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Article

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Oil Price Shock and Agricultural Productivity: Stylised Evidence in Nigeria

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ABSTRACT

The oil sector is dominant, as it is the largest exported commodity in Nigeria. However, evidence has shown that Nigeria, as an oil-dependent country, faces frequent oil price fluctuations that have posed greater challenges to Nigeria's agriculture sector, hence affecting agricultural productivity. This necessitates the need to investigate the effect of oil price shocks on agricultural productivity in Nigeria. This study adopted the Hodrick Prescott data filtering approach to check for the fluctuation of oil prices. The result revealed fluctuation in Nigeria oil price from 2018 up until recently. The long-run relationship was established using the SVAR and the normalised equation. The result revealed a negative relationship between agricultural productivity, oil price and real exchange rate. While a positive relationship exist between agricultural productivity, consumer price index and oil production. oil price fluctuations affect most of the variables, however, oil price shock shows more variations across the time for agricultural productivity. To this end, this study revealed that oil price shock has an adverse effect on Nigeria's productivity in agricultural sector. Hence, the government needs to implement a policy and programmes that will serve as oil price shock absorbers in order to sustain agricultural productivity.

Keywords: Oil Price, Shock, Agricultural Productivity
JEL Classifications: B41, J43, Q43

1. INTRODUCTION

A reflective look into the Nigerian economy revealed that agriculture was the mainstay of the economy. In the 1960s, over 80% of the nation's export and job was from agriculture (World Development Indicator, 2018). According to Daramola (2004), agriculture contributed about 50 per cent in 1970 and 34 per cent in 2003. In recent times, agriculture no longer serves as the significant driver of the Nigerian economy due to the large growth and dependence on the petroleum sector (Abayomi, 1997). However, agriculture still plays a very dominant role in the economy today as it is one of the bedrock of a surviving Nation; it also plays a dominant role in terms of employment by being able to employ two-third of the Nigerian labour force (Popoola et al., 2018).

The discovery of oil in the 1970s led to huge structural changes in the economy. The oil boom led to increasing public expenditure, which led to several economic responses such as institutional expansion, infrastructural development, and importation of consumer goods. However, this growth was not experienced in the agricultural sector (Ademola et al., 2013). Oil price in 1980/1986 was \$37.42/\$14.44 barrel while agricultural productivity was 12.24% and 20.55% and in 2005/2018 when oil price started rising rapidly to \$50.04/\$58.15 agriculture reduced from 26.08%/21.19% (WDI, 2018).

The bulk of energy required in the agricultural sector is manpower and animal power. The record has shown that petroleum production affects agricultural production as it is used for powered tractors in mechanised agricultural activities and also useful for motorised irrigation pumps (Sambo, 2005). Oil price fluctuations, therefore, has huge impact on agricultural productivity. A strong and efficient agricultural-based country will be able to feed its growing population, create job opportunities, provide raw materials for industries, and earn foreign exchange.

The domestic oil price in Nigeria has increased lately, though this has been happening since the 1970s (Adenikinju et al., 2012). Despite the three major oil refineries in the country, the big room is still open for the importation of refined products to meet domestic needs. The persistent increase in oil price in the country has been linked to inefficient refineries, oil spillages and bunker sabotage, amongst others. The disruption in fuel supply has led to both economic and environmental problems. The most persuasive main thrusts of the worldwide economy are crude oil, and changes in costs and prices of oil and how they affect agricultural productivity around the globe, especially in a developing country like Nigeria.

The inability of the Nigerian economy to meet favourable oil prices has been caused by several problems which have been detrimental to agricultural productivity of the country. The disclosure of unrefined petroleum has both positive and negative effects on Nigeria agricultural output. On the negative side, this involves neighbouring communities where oil wells are abused. Most of these communities still suffer from dreadful environmental conditions, thus leading to lack of agricultural production, which is the primary means of living. It also affects other social and economic factors (Oluwatayo and Ukpe, 2015).

Nigeria is blessed with a tremendous store of mineral assets running from crude oil, coal and zinc, amongst others. Still, Nigeria imports refined oil-based commodities because of the breakdown of treatment facilities in the late 1980s, which has been ceaseless even to date, presenting the economy to oil value change. This implies that Nigeria has not been able to meet favourable oil prices. In recent times, the global pandemic led to several and continuous rises in oil prices in Nigeria. This has destabilised productivity in the agricultural sector because the rise in oil price led to falling oil production due to the exchange rate; this further led to reduction in government revenue, thereby having adverse effects on agricultural productivity.

Studies on oil price shock have over the years being an area of great interest to many researchers. Oseni and Kinbode (2018) study examined the relationship between oil price and agricultural commodity prices in Nigeria. Adopting non-linear autoregressive distributed lag (NARDL), they found out that oil price is said to have an asymmetric effect on agricultural commodity prices in Nigeria. A similar study by Binuomote and Odeniyi (2013) examined how crude oil prices affect agricultural productivity in Nigeria. The Johansen procedure revealed that the price of crude oil negatively and significantly affects agricultural production in Nigeria. A similar study by Olutayo (2015) finds that agricultural output increases with the price of petroleum. However, petrol consumption is inversely related to agricultural output.

Ebaidalla (2014) investigated the effects of oil price volatility on the Sudanese economy. The paper examines the relationship between crude oil price fluctuation and economic performance of Sudan. Using variance decompositions (VDCs) and impulse response functions (IRFs), they find that negative oil price shocks have a greater impact on the macroeconomic variables than positive shocks, implying that oil price shocks have an asymmetry impact on the macroeconomic variables. On the contrary, ThankGod and Maxwell (2013) investigated the Macroeconomic impact of oil price levels and volatility in Nigeria. Using the ARCH (GARCH) model, they find that; oil price volatility does not substantially affect government spending, output and inflation rate in Nigeria.

Also, Adedokun (2018) examined how oil shocks affect government expenditure and government revenue in Nigeria. The author adopted the Structural Vector Autoregressive (SVAR) and Vector Error Correction (VEC). The study revealed that shocks to oil largely affect policy indicators in the short run, and the effect spills over to other macroeconomic variables in the long run. A similar study by Asaleye et al. (2019) examined the effects of oil shock on macroeconomic variables, focusing on the dimensions of employment in Nigeria. Using the Structural Vector Autoregressive (SVAR), they find that employment is negatively related to exchange rate and oil price in the long run. They also find that there is a positive relationship between consumer price index, loan fee and employment.

Broni et al. (2018) studied the Economic effects of oil price volatility on developing countries. Using Nigeria as a case study, they adopted the Ordinary Least Square (OLS). They found a linear relationship between oil price volatility and selected macroeconomic variables like foreign direct investment, balance of payment, interest rate, and gross domestic product per capita. Despite several studies on oil price shocks, most of them are silent about how it affects agricultural productivity. Therefore, the novelty of this study is to analyse the effect of oil price shock on agricultural productivity in Nigeria.

2. MATERIALS AND METHODS

The model used in this work is based on the Lewis Arthur development theory. According to him, the economy essentially comprises the traditional (subsistence) and the modern (capitalist, industrial or manufacturing) segment. The behavioural model is given as:

$$Y = f(A, I) \quad (1)$$

Where Y is Economic Development, A is Agricultural Sector, and I is Industrial Sector. This study slightly adjusts the model for this study by correctly specifying the model as:

$$AGP = f(OIP, CPI, REX, OPN, OEX) \quad (2)$$

Explicitly written as:

$$AGP_t = \beta_0 + \beta_1 OIP_t + \beta_2 CPI_t + \beta_3 REX_t + \beta_4 OPN_t + \beta_5 OEX_t \quad (3)$$

Where OIP_t is Oil price, CPI is the Consumer price index, REX is the Real exchange rate, OPN is Oil production, OEX is Oil export, and AGP is Agricultural productivity. The economic relationship can be specified in linear form as:

$$\log AGP_t = b_0 + b_1 \log OIP_t + b_2 \log CPI_t + b_3 \log REX_t + b_4 OPN_t + b_5 \log OEX_t + \mu_t \quad (4)$$

μ_t is Error term at time t, β_0 = is the intercept parameter

The SVAR model is used in this paper to estimate the relationship between oil price shock and agricultural productivity. The estimation of VAR models is frequently based on impromptu premises, which can be random. Therefore, we employ the subsequent SVAR model,

$$\theta_0 x_t = k + \theta_1 x_{t-1} + \theta_1 x_{t-2} + \ldots + \theta_p x_{t-p} + \mu_t \quad (5)$$

x_t is the dependent variable; the white noise is the error term, which implies a serially uncorrelated structural disturbance. That is $E\left|\mu_t \mu_t^{1}\right| = D$, the diagonal matrix note is represented by D. Multiplying the above equation by θ_1^{-1}, gives;

$$x_t = \lambda_0^{-1}(k + \lambda_1 x_{t-1} + \lambda_2 x_{t-2} + \cdots + \lambda_p x_{t-p} + \mu_t) \quad (6)$$

Where $\delta = \lambda_0^{-1}\lambda_2$, where s={1,2,…P}, $C = \lambda_0^{-1}k \;\; \eta_t = \lambda_0^{-1}\mu_t$

The variance-covariance matrix can be written as;

$$E\left|\varepsilon_t \varepsilon_1^{1}\right| = \lambda_0^{-1} E\left|\mu_t \mu_t^{1}\right| \left(\lambda_0^{-1}\right)^{1} = \lambda_0^{-1} D \left(\lambda_0^{-1}\right)^{1} = \Omega \quad (7)$$

Hence, the Cholesky Decomposition of the variance-covariance of the reduced structure VAR residuals Ω was used to create the structural shocks. Therefore, the Vector autoregression model of organise P adopted is;

$$\Delta AGP = \alpha_1 + \sum_{i=1}^{k}\theta_{1i}\Delta OIP_{t-1} + \sum_{i=0}^{k}\beta_{1i}\Delta CPI_{t-1} + \sum_{t-1}^{k}\chi_{1i}\Delta REX_{t-1} + \sum_{t-1}^{k} i_{1i}\Delta OPN_{t-1} + \sum_{t-1}^{k}\delta_{1i}\Delta OEX_{t-1} + \sum_{t-1}^{k}\pi_{1i}\Delta EMP_{t-1} + \sum_{t-1}^{k}\delta_{1i}\Delta RIR_{t-1} + \mu_t \quad (8)$$

Commanding the restriction recommended by the theoretical model, the matrix below shows the relationship between the structural disturbances and the error terms of the reduced form.

$$\varepsilon_t = \beta_0^{-1} u_t \quad (9)$$

$$\begin{bmatrix} \varepsilon_t^{agp} \\ \varepsilon_t^{oip} \\ \varepsilon_t^{cpi} \\ \varepsilon_t^{opn} \\ \varepsilon_t^{oex} \\ \varepsilon_t^{rex} \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & 0 & 0 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 & 0 & 0 \\ a_{61} & a_{62} & a_{63} & a_{64} & a_{65} & a_{66} & 1 \end{bmatrix} \begin{bmatrix} \mu_t^{agp} \\ \mu_t^{oip} \\ \mu_t^{cpi} \\ \mu_t^{opn} \\ \mu_t^{oex} \\ \mu_t^{rex} \end{bmatrix} \quad (10)$$

The oil price shock in equation 10 is μ_t^{oip}, μ_t^{agp} represent the agricultural productivity shock; μ_t^{cpi} represent the monetary shock;

Table 1: Sources and description of Data

Variable	Symbol	Description	Sources	Measurement
Agricultural Productivity	AGP	Value-added per worker	World Development Indicator	Agriculture (% of GDP)
Oil Price	OIP	Crude oil price	World bank	Domestic crude oil prices (in $ barrel)
Oil Production	OPN	Oil production in GDP	CBN Statistical bulletin 2020	Oil production in percentage (%)
Oil Export	OEX	Oil export in GDP	CBN Statistical bulletin 2020	Oil export in percentage (%)
Consumer price index	CPI	The average change in prices that consumers pay for a basket of goods and services over time	World bank	Consumer price index in percentage (%)
Real Exchange Rate	RER	Real exchange rate in GDP	Statistical bulletin	Real exchange rate in percentage (%)

Table 2: Unit root test with break point (Dickey-Fuller T-Statistic)

Variable	Trend specification	Break date at1st diff	Lag length	Critical values at 1%	Critical values at 5%	Critical values at 10%	ADF stat at levels	ADF stat at 1st diff	Order of integration
lnAGP	Trend: Trend & Intercept Breakpoint	2002	3	−5.7191	−5.1757	−4.8939	−7.0296	−6.1636	I (1)
lnOIP	Trend: Trend & Intercept Breakpoint	2014	1	−5.7191	−5.1757	−4.8939	−3.5746	−7.9297	I (1)
lnCPI	Trend: Trend & Intercept Breakpoint	1995	1	−5.7191	−5.1757	−4.8939	−6.7648	−8.1730	I (1)
lnREX	Trend: Trend & Intercept Breakpoint	1999	0	−5.7191	−5.1757	−4.8939	−3.3218	−5.7187	I (1)
lnOPN	Trend: Trend & Intercept Breakpoint	2012	1	−5.7191	−5.1757	−4.8939	−4.7420	−6.5517	I (1)
lnOEX	Trend: Trend & Intercept Breakpoint	2014	1	−5.7191	−5.1757	−4.8939	−3.9004	−7.5019	I (1)

The values in parenthesis are for the first difference, while those values not in parenthesis are for levels. Variables at I (0) are stationary variables, while Variables at I (1) are non-stationary variables but are integrated of order one after the first difference. Source: Source: Authors' computation from Eviews 10

Table 3: Cyclical behaviour

Agp volatility	Nigeria (1981-2018)
CPI	Procyclical
Contemporaneous Correlation	0.0341
Volatility (%)	0.7028
Relative Volatility	13.7522
Phase Shift	Lagging
OIP	Countercyclical
Contemporaneous Correlation	−0.0709
Volatility (%)	0.2957
Relative Volatility	5.2060
Phase Shift	Lagging
OPN	Procyclical
Contemporaneous Correlation	0.6260
Volatility (%)	182.3049
Relative Volatility	3825.4269
Phase Shift	Lagging
OEX	Procyclical
Contemporaneous Correlation	0.0323
Volatility (%)	1.1707
Relative Volatility	23.5726
Phase Shift	Lagging
REX	Procyclical
Contemporaneous Correlation	0.2049
Volatility (%)	0.9196
Relative Volatility	18.3000
Phase Shift	Lagging

Source: Authors computation using Eviews 9

μ_t^{opn} represent the oil production; μ_t^{oex} represent the oil export; μ_t^{rex} represent the real exchange. The matrix in equation 10 has 16 parameters. However, the detected shocks have a contemporaneous effect on the associated variables, i.e., they influence the variable in the order in which they were identified.

The data involved here are secondary time series annual data for 1980-2019 periods (Table 1).

3. PRESENTATION OF RESULTS

3.1. Unit root Test

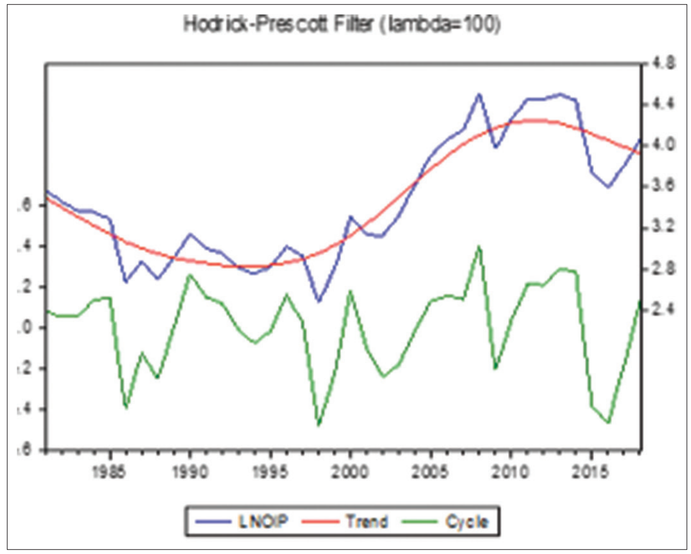
The results in Table 2 present the Augmented Dickey-Fuller unit root test, and it shows that all the variables are stationary at first differencing. This implies that the observed series AGP, OIP, LCPI, REX, OPN, and OEX were not stationary at the level form but became stationary at their first differencing.

3.2. Stylised Facts

The degree of contemporaneous correlation between AGP and CPI is 0.0341, indicating a procyclical relationship. This implies that an expansion in AGP is usually accompanied by increase in CPI in Nigeria. CPI is considered subject to high fluctuations because the relative volatility is >1; this suggests that it is highly volatile and subject to AGP fluctuations. CPI lags AGP over the period in Nigeria.

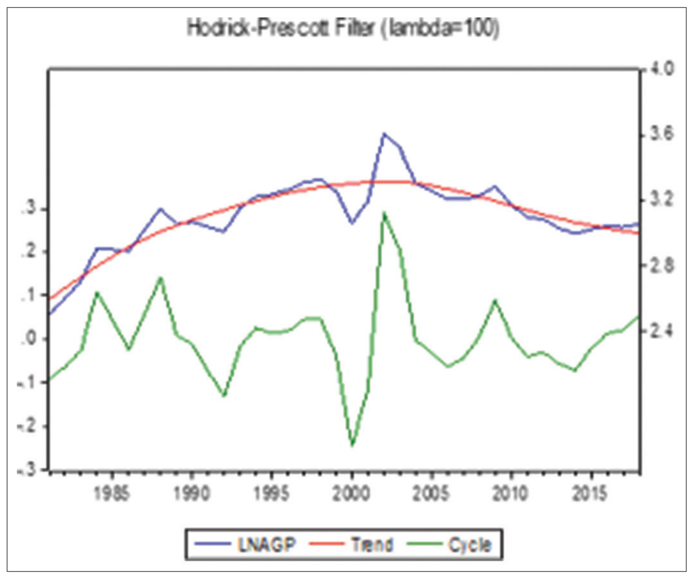
The degree of contemporaneous correlation between AGP and OIP is -0.0709, indicating a countercyclical relationship. This implies that an expansion in AGP is usually accompanied by a reduction in OIP in Nigeria. OIP is considered to be subject to high fluctuations because the relative volatility is >1; this

Figure 1: HP-filtered oil price



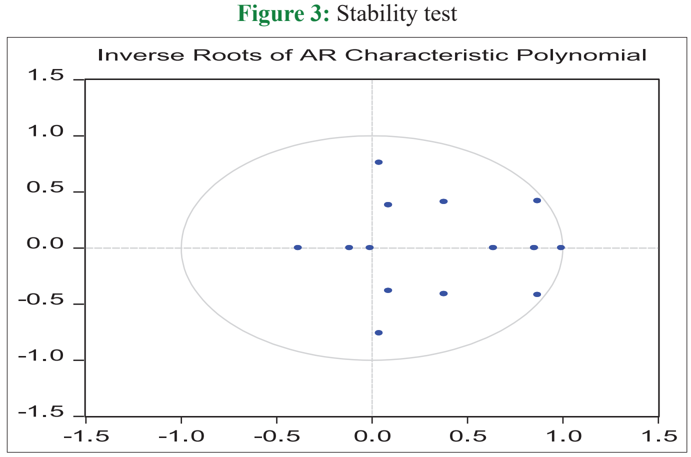
Source: Author's Compilation Using Data from CBN 2019 Statistical Bulletin

Figure 2: HP-filtered agricultural productivity



Source: Author's Compilation Using Data from CBN 2019 Statistical Bulletin

Figure 3: Stability test



suggests that it is highly volatile and subject to AGP fluctuations. OIP lags AGP over the time period in Nigeria. The degree of contemporaneous correlation between AGP and OPN is 0.6260, indicating a procyclical relationship. This implies that an expansion in AGP is usually accompanied by an increase in OPN in Nigeria. OPN is considered to be subject to high fluctuations because the relative volatility is >1; this suggests that it is highly volatile and subject to AGP fluctuations. OIP lags AGP over the time period in Nigeria.

The degree of contemporaneous correlation between AGP and OEX is 0.0323, indicating a procyclical relationship. This implies that an expansion in AGP is usually accompanied by an increase in OEX in Nigeria. OEX is considered to be subject to high fluctuations because the relative volatility is >1; this suggests that it is highly volatile and subject to AGP fluctuations. OIP lags AGP over the time period in Nigeria. The degree of contemporaneous correlation between AGP and REX is 0.2049, indicating a procyclical relationship (Table 3). This implies that an expansion in AGP is usually accompanied by an increase in REX in Nigeria. REX is considered to be subject to high fluctuations because the relative volatility is >1; this suggests that it is highly volatile and subject to AGP fluctuations. OIP lags AGP over the time period in Nigeria.

3.3. Hodrick Prescott (H.P.)-Filtered Oil Price Shock and Agricultural Productivity

This shows the actual trend and cyclical movement of oil price and agricultural productivity over a period of time. In Figures 1 and 2, the red, green, and blue lines denote the trend, cyclical and actual series of oil price and agricultural productivity in Nigeria, respectively. Figure 1 reveals that there was fluctuation in Nigeria oil price around its trend since 1980 up until recently. This is linked to lack of oil production capacity, a reduction in global oil reserves, natural disasters, political events, and Nigeria's overdependence on oil. These fluctuations led to the contraction, and the economy entered into recession in 2016. Figure 2 also reveals that there was fluctuation in Nigeria's agricultural productivity around

Table 4: Johansen cointegration test

Unrestricted cointegration rank test (Trace)				
Hypothesised No. of C.E. (s)	Eigenvalue	Trace statistic	0.05 Critical value	Prob.**
None*	0.776838	158.3392	125.6154	0.0001
At most 1*	0.680449	105.8442	95.75366	0.0084
At most 2*	0.560830	65.91487	69.81889	0.0985
At most 3	0.438247	37.11444	47.85613	0.3421
At most 4	0.231100	16.93016	29.79707	0.6452
At most 5	0.198000	7.732366	15.49471	0.4945
Trace test indicates two cointegrating eqn (s) at the 0.05 level				
Unrestricted cointegration rank test (Maximum Eigenvalue)				
Hypothesised No. of C.E. (s)	Eigenvalue	Max-Eigen Statistics	0.05 Critical value	Prob.**
None	0.776838	52.49500	46.23142	0.0095
At most 1	0.680449	39.92930	40.07757	0.0519
At most 2	0.560830	28.80043	33.87687	0.1790
At most 3	0.438247	20.18428	27.68434	0.3286
At most 4	0.231100	9.197798	21.13162	0.8162
At most 5	0.198000	7.722623	14.26460	0.4076
Eigen test indicates one cointegrating eqn (s) at the 0.05 level				

Source: Authors' computation from Eviews 10

Table 5: Normalised Cointegrating Coefficients

LnAGP	lnOLP	lnCPI	LnOPN	lnREX	lnOEX
1.000000	0.303884 (0.82347)	−5.511354 (0.00295)	−0.000139 (3.61885)	0.117703 (0.93323)	−0.411744 (2.96753)
t.stat	[0.10351]	[2.09262]	[0.01345]	[0.02569]	[0.06131]

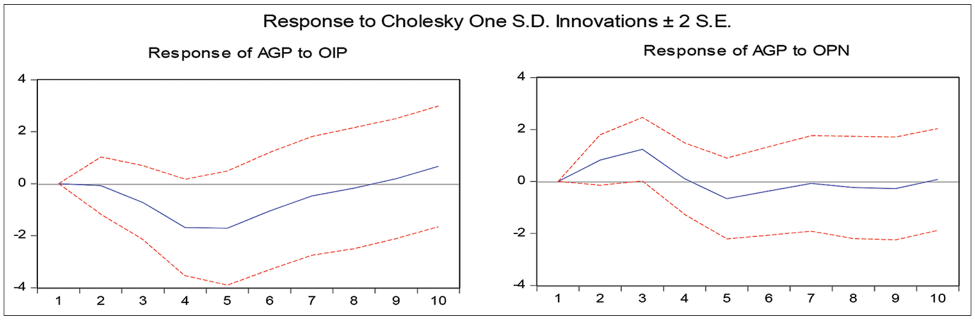
Source: Authors' computation from Eviews 10

Table 6: Variance Decomposition of Oil Price Shock

Period	lnOIP	lnAGP	lnCPI	lnOPN	lnOEX	lnREX
1	97.64260	2.357401	0.000000	0.000000	0.000000	0.000000
2	91.17354	3.165922	0.106287	0.032083	0.036238	5.249084
3	88.80002	2.693306	0.089407	0.042857	0.155444	8.016034
4	83.95735	3.467707	0.455843	0.828293	0.264802	10.68655
5	78.72925	4.261023	1.211444	1.615866	0.255882	13.33245
6	74.70681	4.389253	2.345608	1.533789	0.430249	15.60559
7	72.26844	3.913850	3.586873	2.169569	1.160011	15.42356
8	70.40739	3.932824	4.325184	4.282552	1.983873	13.28948
9	67.65793	5.567479	4.363212	7.336134	2.406413	10.88421
10	63.67828	8.456873	4.016559	10.73340	2.409348	9.051762

Source: Authors' computation from Eviews 10

Figure 4: Impulse response



its trend since 1980. This is attributed to a fall in government investment into the agricultural sector and its over-dependence on the oil sector. Hence making the oil price fluctuations affect the productivity in the agricultural sector.

The result shows that Trace test indicates 2 cointegrating equations at 0.05 level, which at "None and at most 1" (Table 4). However, since the Max-Eigenvalue test indicates one cointegrating equation at "None," therefore we would reject the Null hypothesis of no cointegrating relationship.

The normalised cointegrating result is presented in Table 5. The signs are reverted in the interpretation as a result of the normalisation procedure. The result shows that the coefficient of oil price and real exchange rate negatively affect agricultural productivity. In contrast, consumer price index, oil production, and oil export positively affect agricultural productivity. The result also revealed that oil production and real exchange rate are not statistically significant at 5% level.

The variance decomposition result is presented in Table 6. In period one, the change in oil price explained almost 97% of the variation in forecast error shock, indicating that other factors in the model have no significant impact on oil price. In period two, influences from AGP, LNCPI, OPN, OEX and RIR are barely 4%, so they exhibit strong exogeneity, implying that they have a weak influence on oil price shock. The same thing applies to periods 3 and 4 for AGP, while REX increased gradually. AGP and REX increase in periods 5 and 6 while other variables still have a very weak influence. In periods 7 and 8, reductions occurred for all variables apart from REX that had 15.4% variation in the forecast error of OIP and started declining in period eight. In periods nine and ten, the influence from the variables started increasing except OEX where 5.56% and 8.45% variation in AGP is explained by the forecast error shock of oil, 7.33% and 10.73% variation in OPN is explained by the forecast error shock of oil, 10.88% and 9.05% for REX.

For the autocorrelation, the probability value is higher at 5% level; this shows that this model has no serial correlation (Table 7). The value of Jarque-Bera Statistics is less than 5%, implying that the residual is normally distributed. Similarly, in the heteroskedasticity test, a Chi-square probability value larger than 5% indicates that no ARCH effect exists. The model's stability is tested using the inverse roots of the A.R. characteristic polynomial. It can be seen that the dots are within the circle, indicating that the stability condition is met (Figure 3).

Figure 5: Schematic chat showing the connection between oil price shock and agricultural productivity

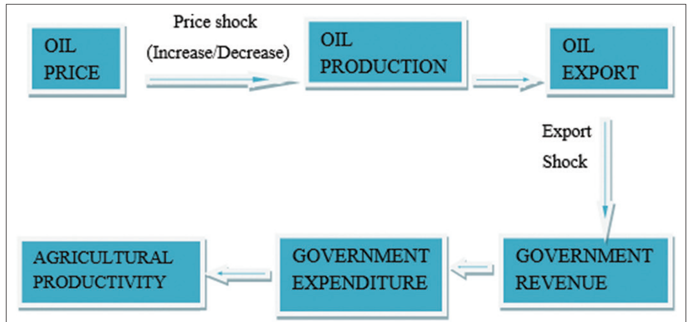


Table 7: Diagnostic test

Autocorrelation LM test: 44.67965	Prob: 0.6488
Heteroskedasticity test Chi-square: 448.9	Prob: 0.4788
Jarque-Bera value: 61.29590	Prob: 0.1012

Source: Authors' computation from Eviews 10

From Figure 4 (The Response of AGP to OIP): A one S.D. shock (innovation) to OIP initially declines gradually from the negative region between periods 1 to period four, where it hits its steady-state value, which indicates the short run. It then increases sharply from period 5 to period 8, where it hits the zero line, which depicts the long run. From the 8th period, the response gradually increases to the positive region, implying that shocks to OIP will negatively impact AGP in the short run and positively impact on AGP in the long run.

From Figure 4 (The response AGP to OPN): A one S.D. shock (innovation) to OPN initially increases gradually from the positive region between periods 1 and 3. It decreases sharply from period 3 to period five below the zero lines, indicating the short run. From the 5th period, the response gradually increases to period 7, where it meets the zero line. Then from period 7, it gradually decreases to period nine and increases to period 10, where it goes above the zero lines. This means that the shocks to OPN will have asymmetric impacts on AGP in the short run and long run.

4. CONCLUSION AND RECOMMENDATIONS

This study aims to provide empirical evidence on the impact of oil price shock on agricultural productivity in Nigeria. The huge reliance on oil as the main source of income in Nigeria has made the economy prone to real and nominal shocks, affecting agricultural productivity. Increase in the price of oil in the world market, coupled with increase in importation, has caused several problems in Nigeria, thereby posing difficulties on agricultural productivity in the economy.

The study examined the effect of oil price shock on agricultural productivity. Based on the unit root test, the Johansen Cointegration was used to examine the long run. The variables considered in this study are agricultural productivity (AGP), oil price (OIP), oil production (OPN), oil export (OEX), consumer price index (CPI), and real exchange rate (RER). Evidence from the result shows that there is a long-run relationship in the model. The result of the normalised cointegration revealed that oil price has a negative impact on agricultural productivity in the long run. In contrast, consumer price index, oil production and oil export have positive impact on agricultural productivity in Nigeria. This finding is in line with Ebaidalla (2014) and Asaleye (2019), who finds that negative oil price shocks have a greater impact on the macroeconomic variables.

This study concludes that oil price shock has a significant negative impact on agricultural productivity. It also concludes that oil production has an asymmetric impact on agricultural productivity. This is not surprising as Nigeria economy currently experience frequent oil price fluctuations, which has affected agricultural productivity. This study recommends that the government implement a policy that will serve as oil price shock absorber so that the effect of oil shock on agricultural productivity can be curbed. Furthermore, refining crude oil before exporting to other countries will reduce its price fluctuations in the economy, and this will reduce its adverse effect on agricultural productivity in Nigeria.

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