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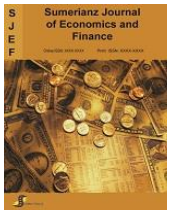

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Upshot of Foreign Capital Flows on Real Sector Growth in Nigeria

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Abstract
This study examines the upshot of foreign capital inflows on real sector growth in Nigeria from 1986 to 2019. The study sets out to achieve the effect of foreign direct investment (FDI), foreign portfolio investment (FPI), and official development assistance (ODA) on real sector growth in Nigeria. The study employed the SVAR model to achieve the study objective and the data sets used for this study were secondary sources. The study found that the inflows of FDI and ODA influence the industrial sector output significantly than the agricultural sector, thereby making the sector unattractive to foreign investors. The study concludes that inflows of foreign direct investment and official development assistance exert influence on industrial sector output than the agricultural sector. The study recommends that policymakers must develop policies that are foreign agricultural capital friendly to attract more foreign capital to the agricultural sector for the growth of economic activities in the industry.
Keywords: Foreign capital inflows; Real sector; Economic growth; Industrial sector output; Agricultural sector output.

1. Introduction
Despite the natural resource endowments and large population size, it is expected that the economy should receive more capital inflows. However, the Nigerian economy still attracts a small fraction of the global capital flows when compared to its resource base and potential need against a huge gap between domestic savings-investment finance demand. For instance, in 2018, the Sub-Saharan Africa share from global finance increased by 12 per cent from 28 USD.04B in 2017 to 31 USD.6B (UNCTAD, 2019). Between 2000 and 2017, foreign aid to Sub-Saharan Africa increased from 13 USD.06B to 47 USD.27B (World Bank, 2019). The percentage of inflows to Nigeria in terms of FDI, FPI, and ODA during the same period was less than 10 per cent.

Before the exploration of Nigeria's crude oil in the 1970s, Nigeria's production and exports of goods were dominated by the agricultural sector. Since then, crude oil did not only become the main source of income but also accounts for the highest proportion of exports. The adverse effects of the production and export of crude products whose prices fluctuate in the international markets could trigger economic instability (Ehigiamusoe and Lean, 2017). Nigeria, like other developing countries, has been making efforts to diversify the economy away from the crude oil sector. However, the resources needed to improve on other economic sectors are capital-related and largely inadequate domestically, which consequently warrants the need for foreign capital inflows (Kargbo, 2012).

While the effectiveness of foreign capital to real economy sectors has been the subject of much debate, however very few have addressed the relationship between aggregate capital flows and the real sectors of the economy. Finally, in examining the relationship between foreign capital inflow and the real sector of the economy, the present study disaggregates foreign capital flow into; foreign direct investment, foreign portfolio investment, and official development assistance on the industrial and agricultural sector, which was not considered by previous studies. The real sector consists of agriculture, building and construction, industry, wholesale and retail, and service sectors (National Bureau of Statistics of Nigeria, 2016). However, this study focuses on the agricultural and industrial sectors because these sectors are considered the major driver of the Nigerian economy (Chete *et al.*, 2014).

2. Literature Review
Foreign capital flow is perceived as a transfer of resources from the developed countries to developing countries in the form of foreign direct investment, foreign portfolio investment, and official development assistance to supplement the domestic financial gap. While the real sector refers to the economic output of an economy. This output includes productivity sectors such as industrial and agricultural sector output.

The study has its theoretical underpinning on the two-gap model of foreign capital (or foreign aids) was first developed by Chenery and Stout (1966), who identified the need to attract foreign capital to fill the two gaps, namely the savings gap, and foreign exchange gap. The savings gap is the excess of domestic investment opportunities over domestic savings, causing investments to be limited by the available foreign exchange. The other gap, foreign exchange gap or constraint exists if a country supplies more foreign exchange to the rest of the world through imports than it receives foreign exchange from the rest of the world through exports.

David *et al.* (2012), used the vector autoregressive (VAR), cointegration, and error correction method to investigate the effect of FDI on the manufacturing sector of Nigeria between the periods 1975-2008. The result of the study showed that FDI hurts productivity in the manufacturing sector and is statistically significant. Also, employing the autoregressive lag distributed (ARDL) technique, Adejumo (2013) examined the impact of FDI on the performance of the manufacturing industry in Nigeria over the periods 1970-2009. The outcome of the study showed that FDI has harmed the Nigerian manufacturing sub-sector. Akande and Biam (2013), investigated the causal relationship between FDI in agriculture and agricultural output in the Nigerian economy between the periods 1960-2008 using Johansen cointegration procedure, error correction model (ECM), Granger causality test and impulse response. The outcome of the study showed that there is no long-run relationship between FDI in agriculture and agricultural output. The result, however, revealed that there is a short-run causal relationship running from FDI in agriculture and agricultural output.

Employing Johansen and Juselius co-integration technique and Vector Error Correction Mechanism (VECM) approach on annual data over the periods 1960-2011, Umer and Alam (2013) analyzed the impact of trade openness and FDI on industrial growth in the Pakistan economy. The result showed that a positive and significant long-run relationship exists between FDI and growth in the industrial sector. Idowu and Ying (2013) evaluated the impact of FDI in the agricultural sector of the Nigerian economy from 1980-2007. Using a vector autoregressive (VAR) approach, they found that FDI has no significant impact on agricultural output.

Oloyede (2014), investigated the impact of FDI on the agricultural sector of the Nigerian economy between the periods 1981-2012. Employing the ordinary least square (OLS) method, the study found that FDI has a significant impact on the agricultural sector of the Nigerian economy. In the same vein, Binuyo (2014), used multiple regression analysis to analyze the relationship between FDI and agricultural sector development in Nigeria between the periods 1981- 2012 and found a positive and significant relationship between FDI and agricultural output. Orji *et al.* (2015), employed the classical linear regression model in examined the impact of FDI on the Nigerian manufacturing sector from 1970 to 2010. The study revealed that FDI impacted negatively on the manufacturing sector. Conversely, Okoli and Agu (2015) employed the OLS and VECM techniques to assess the impact of foreign direct investment flow on the performance of the manufacturing firms in Nigeria spanning 40 years. The study found that FDI inflows had a positive impact only in the long-run.

Verter (2017), assesses the effect of foreign aid on agriculture in Nigeria. Using OLS regression, Granger causality and VDA approaches, the OLS results signify that foreign assistance to agricultural-related activities has a positive effect on crop performance in the country. Similarly, the Granger causality shows a unidirectional causality running from foreign aid to crop production in Nigeria. Mounde (2017), examined the causal relationship between foreign direct investment and manufacturing output in Nigeria from 1981-2016. The error correction model was employed to determine the degree to which equilibrium behaviour drives short-run dynamics. The findings revealed that there is a long-run relationship between foreign direct investment and output growth of the manufacturing sector in terms of industrial production.

Using the ordinary least square (OLS) technique of estimation, Epaphra and Mwakalasya (2017) analyzed the relationship between FDI, agriculture sector, and economic growth of the Tanzanian economy between the periods 1990-2015. The outcome of the study showed FDI has no significant impact on the agriculture sector of Tanzania despite the magnificent flows of FDI into the economy. Anetor (2019), examines the effect of FDI on the real sector in Nigeria between the periods 1981-2016 using the impulse response function (IRF) and variance decomposition (VDC) of VAR. The study found that agricultural sector output responded positively to shocks in FDI inflows but it was statistically insignificant. Eze *et al.* (2019), investigate the impact of foreign direct investment (FDI) on manufacturing sector output growth in Nigeria for the period 1970 – 2016 using OLS and Granger causality tests analysis. The findings of this study reveal that there is a long-run relationship between FDI and manufacturing sector output growth. Granger causality result shows that there is unidirectional causality from FDI and manufacturing sector output growth.

Justina (2020), investigates the effect of FDI inflow on Nigeria's manufacturing sector to get to the root of the problem. Using Time Series Data for the period 1998-2018, the paper employed the unit root test, test for co-integration and Error Correction Technique to estimate the model. The empirical result suggests that FDI inflow was positive but not significant in explaining growth in manufacturing output. However, FDI inflow has a positive and significant effect on overall economic growth. The empirical evidence from the study suggests that foreign direct investment is not impacting Nigeria's manufacturing sector.

Most of the literature on the impact of FDI on economic growth in Nigeria exists (Adejumo, 2013; Anetor, 2019; David *et al.*, 2012; Epaphra and Mwakalasya, 2017). However, these studies ignored the effects of FDI, FPI and ODA on the real sector of the Nigerian economy. This study is distinct as it specifically examines the impact of FDI, FPI and ODA inflows on the real sector of the Nigerian economy over the periods 1986-2019.

3. Methodology

The theoretical framework provides different perspectives on the analyze the impact of foreign direct investment, foreign portfolio investment and official development assistance on the real sector of the Nigerian economy. This study hinges on the theoretical underpinning of the Dual Gap Model which postulates that there is a shortage of domestic savings to match investment hence this gave rise to foreign sources of financing. These inflows are expected to increase output in both the agricultural and industrial sector. Thus, the transmission is given as follows:

$$Cap\inf \uparrow \rightarrow AS \uparrow \rightarrow INDP \uparrow \qquad (3.1)$$

Where Capinf is inflow of capital (FDI, FPI, and ODA), AS is agricultural sector output while the INDP is industrial sector output and the model is specified as;

$$AS = f\left(AS, INDP, FDI, FPI, ODA\right) \qquad (3.2a)$$

$$INDP = f\left(INDP, AS, FDI, FPI, ODA\right) \qquad (3.2b)$$

Transposing the transmission yields,

$$AS_t = f\left(AS_{t-1}, INDP_{t-1}, FDI_{t-1}, FPI_{t-1}, ODA_{t-1}, INDP_t, FDI_t, FPI_t, ODA_t\right) \qquad (3.3)$$

$$INDP_t = f\left(AS_{t-1}, INDP_{t-1}, FDI_{t-1}, FPI_{t-1}, ODA_{t-1}, AS_t, FDI_t, FPI_t, ODA_t\right) \qquad (3.4)$$

$$FDI_t = f\left(AS_{t-1}, INDP_{t-1}, FDI_{t-1}, FPI_{t-1}, ODA_{t-1}, AS_t, INDP_t, FPI_t, ODA_t\right) \qquad (3.5)$$

$$FPI_t = f\left(AS_{t-1}, INDP_{t-1}, FDI_{t-1}, FPI_{t-1}, ODA_{t-1}, AS_t, INDP_t, FDI_t, ODA_t\right) \qquad (3.6)$$

$$ODA_t = f\left(AS_{t-1}, INDP_{t-1}, FDI_{t-1}, FPI_{t-1}, ODA_{t-1}, AS_t, INDP_t, FDI_t, FPI_t\right) \qquad (3.7)$$

Thus, the exposition of the normalized SVAR (1) system of equation yields,

$$AS_t = \alpha_{11}^1 AS_{t-1} + \alpha_{12}^1 INDP_{t-1} + \alpha_{13}^1 FDI_{t-1} + \alpha_{14}^1 FPI_{t-1} + \alpha_{15}^1 ODA_t + \alpha_{12}^0 INDP_t + \alpha_{13}^0 FDI_t + \alpha_{14}^0 FPI_t + \alpha_{15}^0 ODA_t + \varepsilon_{1t} \qquad (3.8)$$

$$INDP_t = \alpha_{21}^1 AS_{t-1} + \alpha_{22}^1 INDP_{t-1} + \alpha_{23}^1 FDI_{t-1} + \alpha_{24}^1 FPI_{t-1} + \alpha_{25}^1 ODA_t + \alpha_{21}^0 AS_t + \alpha_{23}^0 FDI_t + \alpha_{24}^0 FPI_t + \alpha_{25}^0 ODA_t + \varepsilon_{2t} \qquad (3.9)$$

$$FDI_t = \alpha_{31}^1 AS_{t-1} + \alpha_{32}^1 INDP_{t-1} + \alpha_{33}^1 FDI_{t-1} + \alpha_{34}^1 FPI_{t-1} + \alpha_{35}^1 ODA_t + \alpha_{31}^0 AS_t + \alpha_{32}^0 INDP_t + \alpha_{34}^0 FPI_t + \alpha_{35}^0 ODA_t + \varepsilon_{3t} \qquad (3.10)$$

$$FPI_t = \alpha_{41}^1 AS_{t-1} + \alpha_{42}^1 INDP_{t-1} + \alpha_{43}^1 FDI_{t-1} + \alpha_{44}^1 FPI_{t-1} + \alpha_{45}^1 ODA_t + \alpha_{41}^0 AS_t + \alpha_{42}^0 INDP_t + \alpha_{43}^0 FDI_t + \alpha_{45}^0 ODA_t + \varepsilon_{4t} \qquad (3.11)$$

$$ODA_t = \alpha_{51}^1 AS_{t-1} + \alpha_{52}^1 INDP_{t-1} + \alpha_{53}^1 FDI_{t-1} + \alpha_{54}^1 FPI_{t-1} + \alpha_{55}^1 ODA_t + \alpha_{51}^0 AS_t + \alpha_{52}^0 INDP_t + \alpha_{53}^0 FDI_t + \alpha_{54}^0 FPI_t + \varepsilon_{5t} \qquad (3.12)$$

Collecting the contemporaneous effects to the left-hand side (LHS) becomes,

$$AS_t - \alpha_{12}^0 INDP_{t-1} + \alpha_{13}^0 FDI_{t-1} + \alpha_{14}^0 FPI_{t-1} + \alpha_{14}^0 ODA_{t-1} = \alpha_{11}^1 AS_t + \alpha_{12}^1 INDP + \alpha_{13}^1 FDI_t + \alpha_{14}^1 FPI_t + \alpha_{15}^1 ODA_t + \varepsilon_{1t} \qquad (3.13)$$

$$-\alpha_{21}^0 AS_t + \alpha_{22}^0 INDP_{t-1} + \alpha_{23}^0 FDI_{t-1} + \alpha_{24}^0 FPI_{t-1} + \alpha_{25}^0 ODA_{t-1} = \alpha_{21}^1 AS_t + \alpha_{22}^1 INDP + \alpha_{23}^1 FDI_t + \alpha_{24}^1 FPI_t + \alpha_{25}^1 ODA_t + \varepsilon_{2t} \qquad (3.14)$$

$$-\alpha_{31}^0 AS_t + \alpha_{32}^0 INDP_{t-1} + \alpha_{33}^0 FDI_{t-1} + \alpha_{34}^0 FPI_{t-1} + \alpha_{35}^0 ODA_{t-1} = \alpha_{31}^1 AS_t + \alpha_{32}^1 INDP + \alpha_{33}^1 FDI_t + \alpha_{34}^1 FPI_t + \alpha_{35}^1 ODA_t + \varepsilon_{3t} \qquad (3.15)$$

$$-\alpha_{41}^0 AS_t + \alpha_{42}^0 INDP_{t-1} + \alpha_{43}^0 FDI_{t-1} + \alpha_{44}^0 FPI_{t-1} + \alpha_{45}^0 ODA_{t-1} = \alpha_{41}^1 AS_t + \alpha_{42}^1 INDP + \alpha_{43}^1 FDI_t + \alpha_{44}^1 FPI_t + \alpha_{45}^1 ODA_t + \varepsilon_{4t} \qquad (3.16)$$

$$-\alpha_{51}^0 AS_t + \alpha_{52}^0 INDP_{t-1} + \alpha_{53}^0 FDI_{t-1} + \alpha_{54}^0 FPI_{t-1} + \alpha_{55}^0 ODA_{t-1} = \alpha_{51}^1 AS_t + \alpha_{52}^1 INDP + \alpha_{53}^1 FDI_t + \alpha_{54}^1 FPI_t + \alpha_{55}^1 ODA_t + \varepsilon_{5t} \qquad (3.17)$$

Expressing equation 3.13 to 3.17 in matrix form

$$\begin{bmatrix} 1 & \alpha_{12}^0 & \alpha_{13}^0 & \alpha_{14}^0 & \alpha_{15}^0 \\ \alpha_{21}^0 & 1 & \alpha_{23}^0 & \alpha_{24}^0 & \alpha_{25}^0 \\ \alpha_{31}^0 & \alpha_{32}^0 & 1 & \alpha_{34}^0 & \alpha_{35}^0 \\ \alpha_{41}^0 & \alpha_{42}^0 & \alpha_{43}^0 & 1 & \alpha_{45}^0 \\ \alpha_{51}^0 & \alpha_{52}^0 & \alpha_{53}^0 & \alpha_{54}^0 & 1 \end{bmatrix} \begin{bmatrix} AS_t \\ INDP_t \\ FDI_t \\ FPI_t \\ ODA_t \end{bmatrix} = \begin{bmatrix} \alpha_{11}^1 & \alpha_{12}^1 & \alpha_{13}^1 & \alpha_{14}^1 & \alpha_{15}^1 \\ \alpha_{21}^1 & \alpha_{22}^1 & \alpha_{23}^1 & \alpha_{24}^1 & \alpha_{25}^1 \\ \alpha_{31}^1 & \alpha_{32}^1 & \alpha_{33}^1 & \alpha_{34}^1 & \alpha_{35}^1 \\ \alpha_{41}^1 & \alpha_{42}^1 & \alpha_{43}^1 & \alpha_{44}^1 & \alpha_{45}^1 \\ \alpha_{51}^1 & \alpha_{52}^1 & \alpha_{53}^1 & \alpha_{54}^1 & \alpha_{55}^1 \end{bmatrix} \begin{bmatrix} AS_{t-1} \\ INDP_{t-1} \\ FDI_{t-1} \\ FPI_{t-1} \\ ODA_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \end{bmatrix} \qquad (3.18)$$

Hence, $A_0 \quad Z_t = A_1 \quad Z_{t-1} + \varepsilon_1$

Where A_0 = 5 x 5 matrix of contemporaneous effects of endogenous parameters

Z_t = 5 x 1 column vector matrix of estimable endogenous variables,

A_1 = 5 x 5 matrix of lagged estimable endogenous variables,

Z_{t-1} = 5 x 1 column vector matrix of lagged estimable endogenous variables, and

ε_1 = 5 x 1 column vector of error term in the system.

The above model cannot be estimated using SVAR because the numbers of parameters are more than the number of equations. Therefore, the over-parameterized model cannot be estimated, thus based on economic theory and institutional knowledge, certain restrictions were imposed on some parameters of the A_0 matrix to resolve the problem of identification in SVAR. Following the recursive approach, restrictions were imposed on the upper elements above the matrix diagonal to zero.

Following the restrictions, the parsimonious form of the SVAR is given as:

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ \alpha_{21}^0 & 1 & 0 & 0 & 0 \\ \alpha_{31}^0 & \alpha_{32}^0 & 1 & 0 & 0 \\ \alpha_{41}^0 & \alpha_{42}^0 & \alpha_{43}^0 & 1 & 0 \\ \alpha_{51}^0 & \alpha_{52}^0 & \alpha_{53}^0 & \alpha_{54}^0 & 1 \end{bmatrix} \begin{bmatrix} AS_t \\ INDP_t \\ FDI_t \\ FPI_t \\ ODA_t \end{bmatrix} = \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \end{bmatrix} \qquad (3.19)$$

Where $\varepsilon_t = \beta\eta_t$, and

$$\begin{bmatrix} \delta_1^2 & 0 & 0 & 0 & 0 \\ 0 & \delta_2^2 & 0 & 0 & 0 \\ 0 & 0 & \delta_3^2 & 0 & 0 \\ 0 & 0 & 0 & \delta_4^2 & 0 \\ 0 & 0 & 0 & 0 & \delta_5^2 \end{bmatrix}$$ = Unit Variance i.e, Var (η_t) =1 (3.20)

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ -\alpha_{21}^0 & 1 & 0 & 0 & 0 \\ -\alpha_{31}^0 & -\alpha_{32}^0 & 1 & 0 & 0 \\ -\alpha_{41}^0 & -\alpha_{42}^0 & -\alpha_{43}^0 & 1 & 0 \\ -\alpha_{51}^0 & -\alpha_{52}^0 & -\alpha_{53}^0 & -\alpha_{54}^0 & 1 \end{bmatrix} \begin{bmatrix} AS_t \\ INDP_t \\ FDI_t \\ FPI_t \\ ODA_t \end{bmatrix} = \begin{bmatrix} \delta_1^2 & 0 & 0 & 0 & 0 \\ 0 & \delta_2^2 & 0 & 0 & 0 \\ 0 & 0 & \delta_3^2 & 0 & 0 \\ 0 & 0 & 0 & \delta_4^2 & 0 \\ 0 & 0 & 0 & 0 & \delta_5^2 \end{bmatrix} \begin{bmatrix} \mu_t^{AS} \\ \mu_t^{INDP} \\ \mu_t^{FDI} \\ \mu_t^{FPI} \\ \mu_t^{ODA} \end{bmatrix} \qquad (3.21)$$

This implies that the normalized SVAR of the form $A_0 Z_t = A_t Z_{t-1} + e_t$ reduces to $A_0 e_t = \beta\eta_t$. But $\beta\eta_t = \beta\mu_t$ hence, the baseline for the estimable SVAR model can be specified in the reduced form as:

$$A_0 e_t = \beta\mu_t \qquad (3.22)$$

Where A_0 = matrix of long-run contemporaneous effects

e_t = column vector matrix of error for the respective variables

β = matrix of structural shocks in the model, and

μ_t = column vector of structural shocks in the model.

Hence, the 'S' matrix is specified as follows:

$$e_t = A_0\beta\mu_t = \begin{bmatrix} e_t^{AS} \\ e_t^{INDP} \\ e_t^{FDI} \\ e_t^{FPI} \\ e_t^{ODA} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ -\alpha_{21}^0 & 1 & 0 & 0 & 0 \\ -\alpha_{31}^0 & -\alpha_{32}^0 & 1 & 0 & 0 \\ -\alpha_{41}^0 & -\alpha_{42}^0 & -\alpha_{43}^0 & 1 & 0 \\ -\alpha_{51}^0 & -\alpha_{52}^0 & -\alpha_{53}^0 & -\alpha_{54}^0 & 1 \end{bmatrix} \begin{bmatrix} \mu_t^{AS} \\ \mu_t^{INDP} \\ \mu_t^{FDI} \\ \mu_t^{FPI} \\ \mu_t^{ODA} \end{bmatrix} \qquad (3.23)$$

This represents the initial impact of shocks in the SVAR model. The impulse response was used to determine the final impact of shocks in the SVAR model.

Before conducting diagnostic tests, the statistical behaviour of the data for this analysis was x-rayed by tabularizing their statistical properties as a means to understanding their contribution to the statistical validity of the main results of the study. The models above were subject to several tests to ensure that their estimates and predictions are realistic, reliable, and robust.

The unit-roots tests of the Augmented Dicky-Fuller-Fisher and Phillip-Peron -Fisher test was carried out to examine the stationarity of the variables in the model. Should all the variables be stationary (by being of order I(0)) estimation of the (model of) equations in levels gives a correct estimate of long-term relationships between the variables if not, the existence of a long-term relationship may have to be sought for and established, via cointegration tests on the variables.

This test is relevant to the SVAR model. It is important to determine whether or not the model is stable/stationary enough to produce consistent results, even though the individual variables may not. In this wise, the inverse roots of the characteristic autoregressive (AR) polynomials were examined to find out if they lie within the unit circle. The null hypothesis that the system is unstable will not be rejected if the roots lie outside the circle (Greene, 2008). The stability of the model is essential for the validity of some results such as that for the impulse-response analysis. This study selected the optimal lag length using the Akaike information criterion (AIC), Hannan-Quinn test, as well as Swartz Information Criterion (SC). However, priority was given to the stability of the model as the validity of its results, including impulse response result (which is critical to the analysis), depends on the model's stability. Data on all the variables were extracted from World Development Indicators.

4. Results and Discussion

The summary of the descriptive statistics of variables in the study is presented in Table 4.1. The descriptive statistics in Table 4.1 showed that the mean values for foreign direct investment (FDI), foreign portfolio investment (FPI) and official development assistance (ODA) were 2.019874, 0.695853, and 1.462146 respectively. While the mean values for the industrial sector output (INDP) and agricultural sector output (AS) was 5.321626 and 2.464583 respectively. The standard deviation for FDI, FPI, and ODA were 0.989632, 1.415866, and 1.138559 respectively, showing that FPI and ODA are more volatile than FDI. The skewness statistics showed that all the variables were positively skewed. The null hypothesis of the Jarque-Bera test says that the distribution is a normal one. Therefore, if the probability is less than 0.05, we reject the null hypothesis. From the results, it could be seen that all the variables had p-values greater than 0.05 signifying that they were normally distributed. The descriptive statistics show clearly that Nigeria's foreign agriculture capital inflows have a different level of performance in the real sector of the economy.

Table-4.1. Summary of Descriptive Statistics

Variables	FDI	PFI	ODA	INDP	AS
Mean	2.019874	0.695853	1.462146	1.172194	1.271266
Median	2.238019	0.000000	1.414446	1.098494	1.256829
Maximum	3.133638	3.195537	3.167536	1.862370	1.500374
Minimum	0.468521	2.509391	1.000000	0.730782	0.998259
Std. Dev.	0.989632	1.415866	1.138559	0.320846	0.088946
Skewness	0.693955	0.108872	0.266479	0.833405	0.223285
Kurtosis	2.539662	5.519713	4.026200	4.590208	5.089311
Jarque-Bera	2.850943	0.370784	1.643108	3.928243	6.086193
Probability	0.240395	0.130778	0.439748	0.140279	0.127687
Sum	64.63598	22.26731	46.78867	37.51020	40.68051
Sum Sq.Dev	30.36053	62.14497	40.18583	3.191205	0.245256
Observations	32	32	32	32	32

Source: Author's Computation using E-Views 10 Output

Correlation analysis of the variables was conducted to ascertain whether the variables are not orthogonal and also to check for the absence of multicollinearity in the model as presented in Table 4.2.

Table-4.2. Correlation Matrix

Correlation	FDI	PFI	ODA	INDP	AS
LFDI	1.000000				
LPFI	0.494606	1.000000			
LODA	0.663422	0.557628	1.000000		
LINF	0.267749	0.197396	0.294876	1.000000	
LINR	0.013404	0.181338	0.045213	0.438515	1.000000

Source: Author's Computation using E-Views 10 Output

The result of the correlation analysis shows that all the variables have a positive correlation, which suggests that the variables are not orthogonal but are positively related to each other. Given the low correlation coefficients, it is concluded that there is the absence of multicollinearity among the series.

Before the SVAR was estimated, the unit root test was conducted to examine the stationarity property of the series and the ADF is presented in Table 4.3.

Table-4.3. ADF Unit root test

Variable	ADF Statistics	Critical value @5%	Order of Integration
LFDI	-9.450393	-2.963972	1(1)
LFPI	-6.317778	-2.986225	1(1)
LODA	-4.983186	-2.967767	1(1)
LAS	-6.697374	-2.960411	1(1)
LINDP	-6.936479	-2.960411	1(1)

Source: Authors' Computation using E-Views 10 Output.

In doing so, the Augmented Dickey-Fuller (ADF) unit root test was used and the result is presented in Table 4.3 reveals that all the variables LFDI, LFPI, LODA, LINDP and LAS are integrated of order one. This means the series has the mean-reverting ability, implying that any shock to the series will disappear with time.

While Table 4.4 indicate the lag order selection criteria. The result shows that the optimal lag length is lag 2, as suggested by sequentially modified LR test statistic, final prediction error (FPE), Akaike information criterion

(AIC), and Hannan-Quinn information criterion (HQ). This indicates that SVAR (2) specification is the parsimonious model and plausible description of the data employed.

Table-4.4. VAR Lag Order Selection Criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-564.6395	NA	1.99e+09	35.60247	35.83149	35.67838
1	-491.0760	119.5407	97983574	32.56725	33.94138	33.02273
2	-445.8671	59.33662*	31349135*	31.30419*	33.82343*	32.13925*

Note: *indicates lag order selected by the criterion; LR: Sequential modified LR test statistics (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 using E-Views 10 Output.

4.2. Co-Integration and Long-run Relationship Test

From the result of the ADF unit root test result, the Johansen co-integration test was considered the best technique to test the existence of a long-run equilibrium relationship between the variables of interest. Thus, the result of the Johansen co-integration test was presented in Table 4.5. The result reveals that unrestricted rank tests for both Trace and Maximum Eigenvalue statistics indicate 3 co-integration equations at a 5% significant level. This implies that there is a long-run relationship among the variables FDI, FPI, ODA, INF, EXR, and GDP.

Table-4.5. Johansen Cointegration Test

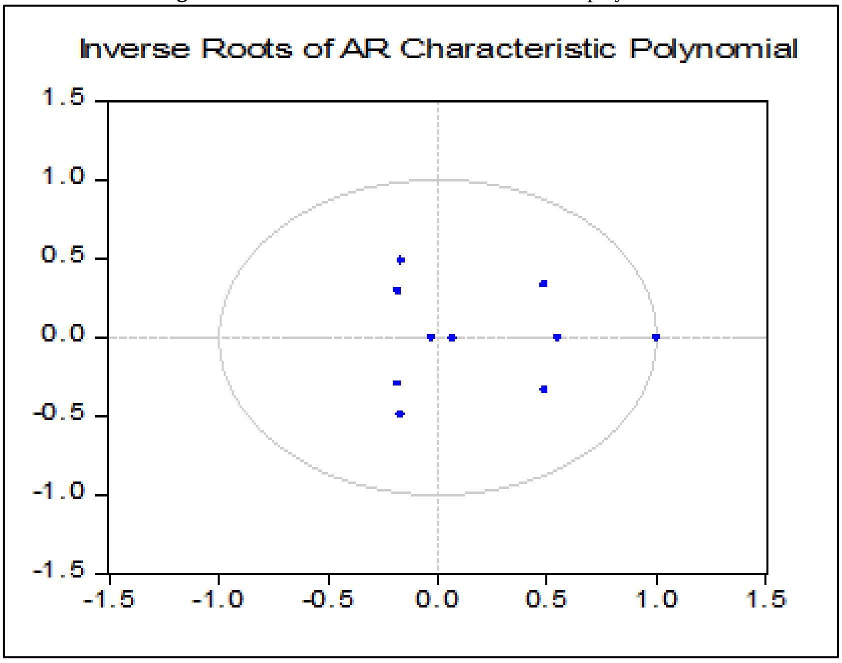
Variables: LAGS LINDP FDI FPI ODA							
Hypothesized		Trace	0.05		Max-Eigen	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**	Statistic	Critical Value	Prob.**
$r = 0^*$	0.840522	175.6926	125.6154	0.0465	56.91129	46.23142	0.0462
$r \leq 1^*$	0.756352	118.7813	95.75366	0.0215	43.77297	40.07757	0.0184
$r \leq 2^*$	0.729115	75.00834	69.81889	0.0181	40.48790	33.87687	0.0270
$r \leq 3$	0.393430	34.52044	47.85613	0.4736	15.49797	27.58434	0.7079

Note: Trace test indicates 3 cointegrating eqn(s) at the 0.05 level and *denotes rejection of the hypothesis at the 0.05 level.

Source: Author's Computation using E-Views 10 Output.

The inverse roots of the AR characteristic polynomial for the model show that all the dots fall within the circle. Similarly, the IRF and FEVD of SVAR estimates are stable and reliable for the model used, as shown in Figure 4.1.

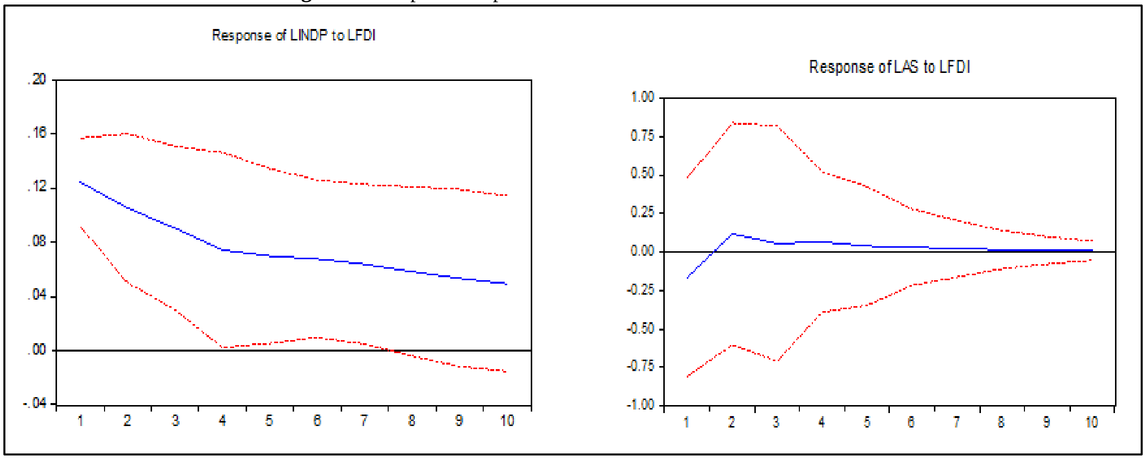
Figure-4.1. Inverse roots of the AR characteristic polynomial



4.3. Impulse Response Functions

Based on the outcome of the diagnostic checks conducted, the impulse response functions were used to examine the response of each variable in the system to shocks from the system variables. Figure 4.2 depicts the impulse response function (IRF) of the industrial sector output (LINDP) to a shock or innovation in the foreign direct investment inflows (FDI) and the impulse response function (IRF) of the agricultural sector output (LAS) over 10 years are presented in the following Figure 4.2.

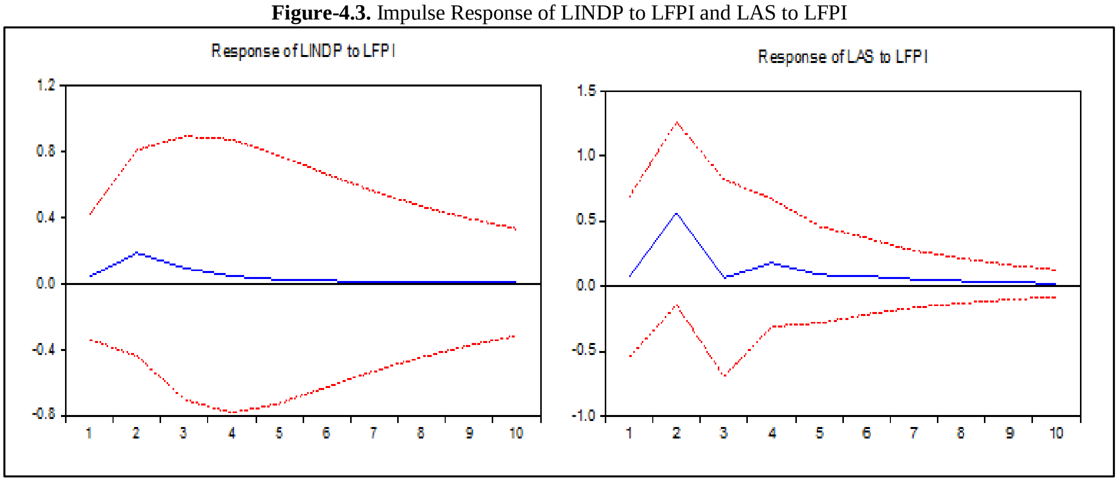
Figure-4.2. Impulse Response of LINDP to LFDI and LAS to LFDI



Source: Authors' Computation Using EViews 10.

Figure 4.2 depicts the impulse response function (IRF) of the industrial sector output (INDP) to a shock or innovation in the foreign direct investment inflows (FDI) over ten years. The IRF indicates that INDP responds positively to shocks or innovations in FDI and it is statistically significant. This presupposes that the inflows of foreign direct investment have positive effects on the growth of the industrial sector in Nigeria. This result is consistent with the outcome of the studies carried out by Bitzer and Görg (2005), Zámborský Peter (2006), Buckley *et al.* (2006). While the impulse response function (IRF) of the agricultural sector output (LAS) to a shock or innovation in the foreign direct investment inflows (FDI) indicates that agricultural sector output responds positively to shocks or innovations in FDI, but it is statistically insignificant as shown by the confidence interval (or bands). This suggests that, even though agricultural output responds positively to the inflows of foreign direct investment, it, however, does not determine growth in the agricultural output in Nigeria. This result is consistent with previous studies such as Idowu and Ying (2013) and Epaphra and Mwakalasya (2017).

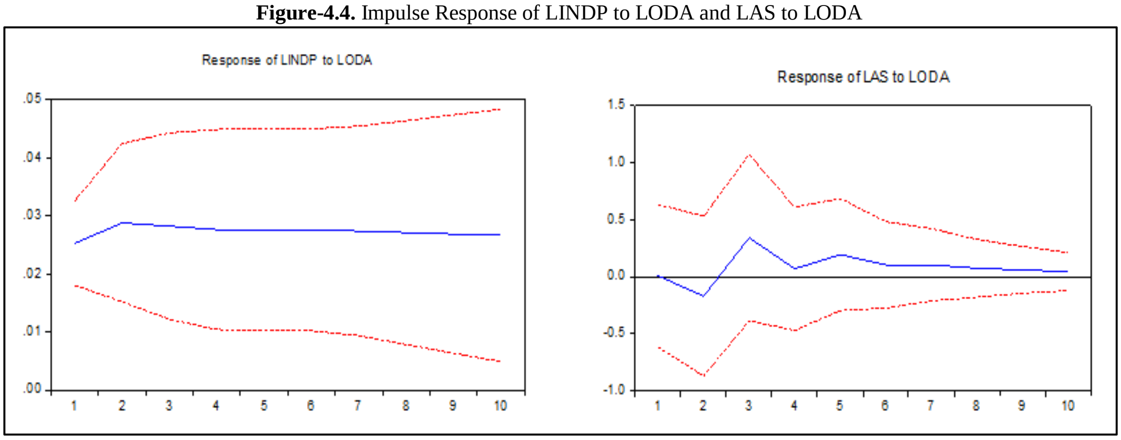
Figure-4.3. Impulse Response of LINDP to LFPI and LAS to LFPI



Source: Authors' Computation Using EViews 10.

Figure 4.4 depicts the impulse response function (IRF) of the industrial sector output (INDP) and agricultural sector output (AS) to a shock or innovation in the foreign portfolio investment inflows (FPI) over ten years was positive but insignificant.

Figure-4.4. Impulse Response of LINDP to LODA and LAS to LODA



Source: Authors' Computation Using EViews 10.

The impulse response function (IRF) of the industrial sector output (INDP) to a shock or innovation in the overseas development assistance (ODA) showed that INDP responds positively to shocks or innovations in ODA and it is statistically significant. This assumes that the inflows of overseas development assistance (ODA) have positive effects on the growth of the industrial sector in Nigeria. While the impulse response function (IRF) of the agricultural sector output (LAS) to a shock or innovation in the overseas development assistance over 10 years. The IRF indicates that agricultural sector output responds positively to shocks or innovations in official development assistance (ODA) and it is statistically insignificant. The result collaborates with Effiong and Eke (2016), who posited that foreign aids and grant to agriculture (FAG), has a positive impact but does not significantly affect crop output in Nigeria.

Table 4.6 shows the variance decomposition (VDC) of agricultural sector output (AS) for 10 periods. In each table, SE refers to forecast error and each column indicates the extent, in percentage, of the forecast error that is explained by each variable in the SVAR. Table 4 depicts that FDI, FPI and ODA accounts for 27.4, 0 and 2.4 per cent variation in agricultural sector output (AS). In the 5th period, FDI, FPI and ODA account for 25.0, 0.7 and 11.3 per cent variation in agricultural sector output (AS) while INDP accounts for less than 1.5 per cent.

Table-4.6. Variance Decomposition of Agricultural Sector Output

Period	S.E.	LAS	LFDI	LFPI	LODA	LINDP
1	1.499751	100.0000	0.000000	0.000000	0.000000	0.000000
2	1.894437	68.69061	27.44510	0.004153	2.412487	1.447657
3	2.081844	61.69364	23.63887	0.078805	11.92905	1.659635
4	2.139826	61.85942	23.53477	0.732260	11.29788	1.575668
5	2.190102	60.33856	25.05855	0.705411	11.33183	1.565646
6	2.211375	60.10660	24.90014	0.861833	11.11597	1.015460
7	2.223557	59.96468	24.74974	0.889758	11.00284	2.392983
8	2.231244	59.77365	24.66205	0.928611	10.92922	2.706462
9	2.235773	59.63019	24.56740	0.956282	10.88600	2.960120
10	2.238581	59.52942	24.51162	0.988048	10.86914	2.101772

Source: Authors' Computations using E-views 10

By the 10th period, FDI, FPI and ODA have accounted for about 24.5, 0.9 and 10.8 per cent variation in agricultural sector output (AS) while INDP accounts for 2.1 per cent. This result implies that the agricultural sector output is influenced by foreign direct investment and official development assistance inflows.

The outcome in Table 4.7 depicts the VDC of INDP for 10 periods. The result indicates that in the second period, FDI, FPI and ODA account for 2.2, 0.9 and 8.3 per cent in variation in INDP while AS accounts for 0.2 per cent. In the 5th period, the variation in INDP caused by FDI, FPI, ODA and agricultural sector output (AS) increased to 9.9, 1.8, 13 and 2.2 per cent respectively.

Table-4.7. Variance Decomposition of Industrial Sector Output

Period	S.E.	LINDP	LFDI	LFPI	LODA	LAS
1	0.998212	100.0000	0.000000	0.000000	0.000000	0.000000
2	1.683889	90.06067	2.240199	0.975490	8.359630	0.264011
3	2.136072	86.88185	4.079240	0.211640	11.52974	0.297532
4	2.431816	86.12474	7.851503	0.300382	12.47615	1.247232
5	2.634633	85.12261	9.947016	1.829838	13.08830	2.212242
6	2.770389	84.23535	12.99515	1.561690	13.31017	3.193282
7	2.853143	83.44756	13.68221	2.251030	13.44922	2.183967
8	2.903585	82.93299	15.45247	2.765710	13.47171	2.184345
9	2.935058	82.63399	19.31988	3.111808	13.43028	2.191937
10	2.955910	82.47181	22.23535	3.334089	13.36891	1.201650

Source: Authors' Computations using E-views 10.

By the end of the 10^{th} period, FDI, FPI, ODA accounts for 22.2, 3.3 and 13.3 per cent respectively of the variation in INDP while agricultural sector output (AS) accounts for only 1.2 per cent. This result implies that both foreign direct investment and official development assistance inflows have a significant influence on industrial sector output in Nigeria. However, the inflows of foreign direct investment have greater influence.

Table 4.8 depicts the vector autoregressive (VAR) Granger Causality Test, which was conducted to ascertain the existence of a causal relationship between the endogenous variables under study. The result shows that a unidirectional causal relationship running from both foreign direct investment and official development assistance to INDP. This suggests that foreign direct investment inflows and official development assistance, granger cause growth in industrial sector output. Also, the foreign direct investment and official development assistance granger cause growth in agricultural sector output. Besides, there is a unidirectional causal relationship running from AS to INDP, and this means that agricultural sector output can be utilised by the industrial sector as input.

Table-4.8. VAR Granger Causality

Null Hypothesis:	Obs	F-Statistic	Prob.
FPI does not Granger Cause FDI	32	0.43651	0.6508
FDI does not Granger Cause FPI		0.39274	0.6790
ODA does not Granger Cause FDI	32	2.28177	0.1215
FDI does not Granger Cause ODA		0.38523	0.6840
LAGS does not Granger Cause FDI	32	0.30038	0.7430
FDI does not Granger Cause LAGS		0.36771	0.6957
LINDP does not Granger Cause FDI	32	0.55860	0.5785
FDI does not Granger Cause LINDP		0.67957	0.0153
ODA does not Granger Cause FPI	32	0.14496	0.8657
FPI does not Granger Cause ODA		0.29448	0.7473
LAGS does not Granger Cause FPI	32	0.52066	0.6000
FPI does not Granger Cause LAGS		0.11840	0.8888
LINDP does not Granger Cause FPI	32	0.00303	0.9970
FPI does not Granger Cause LINDP		0.09873	0.0493
LAGS does not Granger Cause ODA	32	1.03852	0.3677
ODA does not Granger Cause LAGS		1.37364	0.2703
LINDP does not Granger Cause ODA	32	1.33765	0.2793
ODA does not Granger Cause LINDP		1.68905	0.0316
LINDP does not Granger Cause LAGS	32	0.16843	0.8459
LAGS does not Granger Cause LINDP		0.75564	0.0494

Before the impulse response and variance decomposition were conducted, the study performed various diagnostics tests, and the results are shown in Table 4.9.

Table-4.9. Diagnostic Test Result

Model	VAR Residual Serial Correlation LM Tests Rao F-Stat (Prob)	VAR Residual Normality Test Joint Chi-Sq (Prob)	VAR Residual Heteroskedasticity Test Joint Chi-Sq (Prob)
AS	0.299004 (0.9944)	1.946427 (0.7452)	173.3398 (0.2227)
INDP	0.656713 (0.8184)	4.635652 (0.84384)	170.1565 (0.2765)

Source: Author's Computation using EViews 10 Output

The VAR residual test for serial correlation, normality and heteroskedasticity respectively is reflected in Table 4.7. Given the Rao F-statistic values for AS and INDP was 0.299004 and 0.995572 respectively with the probability values for AS and INDP was 0.9944 and 0.4787 respectively, the null hypothesis of no serial correlation among residuals of the series was accepted. Also, with the Joint Chi-Square values for AS and INDP was 1.946427 and 0.837057 respectively with the probability values of 0.7452 and 0.6350, the null hypothesis that the residuals are multivariate normal was accepted. Finally, the Joint Chi-square values of 173.3398 and 175.6426 for AS and INDP respectively with the probability values of 0.2227 and 0.1882 for AS and INDP respectively led to the acceptance of the null hypothesis that the residuals are homoscedastic. This means that the SVAR model is free from the econometric problems of serial correlation, normality and heteroskedasticity.

5. Conclusion and Policy Recommendations

This study investigates the effect of foreign direct investment, foreign portfolio investment (FPI), and official development assistance on macroeconomic performance in Nigeria over the period 1986 to 2019. The study reviewed that the inflow of foreign direct investment, foreign portfolio investment and official development assistance exert influence on both the agricultural sector output and industrial output. However, FDI and ODA inflows influence the industrial sector output significantly than the agricultural sector. In light of these findings, the study recommends that the government should greatly invest in rural infrastructure development that will encourage foreign investment and enhance the linkage of agriculture to industry. More so, the macroeconomic environment should be made conducive for portfolio management and necessary regulation put in place by the capital market to ensure stability. Besides, policymakers must develop policies that are foreign agricultural capital friendly to attract more foreign capital to the agricultural sector for the growth of economic activities in the industry.

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