

Foreign Direct Investment Inflow and Agricultural Sector Productivity In Nigeria

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Abstract: *The agricultural sector plays an important role in the Nigerian economy through its contribution to economic growth and development. Over the years, the growth potentials of the sector have been retarded due to under financing of the sector which results from total neglect of the sector by government and financial institutions. This paper thus, explored the impact of foreign direct investment on agricultural productivity in Nigeria. The study employed Augmented Dickey – Fuller (ADF), Johansen test and Error Correction Mode to examine the effect of foreign direct investment and agricultural development. The unit root test results revealed that all the macroeconomic variables namely Agricultural Productivity, Foreign Direct Investment, Bank Credit to Agricultural Sector and Government Expenditure to Agricultural Sector were stationary at first difference. The results of the co-integration test indicated that there exist long run equilibrium relationships among the variables. The result of the error correction model indicated that both foreign direct investment and bank credit to agricultural sector had significant effect on agricultural productivity while it was established that there exist an insignificant relationship between government expenditure to agricultural sector and agricultural productivity. It was however concluded that, for the Nigerian economy to benefit from the huge potentials of agricultural sector, the sector must be willing to explore more benefits offered by foreign investors. It was however recommended that, adequate infrastructures should be put in place by the government through massive rural-urban in infrastructure investment scheme in order to attract the flow of foreign investment to the agricultural sector. Government should provide stable and conducive environment that is capable of supporting the growth potentials and flow of international investment into the agriculture sector. Finally, government should prioritize the development of the agricultural sector through increase in government budgetary allocation to the agriculture sector. Government should set up a board for the purpose of monitoring the funds allocated to the agricultural sector in order to prevent diversion of funds by government agencies and farmers.*

Key Words: *Agricultural Productivity, Foreign Direct Investment, Government Expenditure and Bank Credit.*

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I. Introduction

The major need of human being since existence is food and shelter. Agriculture has been the mainstay of developing economies including Nigeria and the recent increase in populations has called for the need to ensure food security through huge investments in agricultural sector. The current wave of integration and globalization has increased mutual co-operations among nations of the world through the attraction of foreign investments.

Foreign direct investment involves the investment made by the citizens of a foreign country in a domestic country. Foreign direct investment refers to an investment made to acquire lasting interest in an enterprise operating outside of the economy of the investor (UNCTAD, 2002). Rotjanapan (2005) conceived foreign direct investment as long-term investment made by a foreign resident to have an interest and control of over a company in another economy.

Agriculture involves the cultivation of crop, rearing of animals and aquatic species for human consumption. Agricultural sector has continued to contribute to the economy of developing countries through the provision of basic needs of humankind, creation of employment, provision of industrial materials both for domestic use and exportation and contribution to foreign earnings. Thus, the role of agriculture in promoting growth and development cannot be overemphasized. Chaudhary (2016) asserted that “report of World Bank on development revealed in 2000 over 1.1 billion people were subsisting on less than US\$1 a day and around 2.1 billion people on less than US\$2 a day of which between two thirds to three-quarters live in rural areas of developing nations”. Thus, war on poverty in developing economies can be won through the development of the agricultural sector (Mangisoni, 2006).

In spite of the concentration of government on oil revenue, the agricultural sector still contributed to the economy in terms of gross domestic product, foreign earnings and employment creation. Yusuff et al.,

(2015) aver that agriculture accounts for about 40 percent of GDP and provides employment for about 60 percent of Nigeria's 170 million people. With this huge contribution, it is expected that the Nigerian government would pay a special attention to the agricultural sector but it is unfortunate that the sector has been neglected due to total reliance of the economy on crude oil. The sector continues to witness drop in productivity of major farm produce which has resulted in the importation of consumable products that could be produced in the country. Nigeria that was once a large net exporter of agricultural products and major foreign exchange earner before the advent of oil in 1970s is currently a huge net importer of agricultural products, with such imports exceeding \$3 billion in 2010 (Yusuff, et al., 2015).

The agriculture sector has been experiencing under funding in the recent years which is due to fall in allocation of funds to the sector in the budget. Financial institutions have also turned away from providing credits to agricultural sector as they prefer lending to industrial and oil companies who could give them more returns. The sector still remains in subsistence nature and reliance on crude equipments due to lack of finance. One could conclude that the Nigeria economy has passed its agrarian years. Though, the Nigerian economy has benefited foreign direct investment, however, the recipient sectors have been the communication sector, banking sector, education sector, industrial sector with manufacturing sector being the major recipient.

Considering the unstable nature of oil price which has resulted in dwindling oil revenue and mono culture state of the economy, successive government has made diversification of the economy into agriculture sector their lending agenda. Moreover, as a result of the fact that the agriculture sector has continued to experienced lack of adequate funding from internal sources especially from government and banks institutions, there is the need for alternative sources of finance and investment opportunities in the sector. Thus, this paper explored the relationship between foreign direct investment and agricultural sector development in Nigeria.

II. Literature Review

Theoretically, it is widely believed that foreign direct investment has the capacity to promote growth and development. Ekienabor, Aguwamba and Liman, (2016); Akinmulegun and Oluwole (2014); Orji, Anthony-Orji, Nchege and Okafor (2015) evaluate the impact of foreign direct investment on manufacturing sector in Nigeria, while Akinlo (2004); Imoudu (2012); Uwazie, Igwemma and Eze (2015) examined the impact of foreign direct investment on economic growth in Nigeria. There are many studies done on the relationship between FDI and economic growth. However, there are few literatures on the impact of FDI on agricultural sector development.

Shuaib, Igbinosun and Ahmed (2015) examined the impact of government agricultural expenditure on the growth of the Nigerian economy from 1960 to 2012. The study employed regression analysis to explore the possible links between government agricultural expenditure and economic growth and it was revealed that government agricultural expenditure has a significant direct relationship with economic growth. Akinmulegun (2015) examined the effect of agricultural financing on economic growth using time series which was analyzed using Vector Error Correction Approach (VECA). The result revealed that there is a unidirectional casualty runs from budgetary allocation to agricultural sector (BAAGRIC) to contribution of Agriculture to Real Gross Domestic Product. The result of the co-integration revealed that there is a long run relationship between budgetary allocations to agricultural sector (BAAGRIC) and Agriculture to Real Gross Domestic Product

Akinmulegun (2018) examined the effect of globalization on agricultural sector in Nigeria. The study made use of annual time series data spanning from 1986 to 2015 of globalization proxied by foreign direct investment (FDI) to agriculture, degree of openness, foreign exchange rate and consumer price index to assess the impact of globalization on agricultural productivity proxied by the output of agriculture. The study adopted Error Correction Model to test for the short run relationship having employed Augmented Dickey Fuller and Phillips-Perron unit root tests to verify stationarity of the variables used while bounds Autoregressive distributed lag testing approach was employed to account for the long run relationship of the explanatory variables on the dependent variables. The result of the data analysis indicated that foreign exchange, degree of openness and foreign direct investment were not statistically significant in influencing the favorable trend of agricultural productivity in Nigeria, thus, its growth potential while consumer price index impacted positively on agricultural productivity to a larger extent. Fakun and Evbuomwan (2017) evaluated agricultural financing, policies, programmes and initiatives for a sustainable development in Nigeria, from 1990-2014 using secondary data sourced from the Central Bank of Nigeria (CBN) Statistical Bulletins, Annual Report and Statements of Accounts, Bullion, The Economic and Statistical Review of National Planning Commission, conferences Journals and Publications, World Bank and United Nations publications and text books, using the descriptive and inferential techniques. The findings of the study showed that Nigerian Government failed to show enough commitments to agricultural activities for its development towards realization of agricultural sustainable development.

On the relationship between foreign direct investment and agricultural development, Iddrisu, Immurana and Halidu (2015) studied impact of FDI on the performance of the agricultural sector in Ghana covering the

period of 1980 to 2013 using Unit Root Test, Johansen Cointegration test and Error Correction Model. The results of the study revealed that FDI negatively impacts the agricultural sector productivity in the long run but with positive relationship in the short run and also depreciation of the cedi negatively impacts the growth of the agricultural sector in the long run while trade openness on the other hand had positive and significant long run impact on the agricultural sector. Idowu and Ying (2013) in their study also found that FDI has no significant impact on agricultural output. These studies though reported insignificant impact, fail to show the type of relationship that exist between FDI and agriculture. However, Ogbanje, Okwu and Saror (2010) used Pearson Product Moment Correlation analysis to determine the relationship between agricultural FDI and agricultural GDP and found a positive and strong relationship. Oloyede (2014) examined the impact of foreign direct investment on agricultural sector in Nigeria by employing secondary time series data which spanned from 1981 to 2012 using multiple regressions. It was found in the study that FDI impacted positively on agriculture not only in the short-run but also in the long-run. Abu et al., (2011) explored the relationship between foreign direct investment and Agricultural Production in Nigeria. It was revealed that foreign private investment, domestic investment and export of agricultural output had positive and significant effect on agricultural output while government expenditure had negative effect on agricultural output.

Yusuff et al., (2015) researched on analysis of foreign direct investment on agricultural sector and its contribution to gross domestic production in Nigeria in which they investigated the impact of agricultural foreign direct investment on agricultural sector productivity in Nigeria and used descriptive statistics and simple linear regression with the model agricultural Gross Domestic Product (GDP) as a function of agricultural foreign direct investment, (AGRFDI) found that the inflow of Foreign direct investment to agricultural sector did not follow a regular pattern, but that the sector's contribution to gross domestic product was in direct relationship with the inflows of Foreign Direct Investment. The researchers recommended that the government should put in place the necessary infrastructure and find permanent solution to the problem of insecurity as this would enhance the flow of foreign direct investment into the economy as a whole and the agricultural sector in particular.

Daniel and Maiwada (2015) analyzed the nature and volume of Chinese trade and investment in Nigeria's Agricultural sector and its impact on the Nigerian economy. The study revealed that that the agricultural sector which hitherto dominated the economy especially as a source of revenue soon gave way to crude oil and it was revealed that Chinese trade and investment in Nigeria's agriculture is very low compared to other sectors and have not focused much in the development of the sector in Nigeria.

Many studies have been conducted on the impact of foreign direct investment on economic growth and sectoral performance, however, the impact of FDI on agricultural sector is scanty (Oloyede, 2014; Yusuff et al., 2015; Akinmulegun (2018). For instance Ekienabor, Aguwamba and Liman, (2016); Akinmulegun and Oluwole (2014); Orji, Anthony-Orji, Nchege and Okafor (2015) evaluate the impact of foreign direct investment on manufacturing sector in Nigeria, while Akinlo (2004); Imoudu (2012); Uwazie, Igwemma and Eze (2015) examined the impact of foreign direct investment on economic growth in Nigeria. With the huge role played by foreign direct investment in Nigerian economy and the declining activities of the agricultural sector, the need to evaluate the impact of foreign direct investment on agricultural development in Nigeria which is the main thrust of this study.

III. Methods

This study employed multiple regression economic model to assess the effect of foreign direct investment, bank credit to agricultural sector and government expenditure to agricultural sector on agricultural productivity in Nigeria. Data involved in the study were secondary data which spanned through 1986 to 2015 and obtained from Central Bank of Nigeria Statistical Bulletin and World Development Indicators.

Econometric Model

This study adopted re-modified model of Yusuff, Adamu and Afolayan (2015) with a little modification: The model surpassed the mode of Yusuff et al., (2015) by including Bank Credit to Agricultural Sector and Bank Credit to Agricultural Sector.

$$AP = f(\text{FDI, BCA and GEA}) \tag{1}$$

This is given mathematically as:

$$AP = B_0 + B_1\text{FDI} + B_2\text{BCA} + B_3\text{GBA} + U_i \tag{2}$$

Following an Error Correction Model specification, the model was transform;

$$D(AP) = \Theta_0 + \Theta_1D(AP_{t-1}) + \Theta_2D(\text{FDI}_{t-1}) + \Theta_3D(\text{FDI}_{t-2}) + \Theta_4D(\text{GEA}_{t-1}) + \Theta_5D(\text{GEA}_{t-2}) + \Theta_6D(\text{BCA}_{t-1}) + \Theta_7D(\text{BCA}_{t-2}) + \text{ECT}_{t-1} + U_t \tag{3}$$

Where

AP = Agricultural Productivity

FDI = Foreign Direct Investment

BCA = Bank Credit to Agricultural Sector
 GBA = Government Budget to Agricultural Sector
 Θ_0 = Constant Tem
 $\Theta_1 - \Theta_7$ = Estimated Parameters
 U_i = Stochastic Error Term

Data Analysis Techniques

Based on the nature of the data for the study which are time series in nature, the analytic techniques for this study are Augmented Dickey Fuller unit root test, Johansen Co-integration Test and Error Correction Model. The Augmented Dickey Fuller test was employed in order to test the stationary properties of the time series data and obtain the order of integration of the variables.

Also, Johansen Co-integration test is employed to determine the long run equilibrium among the macroeconomic variables employed namely foreign direct investment, bank credit to agricultural sector and government expenditure to agricultural sector and agricultural output. Also Error Correction Model was employed to ascertain the speed of adjustment in the short run.

F-statistic was employed to determine the joint impact of the explanatory variables (measure as foreign direct investment, bank credit to agricultural sector and government expenditure to agricultural sector) on agricultural productivity. Finally Adjusted R^2 was adopted to determine the proportion of agricultural productivity that is explained by the explanatory variables (measure as foreign direct investment, bank credit to agricultural sector and government expenditure to agricultural sector).

IV. Result and Discussions

Trends Analysis

The following diagrams were observed to study the growth pattern of Agricultural Productivity in Nigeria economy in response to changes in the explanatory variables.

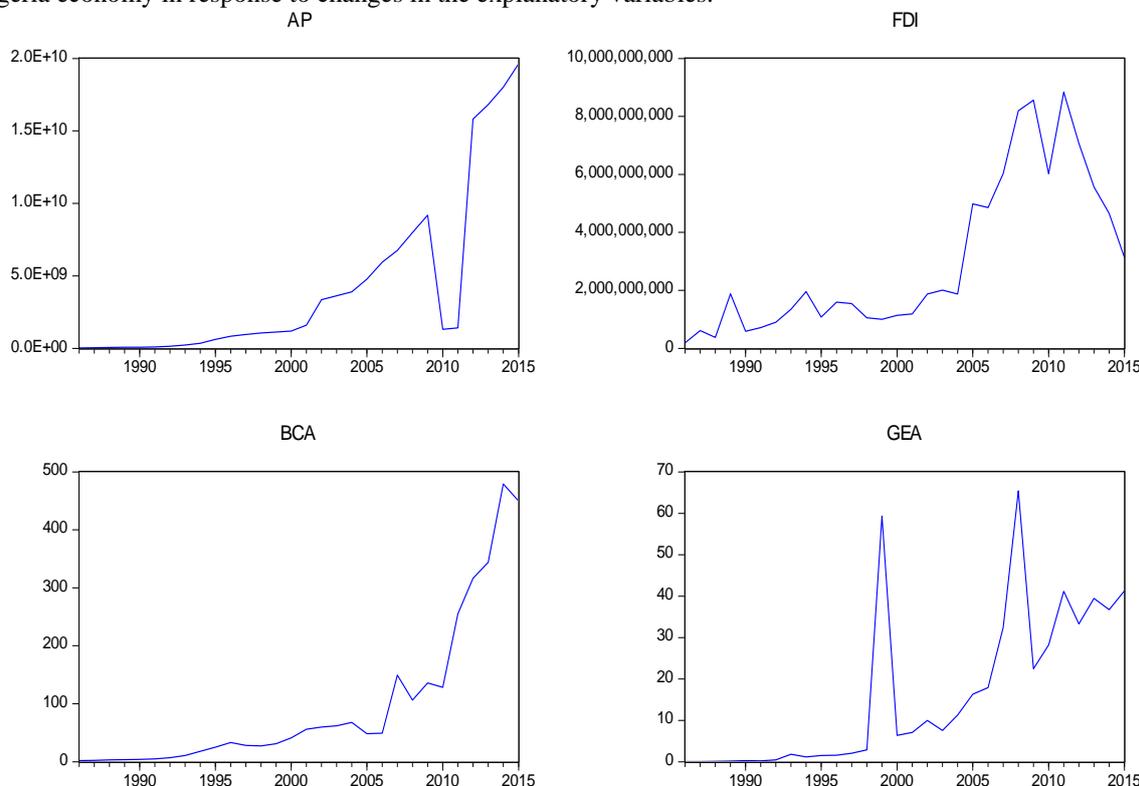


Figure 1: Trends Analysis

Figure 1 above depicts the graphical representation of the relationship explanatory variables (measured as Foreign Direct Investment, Bank Credit to Agricultural Sector and Government Expenditure to Agricultural Sector) on the dependent variable (measure as Agricultural Productivity) from 1986 to 2015. It was revealed that between the periods of 1986 to 2000, the Agricultural Productivity (AP) was very low and showed a sluggish growth rate which resulted low funding of the agricultural sector by commercial banks and government expenditure with fluctuating Foreign Direct Investment. The above graphs revealed that Bank Credit to

Agricultural Sector and Government Expenditure to Agricultural Sector were at the lowest between the period of 1986 and 1995.

However, in year 2000 there was slight increase Agricultural Productivity (AP) result from little increase in Bank Credit to Agricultural Sector and Government Expenditure to Agricultural Sector. However, Foreign Direct Investment fluctuated at this period which point to the unstable nature of the Nigerian economy to support international investment. Also, in 2000 there was a significant allocation of government expenditure to the agricultural sector, slight increase was recorded in agricultural productivity which might be as a result of corruption and diversion of funds meant for agricultural purpose. There was improvement in agricultural productivity from 2000 to 2005 despite little funding of the sector.

The impact of the determinant factors was clearly captured during the period 2010 to 2015. In 2010 there was a significant drop in Agricultural Productivity (AP) in Nigeria resulting from poor funding of the sector. However, a remarkable improvement was recorded in agricultural sector from 2010 upward with high rises in Agricultural Productivity rise resulting from adequate funding of the sector. Though, the growth rate of Government Expenditure to Agricultural Sector was unstable which reflected the low budgeting to the sector annually.

Correlation Matrix

Table 1 Correlation Matrix

	AP	FDI	BCA	GEA
AP	1.000000			
FDI	0.553612	1.000000		
BCA	0.911800	0.577134	1.000000	
GEA	0.617559	0.702534	0.639798	1.000000

Sources: Researchers' Computation, 2018

Table 1 above shows the correlation matrix for the macroeconomic variables employed in this study. A correlation above 0.7 or 70 percent indicates evidence of multicollinearity. It is thus revealed that absence of multicollinearity in all the explanatory variables since the correlation values are less 70% except Bank Credit to Agricultural Sector with a correlation value of 91%.

The table indicates all the explanatory variables (measured as Foreign Direct Investment, Bank Credit to Agricultural Sector and Government Expenditure to Agricultural Sector) have direct correlation relationship with Agricultural Productivity in Nigeria. It was revealed that both Bank Credit and Government Expenditure to Agricultural Sector have strong relationship with Agricultural Productivity which implies that an increase Bank Credit and Government Expenditure to Agricultural Sector will lead to increase in Agricultural Productivity while Foreign Direct Investment has moderate relationship with Agricultural Productivity.

Test of Stationarity for the Variables

Table 2: Summary of Unit Root

VARIABLES	TEST STATISTIC	5% CRITICAL VALUE	Prob.	LEVEL	S/NS
AP	/5.126601/	/3.644963/	0.0026	1(1)	S
FDI	/6.057319/	/3.580623/	0.0001	1(1)	S
BCA	/7.032515/	/3.580623/	0.0000	1(1)	S
GEA	/6.288404/	/2.976263/	0.0001	1(1)	S

Sources: Researchers' Computation, 2018

Table 2 above shows the summary of unit root test of the macroeconomic variables. In order to reject the unit root the test statistics must be greater than the critical value at 5% level of significance in absolute term. It was revealed that all the variables that is, Agricultural Productivity, Foreign Direct Investment, Bank Credit to Agricultural Sector and Government Expenditure to Agricultural Sector were stationary at first difference 1(1). Hence, null hypothesis of unit root test of was rejected for all the variables

Co-integration Test

Table 3 The Johansen Co-integration

Trace Test			Maximum Eigen Test		
T-statistic	95% Critical Value	P-value	T- statistic	95% Critical Value	P-value
88.04160	47.85613	0.0000**	50.58913	27.58434	0.0000**
37.45247	29.79707	0.0054**	22.30067	21.13162	0.0341**
15.15180	15.49471	0.0563	13.71025	14.26460	0.0610
1.441553	3.841466	0.2299	50.58913	27.58434	0.0000

Sources: Researchers' Computation, 2018

Table 3 above indicates the result of the co-integration and it was revealed the trace statistics and maximum eigen value test shows that there exist 1 co-integration equations among the macroeconomic variables thereby leading to the rejection of null hypothesis and accept alternative hypothesis of long run equilibrium relationships. The result also indicates that in the long run, the independent variables can efficiently predict the dependent variable proxy as Gross Domestic Product. Thus, Vector Error Correction Model is employed since the model contains more than two macroeconomic variables.

Regression Result

Table 4 Error Correction Model

Variables	Coefficient	Std. error	t-statistics	P-value
D(AP(-1))	0.468	0.119	3.913	0.0009
D(FDI)	0.529	0.271	1.946	0.0665
D(FDI(-1))	1.094	0.244	4.477	0.0003
D(GEA)	103.0	179.0	0.575	0.5716
D(GEA(-1))	237.0	180.0	1.316	0.2037
D(BCA)	294.0	712.0	4.129	0.0006
D(BCA(-1))	126.0	919.0	1.374	0.1852
ECM(-1)	-0.925	0.154	-5.987	0.0000
C	-6002	338.0	-1.770	0.0926
R-squared	0.866443			
Adjusted R ²	0.810209			
F-statistic	15.40773			
Prob(F-statistic)	0.000001			
Durbin-Watson stat	1.780586			

Sources: Researchers’ Computation, 2018

Table 4 represents the result of the error correction model for the study. It was revealed that coefficient of ECM depicts the expected negative sign of -0.925226 and significant at 5% critical value which implies that there is a speed of adjustment among the variables in the short run. This implies that a deviation in Agricultural Productivity (AP) from equilibrium is corrected by as high as 92% percent the following year.

Going by the ECM estimated result, it was established that there is direct and significant relationship the first period lag of Agricultural Productivity (AP) and Agricultural Productivity (AP). Also the result revealed that Foreign Direct Investment had coefficient value of 1.094 which is highly significant at 5% which implies that a unit increase in Foreign Direct Investment will lead 1.094 increase in Agricultural Productivity (AP) in Nigeria. In the same vein, Government Expenditure to Agricultural Sector was revealed to have a direct and insignificant effect on Agricultural Productivity (AP) with a coefficient value of 237.0 implying that an increase in Government Budget to Agricultural Sector will lead to 237.0 increase in Productivity (AP).

Finally, it was found that that there exist a direct and insignificant relationship between Bank Credit to Agricultural Sector and Productivity (AP) with a coefficient value of 126.0 such that a unit increase in Bank Credit to Agricultural Sector will lead to rises in Productivity (AP) by 126.0.

The adjusted R-squared for the model is pegged at 0.810209 or 81%, which implies Foreign Direct Investment, Bank Credit to Agricultural Sector and Government Expenditure to Agricultural Sector explained about 81% variation in Agricultural Productivity over the observed years while the remaining 19% variation is explained by other variables not captured in the regression model.

The regression result indicated the value of the F-statistic is 15.40773 with a probability value of 0.000001 which is highly significant at 5%. This means that the joint influence of all included explanatory variables is significant in explaining variations in Agricultural Productivity in Nigeria.

Table 5: Diagnostics

Diagnostics test	Observed value	P-value (Chi-square)
Normality Test	3.4179	0.1810
Breusch-Godfrey LM test for autocorrelation	1.071183	0.5853
Heteroskedasticity Test: Breusch-Pagan-Godfrey	12.28866	0.1388
Ramsey Reset Test	0.005509	0.9416

Researchers’ Computation, 2018

Table 5 above presents the results of residuals diagnostics test for the model. The Jarque-Bera normality test revealed that the residuals of the model is normally distributed given a probability value of 0.1810 which is significant at 5% level of significance, thus the null hypothesis of normality is therefore accepted for the model which implies that the model is normally distributed. Also, Breusch-Godfrey Lagrange Multiplier test (LM) revealed that the regression model is not serially correlated since the p-value of 0.5853 is greater than 5% conventional level which leads to the acceptance of null hypothesis of no serial correlation. The

result of Breusch-pegan test was conducted to check the presence heterosecedaticity in the model and it was revealed that there no heterosecedaticity in the regression model given a probability value of 0.1388 which is greater than 0.05 and implying that the model is homosecedatic. Finally, the result of the Ramsey Reset Test indicates that there is mis-specification in the regression model

Stability Test

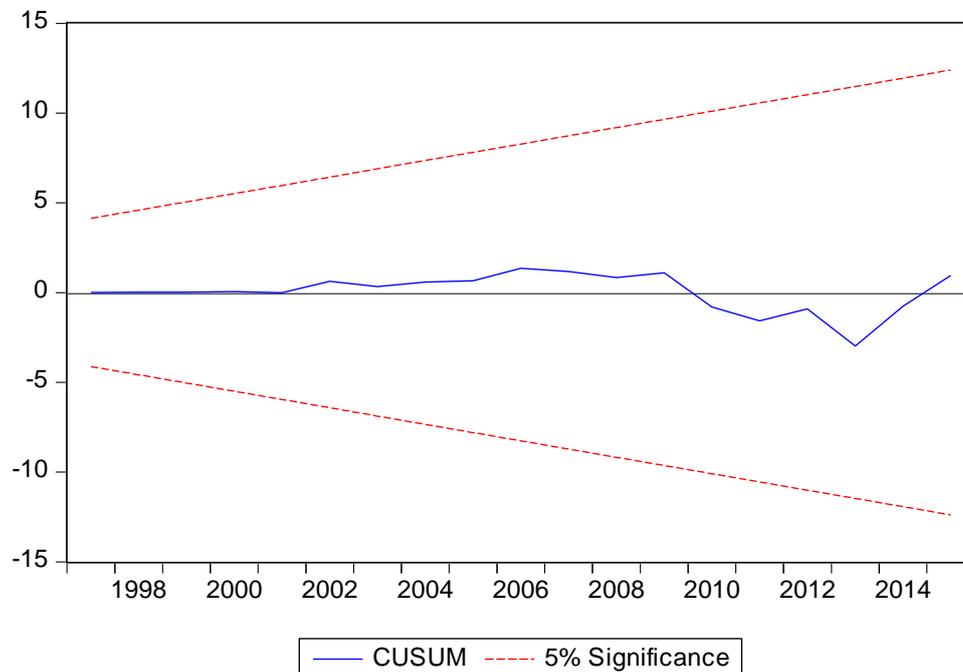


Figure 2: Cusum Stability Test

The result above shows the stability test for the regression model. A relatively stable model regression model cusum’s line is expected to be in the acceptable region and it is indicated in the result above that the regression model is relatively stable

Pairwise Granger Causality Test

Table 5: Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.	Result
D(FDI) does not Granger Cause D(AP)	27	7.16272	0.0040	Bidirectional relationship
D(AP) does not Granger Cause D(FDI)		3.55655	0.0459	
D(GEA) does not Granger Cause D(AP)	27	1.79599	0.1895	Independent Relationship
D(AP) does not Granger Cause D(GEA)		0.04882	0.9525	
D(BCA) does not Granger Cause D(AP)	27	6.38126	0.0065	Uni-directional relationship
D(AP) does not Granger Cause D(BCA)		3.38920	0.0521	

Source: Researchers’ Computation, 2018

Table 5 above reveals the result of the causality test among the macroeconomic variables. It was revealed that there is bidirectional relationship between foreign direct investment and agricultural productivity. Furthermore, independent relationship was recorded between government expenditure to agriculture and agricultural productivity which implies that government expenditure to agriculture does not granger cause agricultural productivity. Finally, it was indicated that there exist a unidirectional relationship between bank credit to agriculture and agriculture productivity

V. Conclusion and Recommendations

The agricultural sector plays an important role in the Nigerian economy through its contribution to economic growth and development. Over the years, the growth potentials of the sector have been retarded due to under financing of the sector which results from total neglect of the sector by government and financial institutions. It was revealed that foreign direct investment inflow has significant influence on agricultural development in Nigeria which implies that the agricultural sector has continue to undertake the huge financial and technological potentials that are offer through international investment in the economy.

In the same vein, it was established that commercial bank credit to the agricultural sector has been expanding over the years and have contributed significantly to improve productivity in the sector. Finally, it was revealed while government expenditure have positive effect on agricultural productivity, the effect was insignificant in the long run and is an indication of under financing of the sector by government and the diversion of funds allocated to the sector. It was however revealed that, for the Nigerian economy to benefit from the huge potentials of agricultural sector, the sector must be willing to take the advantage of opportunities offered by the foreign investors.

Adequate infrastructures should be put in place by the government through massive rural-urban in infrastructure investment scheme in order to attract the flow of foreign investment to the agricultural sector. Also, Government should provide stable and conducive environment that is cable of supporting the growth potentials and flow of international investment into the agriculture sector.

Finally, government should prioritize the development of the agricultural sector through increase in government budgetary allocation to the agriculture sector. Government should set up a board for the purpose of monitoring the funds allocated to the agricultural sector in order to prevent diversion of funds by government agencies and farmers.

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Akinwale "Foreign Direct Investment Inflow and Agricultural Sector Productivity In Nigeria"
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