_1(L)$ and $A_1(L)$ is a matrix of polynomial in the lag operator and Observed residual ϵ is Structural innovations/shocks or fundamental shocks.

In order to proceed with identification of oil price shock we impose the short run restrictions on the endogenous variables included in SVAR.

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ b_{21} & 1 & 0 & 0 \\ b_{31} & b_{32} & 1 & 0 \\ b_{41} & b_{42} & b_{43} & 1 \end{bmatrix} \begin{bmatrix} \mu_{0ILP} \\ \mu_{EXR} \\ \mu_{INF} \\ \mu_{GDP} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \epsilon_{0ILP} \\ \epsilon_{EXR} \\ \epsilon_{INF} \\ \epsilon_{GDP} \end{bmatrix}$$

The oil oil price is assumed to be exogenous and eror term of international oil price will be equal to its structural error term. The reduced eror term for oil price can be expressed as follows:

$$_{OILP} = \epsilon_{OILP} \quad (3)$$

Furthermore, the reduced error term of the exchange rate, inflation and GDP can be expressed as follows:

$$_{EXR} = -b_{21\ OILP} + \epsilon_{EXR} \quad (4)$$

$$_{INF} = -b_{31\ OILP} - b_{32\ EXR} + \epsilon_{INF} \quad (5)$$

$$\mu GDP = -b_{41\ OILP} - b_{42\ EXR} - b_{43\ INF} + \epsilon_{GDP} \quad (6)$$

The equations (4), (5) and (6) allow us to establish the impact of the variation on exchange rate, inflation and GDP.

Sources and Methods of data collection

This study used secondary data which was collected from the publications of various government agencies as well as other publications from multinational companies. Data on crude oil prices was collected from Bp statistical Bulletin. While the data on Nigeria's Gross Domestic Products (GDP), exchange rates, inflation was collected from National Bureau for Statistics (NBS) and Central Bank of Nigeria (CBN) statistical bulletins respectively.

Data Analysis Techniques

The study employs Augmented Dickey Fuller (ADF) and Philip Peron tests to test for the presence of unit root.

Whereas, structural vector autoregressive model (SVAR) was used to determine the impact of different oil price shocks on macroeconomic variables in Nigeria (Exchange rate, Inflation and GDP). The SVAR is estimated using Autoregressive Distributed Lag Model (ARDLM) to estimate the impulse response and variance decomposition. This helps to determine how one standard deviation shock in the error term of a variable affects other endogenous variables in the model. It was used to forecast the extent of error variance of variables that is due to oil price shocks and it was also used to ascertain the short and the long run impacts of oil price shocks on the said variables.

Data Presentation and Analysis of Result

Introduction

This section presents the empirical results of the analysis beginning with the time series properties of the variables used for the estimation. This is meant to ascertain the appropriateness of the specification and determine the underlying properties of the data generating processes. Following this, the empirical results are presented.

Unit Root Test

Unit root test was conducted for all the variables captured in the model Oil Price (OilP), Exchange Rate (EXR), Inflation Rate (INFR), Gross Domestic Product (GDP) Using Augmented Dickey Fuller (ADF) test and Phillips Perron (PP) test which is presented in Table 1.1 below:

Table 1 Unit Root Test

Augmented Dickey Fuller (ADF)			Phillips Peron (PP)		
Variables	Level	1st Difference	Level	1st Difference	Comment
OILP	-1.853637	-5.985640 *	-2.043823	-5.971842 *	I (1) for ADF and PP
EXR	-0.517796	-4.763172 *	-0.721536	-4.739114 *	I (1) for ADF and PP
INFR	-3.886945	-6.846888 *	-3.164491	-14.06530 *	I (1) for ADF and PP
GDP	-1.745826	-6.877567 *	-1.788320	-6.923711 *	I (1) for ADF and PP

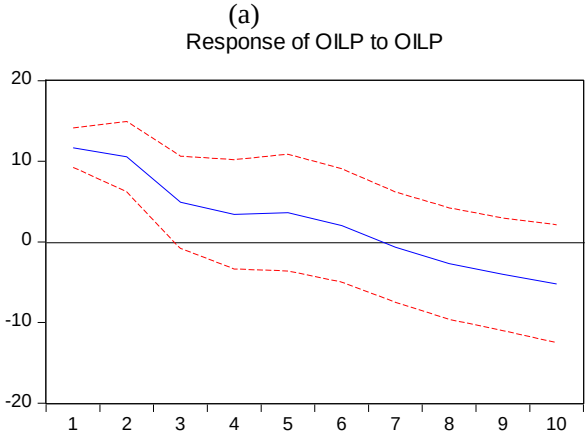
Source: Authors computation from Eviews Note: * means stationary at 10%

Table 1 presents the unit root test for the properties of the series used for the estimation of the relationships between oil prices and macroeconomic variables, both the ADF and PP tests, the unit root hypotheses are accepted for all the series; they are therefore all integrated I (1). reveals that, all the variables are stationary at first difference I (1)

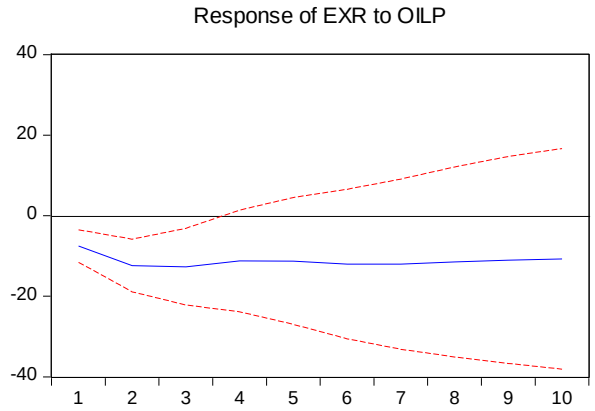
Impulse Response Functions

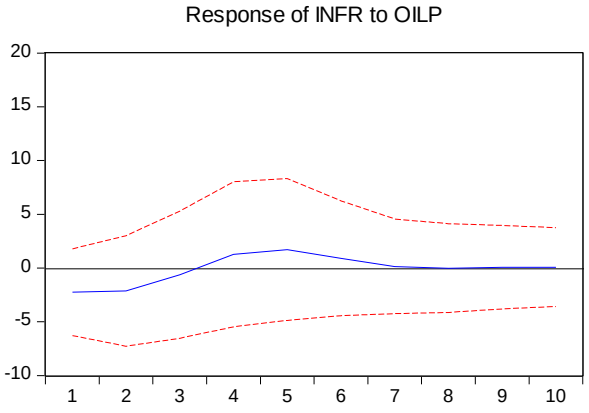
Fig. 1 Response to Cholesky one S.D innovations +/- 2 S.E

(a)

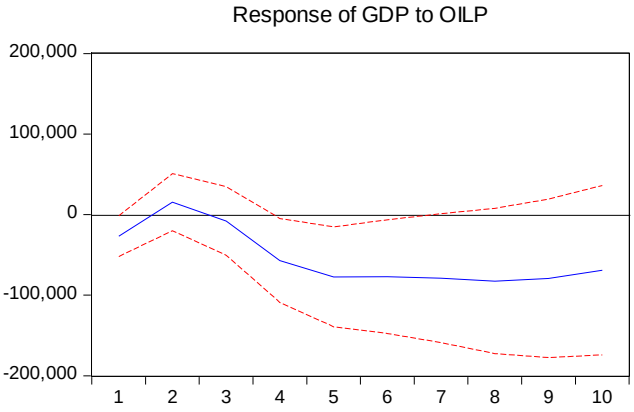


(b)





(c)



(d)

The response function reveals the shock of oil price itself, exchange rate, inflation and GDP as can be seen in fig. 1 (a) to (d). Oil price own shock is presented in fig. 1 (a); the result shows that from first to seven periods, it experienced a positive shock, from that period to tenth, negative shock. Similarly, in the fig. 1 (b) the impulse response of exchange rate to oil price shocks shows that exchange rate significantly responds to oil prices shocks throughout the period. Though, the result shows a negative response from the first to tenth period. This is not unconnected with the fact that, Nigeria is an import deriving economy; so an increase in oil price leads to rise in cost of production of imported products and this will result to massive outflow of domestic currency as a result of increase in prices of those products which will subsequently depreciate the currency.

On the other hand, there was insignificant response to structural one standard deviation innovation in oil prices on inflation from the beginning up to the fourth period and subsequently positive impact up to period seven and tends to mild impact from that period up to period tenth. (Fig.1 (c)). Increase in oil prices contribute to higher levels of government expenditure. Considering the dominant role of the government in the domestic economy, which is beyond the budgetary expenditures and includes great implicit expenditures (e.g various oil subsidies, salaries and wage bills of government employees and special intervention programs e.t.c), recurrent and capital expenditures of the government will rise as oil price rises which translate into increase in inflation rate. 1(d) the GDP shows significant response to structural one standard

deviation innovation in oil prices. GDP responded negatively up to period two and positive response from that period to period three and decline downward to negative and remain fairly stable up to period tenth.

Variance Decomposition

Table 2 (a) Variance Decomposition of OILP

Period	S.E	OILP	EXR	INFR	GDP
1	11.67861	100.0000	0.000000	0.000000	0.000000
5	18.35675	88.08885	5.393233	0.565496	5.952424
10	22.83799	67.50305	21.67160	0.893583	9.931769

Table 2 (b) Variance Decomposition of EXR

Period	S.E	OILP	EXR	INFR	GDP
1	14.56456	26.80718	73.19282	0.000000	0.000000
5	40.61407	37.89958	59.58767	2.233051	0.279700
10	64.38575	30.95863	63.55493	3.477738	2.008708

Source: Authors computation from Eviews

Table 2(c) Variance Decomposition of INFR

Period	S.E	OILP	EXR	INFR	GDP
1	13.64736	2.727626	2.537522	94.73485	0.000000
5	17.48224	4.779628	4.366338	90.03534	0.818691
10	17.73766	4.907939	6.120829	87.72560	1.245627

Source: Authors computation from Eviews

Table 1 Selection of lag lengths for estimation

Number of lags	Akaike Criterion	Schwartz Criterion	Hannan Quinn
1	-10.56*	-9.99*	-10.39*
2	-10.22	-9.21	-9.92
3	-10.27	-8.83	-9.85

Note: * indicates the number of lags selected.

The optimal length of lag selection for the estimation of SVAR, based on the three information criteria, is reported in Table 2. From the table, all the three information criteria, the AIC, HQ and SIC suggest that one lag length is optimal for the test. Consequently, the lag of one is used for the SVAR test based on all the three criteria.

Table 3(d) Variance Decomposition of GDP

Period	S.E	OILP	EXR	INFR	GDP
1	86921.89	9.619464	3.578308	0.055002	86.74723
5	173891.5	33.93259	7.234240	0.438971	58.39419
10	262905.6	58.30408	13.46768	0.474794	27.75345

Source: Authors computation from Eviews

The prime interest of this discussion is the shocks to exchange rates, inflation rate and GDP explained by innovation in oil price. In the first year, in table 3 (b), oil price shock contributes 26.80% to the variation in exchange rate. This however rose to 37.89% by the fifth period, and declined to 30.95% at the tenth period. Furthermore, in table 3 (c); 2.73%, 4.78% and 4.90% variation in the inflation rate are explained by oil price in the first, fifth and tenth periods, respectively. The responses of GDP in table 3 (d) explained by innovation in oil prices is 9.62%, 33.94% and 58.30% in the first, fifth and tenth periods respectively. This shows that 58.30% of the variation in GDP could be attributed to oil price changes.

Post Estimation Diagnostic Test

Table 3 **Serial Correlation Test**

Lags	LM-Stat	Prob. (from chi-square with 16 df)
1	26.57993	0.0464
2	21.26879	0.1684
3	15.48593	0.4894
4	15.60910	0.4806
5	7.412969	0.9645
6	9.155226	0.9069
7	25.85815	0.0561
8	16.04020	0.4502
9	23.73855	0.0954
10	30.44180	0.0158
11	63.54722	0.0000
12	19.13312	0.2618
13	42.60729	0.0003
14	17.60645	0.3474
15	19.73617	0.2323
16	18.66450	0.2864
17	22.87342	0.1172
18	32.56565	0.0084
19	58.73202	0.0000
20	37.93430	0.0015

Source: Authors computation from Eviews

In Table 4 most of the probabilities of the corresponding lags exceeded 0.05, therefore, the null hypothesis is accepted. Thus, there is no evidence of serial correlation.

Table 5

Autoregressive Conditional Hetroskedasticity Test

Chi-sq	Df	Prob.
169.1457	160	0.2950

Source: Authors computation from Eviews

In Table 4 the joint test for autoregressive conditional hetroskedasticity indicates the absence of hetroskedasticity with 0.2950 probabilities. Thus, the null hypothesis is accepted.

Discussion of Major Findings

To measure the effects of oil price shocks on some selected macroeconomic variables (exchange rate, inflation rate and GDP). As reveals by the variance decomposition in table 5 (a)-(d), there exist significant effects of oil price shocks on the said macroeconomic variables. Similarly, impulse response functions also display the existence of significant effects of the oil price shocks on the selected macroeconomic variables. Hence, the null hypothesis is rejected. It can be concluded that, that the shocks of oil prices have significant effect on the selected macroeconomic variables. This finding is in line with that of Brini et.al (2016), Aimer (2016), Guo and Kliesen (2005),Cunado and de Gracia (2005) and Nwanna and Eyadeyi (2016). Those that contravene this findings are Thank God and Maxwell (2013), Apere and Ijomah (2013) and Adeniyi (2011).

Furthermore, in order to ascertain short run and long run impact of oil price shocks on gross domestic product (GDP), inflation and exchange rate; impulse response has also been employed. The impulse response functions reveals the presence of both short and long run impact of oil price shocks on the selected macroeconomic variables; except that of inflation which exhibit a mild impact in the long run. Hence, the null hypothesis is rejected .Thus, there is short and long run impact of oil price shocks on the selected macroeconomic economic variables. This finding is in conformity with the studies carried out by Olanipekun (2016) and Ekpo (2013) and disagrees with Gummi et. al (2015).

Conclusion

Overall, these results lead to the conclusion that the Nigerian economy is greatly vulnerable to oil price shocks. The exchange rate falls significantly (domestic currency depreciates) for the entire period. The implication of this finding is that there is likelihood for potential currency crisis after a shock occurs in the international oil market. This depreciation increases the price of imports. On the contrary, the result shows the opposite for inflation, which is affected both positively and negatively by the oil price shock. This finding indicates a dependence of the economy on the import sector. In the same vein, the response of the GDP to oil price shocks shows a high dependence of the Nigerian government on oil. Moreover, the results of the variance decomposition also assert a strong influence of oil price shocks on the selected macroeconomic variables in Nigeria.

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