Structural Effect of Oil Price Shocks and Food Importation on Economic Growth in Nigeria Using SVAR Model

Sani Abdulrahman Bala✉ , **Ali Alhassan**

Department of Accounting Usmanu Danfodio University Sokoto, Nigeria

Info Articles	Abstract
	The study empirically examines the effect of oil price shocks and food importation on economic growth in Nigeria along with two control variables i.e. exchange rate and inflation using Structural Vector Autoregressive (SVAR) Model covering the period of 1970 to 2015. The result from SVAR short-run pattern and long-run pattern indicate that GDP has recently been affected by all variables in the model. More also, it indicates a significant permanent effect of crude oil price shocks and food imports on economic growth, while the result further indicates a transitory effect of exchange rate and inflation on economic growth. For significant t-value of the long run SVAR estimate matrix, confirms long effect of crude oil price shocks, food imports, exchange rate and inflation on economic growth in Nigeria. The results from structural response indicate that crude oil have high positive impact on GDP at the initial period and negative impact at the end of the period. Furthermore, food imports have high negative effect on GDP, while GDP response negatively to exchange rate and inflation rate from the period. The result from the structural decompositions indicates that crude oil price and food imports and exchange rate contribute more variability to GDP, while inflation contribute less variability in explaining the variation of GDP in Nigeria. The study recommends that government should come up with a policy that will focus on alternative sources of government revenue by investing more in real sectors especially agriculture in order to withstand vicissitudes of oil shocks in future.

✉ Address Correspondence:
E-mail: sonyaxle9@gmail.com

INTRODUCTION

Oil represents one of the most important macroeconomic factors in the world economy, and the crude oil market is the largest commodity market in the world (Oriavwote and Eriemo, 2012). What makes oil price changes even more interesting is not only their direct impact on economic activity, but also the changes in oil prices might reflect or even forecast changes in the intercontinental macroeconomic stability (Steven, 2008). Oil-exporting nations usually accumulate foreign reserves when oil prices rise and during periods of falling prices, they tend to reduce foreign reserves holdings while trying to manage the depreciation of local currency caused by unfavourable balance of payment (Sascha, Maurizio & Livio, 2015). Furthermore, exchange rate volatility occasioned by unfavourable oil price movements not only contributes to increasing the foreign exchange risk of businesses but also leads to higher cost of living when an economy is import dependent like Nigeria.

Oil prices have become so important to the Nigerian economy due to the inevitable direct impact it has on the national budget (Oriakhi and Osaze, 2013; Ani *et al*, 2014; Ifeanyi and Ayenajeh, 2016).   In theory, changes in oil prices affect exchange rate through a country's terms of trade or through what we call "the wealth effect" in which there is a transfer of wealth from oil-exporting nations to oil-importing nations when oil prices fall and vice versa (Ebele, 2015; Augustine, 2015). International oil prices witness a sharp fall during the global economic crisis of 2008. This led to a fall in oil revenues and unfavourable exchange rate movements for major oil-exporting economies especially those that were not well-diversified. The situation was worse for some OPEC economies with low levels of accumulated foreign reserves like Nigeria. Food production has become a major problem in Nigeria and massive foreign exchange earnings from oil are being utilized in importing food. More so, UNCTAD (2013) stated that in order for Africa to create a future in which man, woman and child have the chance to lead a healthy and productive life, there must be a transformation in Africa's ability to produce food. Rising food prices due to supply constraints to the domestic market will have the effect of fuelling inflation, especially in low income countries like Nigeria where food accounts for large share of the consumer basket (Oluwaseun, Adeyemi & Evans 2013). On the other hand, increasing of exports and adjusting for efficient resource allocation generate comparative advantage which eventually can result to a high surplus production (Nirodha, Jaime & Jeff, 2013).

Oil export revenue dropped from US$74,033 million in 2008 to US$43,623 million in 2009 and the naira depreciated to N148.902 in 2009 from N118.546 in 2008 (OPEC 2013). The average oil price between November 2010 and October 2014 was $91 and for 18 months of that period, prices were more than $100 per barrel. In all of these cases, oil prices exceeded $90 per barrel in real 2015 dollars for extended periods. Oil prices rose from $50 to $115 per barrel (in real 2015 dollars). Nigeria`s economy developed if the price would steady rose up $40 per barrel. There seems to be a ray of hope for the Nigerian economy as the price of crude oil continues to ride steadily. Oil prices rose close to $40 per barrel on March 7. The reduction in the output of US production increased the North American crude benchmark. Brent crude which is the benchmark in the pricing of Nigerian oil increased by nearly 0.76 percent and reached some of the highest levels since early January and standing at $39.48 per barrel. The increase in the price of oil in the international market is a welcomed development for Nigeria as it should be recalled that the 2016 budget is fixed at $38 per barrel (Taiwo and Olumuyiwa, 2015; EIA, 2016).

Several studies have been carried out on this area, however, the previous studies adopted OLS regression techniques and VAR model, though the VAR model have emerged as a dominant research strategy in empirical macroeconomics but suffer from the large number of parameters employed and the result estimated uncertainty associated with their impulse response. The impulse responses generated by such a VAR do not possess a structural interpretation and it does not structure inference. A related approach response to the problem of interpreting VARs has been the development of Structural Vector

Auto Regressions (SVARs), which introduce theoretical restrictions to identify the underlying shocks. The SVAR approach tends to impose just enough restrictions to permit a coherent interpretation of the shocks to the system (Bernhard and Kronberg, 2008). The previous studies like that of Emmanuel (2015); Yusuf, (2015); Oluwaseun, Adeyemi & Evans (2013); Muhammad and Atte, (2006); Olagunju, Oguninyi & Oguntegbe (2015); Umar and Abdulhakeem, (2010) and Ani *et al.* (2014) considered these variables independently without considering the structural interaction or relationship that exists between the variables. Therefore, this study intends to bridge the aforementioned gaps in the literature. Against this background, the study intends to investigate the structural effect of oil price shocks and food importation on economic growth in Nigeria. This study is structured into five sections, thus, one is the introductory section, two is the review of related literature and theoretical framework. Section three concerned with methodology, four presents findings and discussion of results. Finally, section five deal with conclusion, and provides recommendations for policy implications.

LITERATURE REVIEW

Review of Empirical Studies

There exists a sizeable volume of literature on the relationship between oil prices, food imports and economic growth in Nigeria. We examine some of the ongoing discussions below.

Umar and Abdulhakeem, (2010) investigate how oil price shocks affect the macro economy using a VAR approach and found that oil price shocks had strong impact on GDP. Ani *et al.* (2014) examine the causal relationship between four macroeconomic variable including inflation rate, exchange rate, interest rate and real GDP in Nigeria using ordinary least squares and Granger causality approach. Their results show a positive but insignificant relationship between oil price and the Nigerian Gross domestic product. Overall oil prices have no significant impact on Nigerian economy.

Yusuf, (2015) examine the relationship between oil prices, exchange rate and economic growth in Nigeria. The results show that the variables are cointegrated and that oil prices and exchange rate were significant in predicting the economic growth. More so, Ifeanyi and Ayenajeh (2016) investigate the impact of crude oil price volatility on economic growth of Nigeria. The study utilizes secondary data covers a period of 1980 to 2014 using Multiple regressions. The findings of the study reveal positive and significant relationship between oil price and economic growth. Based on the findings the researchers hereby conclude that oil price volatility does not have a positive impact on the economy but oil price itself does

Muhammad and Atte, (2006) conduct study on production of agriculture in Nigeria using OLS regression techniques, the result of the study reveals a negative relationship between food imports and domestic agricultural production and GDP, positive relationship between GDP growth and domestic agricultural production. In addition, population increase, consumer price index and government expenditure are positively related to domestic agricultural production. Based on their findings, they recommended that government should boost agricultural productivity by encouraging farmers with incentives and low interest loans.

Khuram et al., (2015) examine the impact of exchange rate volatility and oil prices fluctuations on economic growth in France based on annual data covering the period of 40 years. The result of the study reveals the significant impact of oil prices shock on economic growth. Cointegration technique results indicate significant relationship in the long run and its error correction adjustment mechanism (ECM) in short runs is significant and correctly signed for France. Also, Muritala, Taiwo, & Olowookere (2012) studied how oil and stock prices affect economic growth using Johansen method of cointegration and found that the variables have long-run relationship. More so, Igberaese, (2013) did a study on the impact of oil prices on Nigeria's economic growth and found out that oil prices significantly impacted growth. Specifically, in the short run, high oil prices spurred growth but not in the long run.

Theoretical Framework

The theoretical underpinning of this study is based on the Linear/Symmetric relationship theory of growth and Heckscher-Ohlin Trade Theory.

Linear/Symmetric relationship theory of growth which has as its proponents, Hamilton (1983), Hooker (1986) and Lee (1987) postulated that volatility in GNP growth is driven by oil price volatility. They hinged their theory on the happenings in the oil market between 1948 and 1972 and its impact on the economies of oil-exporting and importing countries respectively. According to this theory, volatility in oil price has a negative and significant impact on economic growth immediately. In view of this, Lee (1987) confirms the symmetric relationship between oil price volatility and economic growth. After an empirical study of her own, she found that an increase in oil prices lead to a decrease in GDP, while the effect of an oil price decrease on GDP is ambiguous, because its effects varied in different countries. The theory conclude that oil price increases have significant negative impact on economic growth especially for importing countries, while oil price declines a significantly affect economic activity of exporting countries. Mork (1989) after 1986 and increasing oil price volatility. Hooker's analysis could not confirm that only oil price increases have a negative effect on economic growth, while oil price decreases don't affect macroeconomic. More so, the empirical study conducted by Hooker (1994) confirmed Hamilton's results and demonstrated that between 1948 and 1972, oil price variability exert influence on GDP growth. He shows that oil price level and its changes exerted influence on GDP growth significantly.

Heckscher-Ohlin Trade Theory was promulgated by Two Swedish economists, Eli Hecksher and Bertil Ohlin (1919) The theory explains two issues in the theory of comparative advantage. First, what are the factors that determine comparative advantage of countries and second, what are the effects of trade on factor income in the trading countries. The theory focuses on the differences in relative factors endowments and factors prices between nations as the most determinants of trade. The theory emphasizes that countries should produce and export goods that require resources (factors) that are abundant and import goods that require resources in short supply. According to this theory, the main determinant of the pattern of production, specialization and trade among nations is the relative availability of factor endowments and factor prices. Regions or countries have different factor endowment and factor supplies. The theory suggests that a country should specialize in production and export using the resources (factors) that are most abundant, and thus the cheapest. The less develop countries that are labour abundant should specialize in the production of primary products especially agricultural products because the labour requirement of agriculture is high except in the mechanized form of farming.

METHODS

The study empirically examines the effect of oil price shock and food importation on economic growth in Nigeria along with two control variables i.e. exchange rate and inflation over the period of 1970 to 2015. The data employed for this study was secondary data and source from the publication of Central Bank of Nigeria statistical bulletin of various years. The data collected for the study has been analyzed using Structural VAR model with two structural innovations for the specified econometric model. Since time series data are notably not stationary overtime, this study applied unit root tests to test the existence of unit root in the series in order to avoid spurious results. The result was analyzed with the aid of R-Software.

The model to be estimated is represented thus:

GDP=f(COP, FIM, EXCHR, INF)……………………………………………………1

Where GDP: real Gross domestic product, COP: Crude Oil Price, FIM: Food Import, EXCHR: Exchange Rate and INF: inflations.

In order to estimate the equation would be transformed into an econometric equation stated as follows:

$$GDP_t = \alpha_0 + \alpha_1 COP_t + \alpha_2 FIM_t + \alpha_3 EXCHR_t + \alpha_4 INF_t + B\varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 2$$

$\alpha_0 = constant\ term,\ \alpha's =$ the parameters to be estimated, $B\varepsilon_t = structural\ shocks$

In its basic form, a VAR consists of a set of K endogenous variables

$$Y_t = (y_{1t},\dots,y_{2t},\dots,y_{kt})\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots3$$

For k = 1…p

The VAR (p)-process is then defined as:

$$y_t = A_1 y_{t-1} + \cdots A_P Y_{t-p} + u_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots4$$

With A_i are $(K \times K)$ coefficient matrices for i=1… p and u_t is a k-dimensional process with $E(u_t) = 0$ and time invariant positive definite covariance matrix $E (u_t u_t^T) = \sum_u$ (white noise). One important characteristic of a VAR (p)-process is its stability. This means that it generates stationary time series with time invariant means, variances and covariance structure, given sufficient starting values. Recall from the definition of a VAR (p)-process, in particular equation1. A VAR (p) can be interpreted as a reduced form model. Structural Vector Autoregressive (SVAR) model in its structural form and is defined as:

$$Ay_t = A_1^* y_{t-1} + \cdots + A_p^* y_{t-p} + \beta\varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots5$$

$$y_t = A^{-1}A_1^* y_{t-1} + \cdots + A^{-1}A_P^* y_{t-p} + A^{-1}\beta\varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots6$$

It is assumed that the structural errors ε_t, are white noise and the coefficient matrices A_i^* for i = 1… p, are structural coefficient that differ in general from their reduced form counterparts.

According to Zeileis *et al.*, (2002) SVAR model can be used to identify shocks. The structural impulse response functions (SIRF) will help us to show the dynamic response of current and future values of each variable to a one unit change in the current value of one structural shock while assuming that other shocks are equal to zero. More so, structural forecast error variance decompositions (SFEVD) displays the volume of information each variable gives to other variables in an auto regression and it divides the variation in an endogenous variable into constituent shocks to VAR and simply allocates the variance of forecast errors in a given variable to its own shocks and the other variables. Through imposing restrictions on the matrices. Given the following reduced form Vector Moving Average representation recovered from the inversion of a stationary Vector Autoregressive Representation (VAR):

$$y_t = A_1^{-1}(L) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots7$$

Where y_t is the vector of the variables included in the model $A_I^{-1}(L)$ is the inverted dynamic coefficient matrix; ε_t is the Error terms. We define $A^{-1}(L) = \phi(L)$ and obtain a process expressed as a linear combination of the past innovations in accordance with the *Wold* composition

$$y_t = \phi(L)u_t = \sum_{h=0}^{\infty} \phi_h u_{t-h} \quad \text{where } \phi_0 = I_m \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots8$$

But, in order to recover the unobservable relevant shocks (ε_t) out of the observable reduced form innovations a structural VAR representation has to be considered and a set of restrictions has to be imposed. Given the following Structural VAR form:

$$A_0 y_t = \sum_{i=1}^{p} A_i^* y_{t-i} + B\varepsilon_t \qquad \varepsilon_t \sim N(0, I_m) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 9$$

Where A_0 is the (m x m) contemporaneous effects matrix; A_I^* is the (m x m) lagged effects matrix and B is the (m x m) structural shocks "short-run response" matrix. What follows is the system of structural equations linking u_t to ε_t which we have to restrict in order to univocally identify them. The reduced form residuals can be retrieved from a SVAR model by $u_t = A^{-1}B\,\varepsilon_t$ and its variance-covariance matrix by $u_t = A^{-1}BB^T A^{-T}$ ant it is always depend on the impose restrictions. (Lutkepohl 2006; Lutkepohl and Kratzig 2004; Johansen, 1995; Amisano and Giannini, 1997). The restrictions structure of the model is $K(k-1)$. So the number of restrictions we imposed is:

$$\frac{k(k-1)}{2}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..10$$

Since we deal with a 5 variables SVAR -which are imposed on the long-run C (1), matrix, according to a *cholesky* triangular factorization:

$$
C(1)=
\begin{bmatrix}
var\,iables \\ GDP_t \\ COP_t \\ FIM_t \\ EXCHR_t \\ INF_t
\end{bmatrix}
\begin{bmatrix}
\varepsilon^{GDP_t} & \varepsilon^{COP_t} & \varepsilon^{FIM_t} & \varepsilon^{EXCHR_t} & \varepsilon^{INF_t} \\
1 & 0 & 0 & 0 & 0 \\
0 & 1 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 1 & 0 \\
0 & 0 & 0 & 0 & 1
\end{bmatrix}
=
\begin{bmatrix}
var\,iables \\ u_t GDP_t \\ u_t COP_t \\ u_t FIM_t \\ u_t EXCHR_t \\ u_t INF_t
\end{bmatrix}
=
$$

$$
\begin{bmatrix}
\varepsilon^{GDP_t} & \varepsilon^{COP_t} & \varepsilon^{FIM_t} & \varepsilon^{EXCHR_t} & \varepsilon^{INF_t} \\
b_{11} & 0 & 0 & 0 & 0 \\
0 & b_{22} & 0 & 0 & 0 \\
0 & 0 & b_{33} & 0 & 0 \\
0 & 0 & 0 & b_{44} & 0 \\
0 & 0 & 0 & 0 & b_{55}
\end{bmatrix}
=
\begin{bmatrix}
\varepsilon^{GDP_t} & \varepsilon^{COP_t} & \varepsilon^{FIM_t} & \varepsilon^{EXCHR_t} & \varepsilon^{INF_t} \\
1 & 0 & 0 & 0 & 0 \\
NA & 1 & 0 & 0 & 0 \\
NA & NA & 1 & 0 & 0 \\
NA & NA & NA & 1 & 0 \\
NA & NA & NA & NA & 1
\end{bmatrix}
\ldots\ldots.11
$$

The non-zero coefficients b_{ij} and NA, in matrices indicated that any residual j in matrices ε_t and u_t has an instantaneous effect on variable i.

Structural VAR Estimates on Short- run pattern

Estimate Result on matrix A

$$\begin{bmatrix} var iables \\ GDP \\ COP \\ FIM \\ EXCHR \\ INF \end{bmatrix} \begin{pmatrix} \varepsilon^{GDP_t} & \varepsilon^{COP_t} & \varepsilon^{FIM_t} & \varepsilon^{EXCHR_t} & \varepsilon^{INF_t} \\ 1 & 0 & 0 & 0 & 0 \\ c_{21} & 1 & 0 & 0 & 0 \\ c_{31} & c_{32} & 1 & 0 & 0 \\ c_{41} & c_{42} & c_{43} & 1 & 0 \\ c_{51} & c_{52} & c_{53} & c_{54} & 1 \end{pmatrix}$$

Estimate Result of matrix B:

$$\begin{bmatrix} var iables \\ GDP_t \\ COP_t \\ FIM_t \\ EXCHR_t \\ INF_t \end{bmatrix} \begin{pmatrix} \varepsilon^{GDP_t} & \varepsilon^{COP_t} & \varepsilon^{FIM_t} & \varepsilon^{EXCHR_t} & \varepsilon^{INF_t} \\ C_{11} & 0 & 0 & 0 & 0 \\ 0 & C_{22} & 0 & 0 & 0 \\ 0 & 0 & C_{33} & 0 & 0 \\ 0 & 0 & 0 & C_{44} & 0 \\ 0 & 0 & 0 & 0 & C_{55} \end{pmatrix}$$

Structural VAR Estimates on Long- run pattern matrix

$$\begin{bmatrix} var iables \\ GDP_t \\ COP_t \\ FIM_t \\ EXCHR_t \\ INF_t \end{bmatrix} \begin{pmatrix} \varepsilon^{GDP_t} & \varepsilon^{COP_t} & \varepsilon^{FIM_t} & \varepsilon^{EXCHR_t} & \varepsilon^{INF_t} \\ C_1 & O & O & O & O \\ O & C_2 & O & O & O \\ O & O & C_3 & O & O \\ O & O & O & C_4 & O \\ O & O & O & O & C_5 \end{pmatrix}$$

The above equations for both short run and long run SVAR estimates pattern matrix assumes that GDP is the most endogenous variable in the model, but does not affect by the shocks to all other variables in the model. The second equation indicates crude oil price has been recently affected by GDP but does not affect food import, exchange rate, and inflations. the third equation indicate that shocks to GDP and crude oil price, recently affected food import, but does not affect exchange rate and inflations rate. Forth equation indicate that shocks to GDP, crude oil price and food import recently affected exchange rate but does not affect inflations rate. For equations five, indicate that shocks to GDP, crude oil price, food import and exchange rate recently affected inflations rate.

RESULT AND DISCUSSION

Unit Root Test

In line with the methodology of the study, the issue of structural change, and its consequential implications for structural breaks in macroeconomic time series data must be robustly addressed in order to ensure non spurious results of unit root tests of such data. the unit root test was conducted using Zivot and Andrews unit root test because one of the major problem with conventional unit root tests they do not allow for possibility of structural break. This is because the power to reject a unit root decreases when the stationary alternative is true and a structural break is ignored (Lee and Strazicich, 2004). An important aspect of unit root estimation in the present of structural break is the trend property of the variable. If the series exhibits a trend, then estimating the model without trend may fail to capture some important characteristic of the data (Zivot and Andrews. 1992).

Table 1. Presented the result for zivot and Andrew unit root test

Variables Series	t-statistics	Structural Break Location	Structural Break Year	Order of Integration
GDP	-6.7081***	C	1974	I(0)
COP	-5.6514***	C	1972	I(0)
FIM	-7.8153**	C	1975	I(0)
EXCHR	-5.2141**	B	1974	I(0)
INF	-6.0813**	A	1973	I(0)

Note that: The critical value for Zivot and Andrews test are -5.57, -5.08, -4.82 at at 1% , 5% and 10% levels
of significance respectively. ***, **, * indicate significant at 1%, 5% and 10% levels respectively.
Break location: A = Intercept, B = Trend, C = Trend and Intercept
The lag lengths for the ZA is chosen by using Schwarz Information Criterion
Source: Author's Computation

The result from Table 4.2 presented the Zivot-Andrews unit root test which account for the present of structural break in the variables. This is done to reduce the bias in the unit root tests by endogenously determining the time of the structural break. The null hypothesis in the Zivot and Andrews test is the series has unit root with structural break in both the intercept and trend. From the test, all the variable was found to be stationary in levels. The result indicates that almost all the series exhibits structural breaks during 1970's; clustering around 1972 to 1975. These results suggest that we can reject the null of unit root for all variables at 5 percent significance level. Haven conduct unit root test, and the result confirm the stationarity of the series variable at the same level I(0) as indicate by t-statistic values of the different variable in table 4.1 which is one of the basic requirement for SVAR (Sims, Stock, & Watson, 1990; Perron, 1997; Breitung, Bruggemann & Lutkepohl, 2004), so it is important to determine the number of lag to be included in the model.

Optimum lag Test

Table 2. Result of Optimum lag Test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2015.448	NA	4.47e+34	93.97432	94.17911	94.04984
1	-1866.215	256.8194	1.40e+32	88.19605	89.42479	88.64917
2	-1804.820	91.37833	2.70e+31	86.50326	88.75596*	87.33399
3	-1769.078	44.88595*	1.86e+31*	86.00361*	89.28026	87.21194*

Note that * indicate lag order selected by the criterion. LR: sequential modlified LR test statistic (each test at 5% level), FPE: Final Prediction Error, AIC: Akaike Information Criterion, SC: Schwarz Information Criterion and HQ: Hannan-Quinn Information Criterion.
Source: Author's Computation

As presented in Table 2, optimum lag order selection was carried out to determine the number of lag(s) to be included in the model prior to structural long run test. The maximum lag for the model was selected based on the five different information criteria. It is evident from table 2 that only for SC which agreed at two lag, all the remaining agrees at lag 3. Hence, the study adopted three lag as the maximum for the model.

Structural VAR Estimates on Short- run pattern

Table 3. Result of Structural VAR Estimates Result on Short- run pattern

Variables	Coefficient	Std. Error	Prob.
C(1)	-0.496559	0.130317	0.0024***
C(2)	-0.144835	0.264798	0.0654**
C(3)	0.475513	0.210109	0.0065***
C(4)	-0.017623	0.838769	0.0206**

Note that *** . ** and * indicate significant at 1% , 5% and 10% levels respectively.
Source: Author's Computation

From Table 3, GDP shock consist of crude oil price C(1), food imports C(2), exchange rate C(3), inflations rate C(4). This shows that in short run GDP is negatively related to COP, FIM and IFN while it positively related to EXCHR. Evidence from the above result we reject our assumption of GDP is the most endogenous variable in the model which cannot be affected by the shocks to all other variables in the model because has been affected by shocks to all other variables in the model given C(1) C(3) and C(4) are statistically significant at 5% level respectively. While C(2) is statistically significant at 10% level.

Structural VAR Estimates on Long- run pattern matrix

Table 4. Structural VAR Estimates Result of Long- run pattern matrix:

| Variables	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	0.093952	0.012337	7.615773	0.0000***
C(2)	0.356411	0.046799	7.615773	0.0075***
C(3)	-0.535242	-0.070281	7.615773	0.0000***
C(4)	0.168979	0.022188	7.615773	0.0000***
C(5)	-0.400330	- 0.052566	7.615773	0.0000***
Log likelihood	-39.99406			
LR test for over-identification:				
Chi-square(10)	113.42619***			

Note that *** . ** and * indicate significant at 1% , 5% and 10% levels respectively.
Source: Author's Computation using R-Software

From Table 4, GDP shock has recently affected crude oil price, food import, exchange rate, and inflation given   C (1) is statistically significant at 1% level given it p-value (0.0000). GDP is positively related to oil price and exchange rate in recent time while food import and inflation are negatively related to GDP. More so, the value of test statistics is 113.42619 at 1% significant level with p-value (0.0000). which is in line with boostrap t-value of the estimated longrun matrix. Then we accepted the hypothesis at 5% level of significant which shows that, crude oil, food import, exchange rate, and inflations rate have long run run effect on economic growth in Nigeria

The Structural Impulse Response Functions (SIRF)

This will help us to understand the dynamic response of current and future values of each variable to a one unit change in the current value of one structural shock while assuming that other shocks are equal to zero.
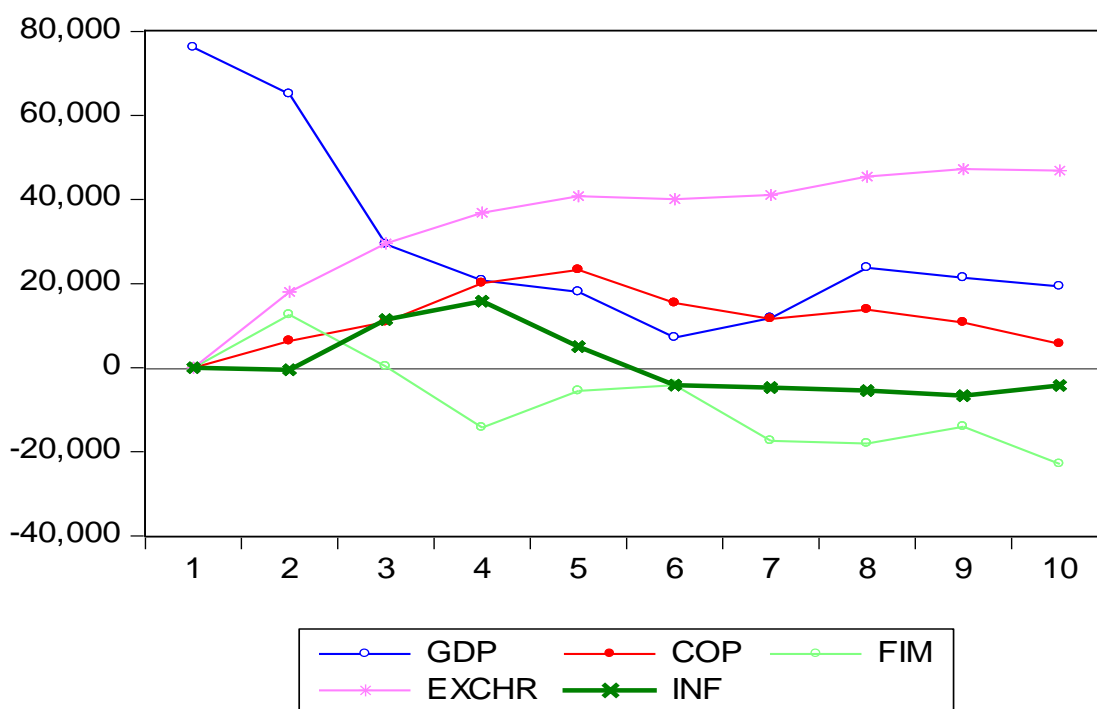
Source: Author's Computation
Figure 1. Structural Response to GDP

From Figure 1, On x-axis, 1 represent 4.6 years, that is from 1970-1975, 2-represent 9.2 years, that is from 1970-1979, 3-represent 13.8 years i.e 1970-1984, 4-represent 18.4 years that is from 1970-1988, 5-represent 23 years, that is from 1970-1993 , 6-represents 27.6 years, that is from 1970-1998, 7-represent 32.2 years, that is from 1970-2002, 8-represents 36.8 years, that is from 1970-2007, 9-represents 41.4 years, that is from 1970-2011, 10 represents 46 years, that is from 1970-2015. Furthermore, Figure 1 indicates that GDP response more to it shocks in both the short run and long run periods i.e. 1970 to 2015. It further show that GDP shock originate from shocks of the indipendent variables in the model. Crude oil price have positive effect to GDP shock from 1970 to 1993 that is 23years, it started to decline from priod 5th to 7th. But from period 8th, GDP response positively more to it shock. More so, it also response more to crude oil price shocks as indicate on further changes from 1994 to 2015. Food import changes result to positive effect on GDP shock from 1970 to 1975, from period the shock remain negative up to 10th period i.e 2015. From 1976, the response of GDP turn to slightly negative due to the high persistence level of food importation and inflation in Nigeria. Also, respose of GDP to Exchange rate remain positive in all the periods i.e. 1970-2015. While inflation is positive to GDP shock from second period up to fifth period but become negative from half of fifth period up to last period i.e. 2015.

Structural Variance Decomposition

This indicates the proportion of the moments in a sequence due to it own shocks versus shock to other variable.

Table 5. Structural Variance Decomposition to GDP

Period	S.E.	GDP	COP	FIM	EXCHR	INFL
1	0.164093	100.0000	0.065097	9.190274	0.000000	0.000000
2	0.185540	89.78424	0.051816	13.60965	3.810370	0.085833
3	0.200085	78.42300	34.92271	8.403289	10.80210	0.478080

4	0.213032	80.51811	40.67896	10.63784	9.546023	0.450616
5	0.215197	79.84113	36.99578	14.07073	9.398245	0.557015
6	0.220278	76.32760	36.19984	13.76636	12.57177	1.253848
7	0.220569	76.17370	35.17538	16.07708	12.54023	1.315239
8	0.221160	76.01967	34.75105	16.12598	12.55804	1.418431
9	0.221323	76.00621	34.37000	16.52139	12.54365	1.437949
10	0.221620	76.62321	34.28738	16.47885	12.52702	1.435524

Source: Author's Computation

The result of variance decomposition are presentd in table 5 which indicate the proportion of the forcast error variance in GDP explaied by its own innovations and innovations in food imports, exchange rate and inflations rate. Table 5 show that gross domestic product dominates its own innovations with 76.62 to 100 percent of the variance of its forecast and contributes more variability to crude oil price for about 0.0651 to 34.29%, food import 9.1903 to 16.48 and exchange rate with 3,8104 to 12.53% and less with inflation for about 0.8583 to 1.4355% from 1970 to 2015.

CONCLUSION

In line with the findings of this study, the study conclude that GDP has recently affected by crude oil price, food imports, exchange rate and inflation in both short run and long run period. Structural response indicate that crude oil price has high positive influence on GDP at the initial period and negative impact at the end of the period, furthermore, food imports have high negative effect on GDP, while GDP response less to exchange rate and inflation rate from initial to end of the period. The result from the structural decompositions indicated that crude oil price and food imports contribute more variability to GDP and exchange rate and interest rate with less variability in explaining the variation of GDP in Nigeria.

Based on the findings of this research, the following recommendations were made; government should come up with a policy that will focus on alternative sources of government revenue by investing more in reals' sectors especially agriculture in order to withstand vicissitudes of oil shocks in future. More so, Government should discourage food importation by promoting agricultural programmes that will inculcate in the Nigerians the value and importance of agriculture. As well as massively educating the Nigerians about importance of consuming locally agricultural products which will discourage more importation in the country and reduce the demand for dollar for importation purposes.

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