

An Investigation of the Effect of External Sector Variables on Agricultural Sector Performance in Nigeria, 1980 – 2016

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Abstract

The study investigates the effects of the external sector variables on the agricultural sector in Nigeria using annual time series data from the period 1980 to 2016 as the objective of the study. The dependent variable in this study is the agricultural output while the Official development assistance (ODA), stock of external debt (SXD), exchange rate (EXR) and the balance of payments (BOPs) of Nigeria are the independent variables. The study utilized the Augmented Dickey-Fuller test and the Phillips -Perron test procedure to determine stationarity of the data. Again, the Co-integration test was carried to establish the existence of a long run relationship among the variables used in the model. Furthermore, the log-linear multiple regression method and Dynamic Ordinary Least Square (DOLS) approach was used for the short run analysis. The DOLS result indicates that all the variables with such as balance of payments, exchange rate and official development assistance and stock of external debt are key determinants of agricultural development in Nigeria given that their t^* values were greater than t-critical value excluding SXD which appear to be statistically insignificant. The unit root test result indicates that all the variables attained stationarity at first difference except SXD that attained stationarity at levels. The Co-integration result revealed the existence of a long term relationship among the variables. Based on the results, it is recommended that government should revitalize the economy to eliminate deficits balance of payments, ensure efficient utilization of some development assistance and foreign debts be directed towards agricultural development in Nigeria. The study concludes that agricultural development requires internal and external effort especially in Nigeria in order to enhance agricultural productivity given that no nation can exist in autarky.

Keywords: *External sector, Real sector, Agriculture, Exchange rate.*

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Background to the Study

The real sector of the Nigerian economy has remained a strategic component through which an economy produces and distributes tangible goods and services to meet or satisfy aggregate demand in the economy. Every economy is remarkably or distinctly divided into four interrelated sectors and these are the real, external, fiscal and the financial sectors (Aiyedogbon, 2013). The focal point of this study is on the real sector like agriculture. As strategic as the real sectors are, they constitute the gauge for understanding the standard of living of the people in terms of performance measurement. The real sectors measure the effectiveness of the overall performance of the government. This is to be accomplished through macroeconomic guidelines or policies of government and can be adjudged to be successful if and only if it affects positively on the production and distribution of products to elevate the welfare of the citizen. The agricultural sub-sectors and the manufacturing sectors among the different sectors have more linkages to create employment, generate earnings or income and reduce undue stress on the external sectors (Ajayi and Oke, 2012).

Nigeria's external sectors reflect the economic dealings between the citizens (residents) of Nigeria and the rest of the world and may occasionally be in equilibrium or disequilibrium (surplus or deficit). A deficit outcome or results represents a scenario wherein receipts are inadequate to deal with the bills or balance of payments whereas a surplus part reflects a scenario in which receipts is in excess of the payments. A perfect or an ideal external sectors is one that is stable and in equilibrium over time. Equilibrium is achieved when external receipts and payments are equal, the exchange rate is stable and external reserves are sufficient. However, in more practical terms, this kind of ideal system hardly exists (Africa, 2008; Aslan, 2007). The Central Bank of Nigeria (2014) viewed external sectors as transactions in international trade in terms of exports, imports, capital account outflows and inflows and recorded in accounts that show the contribution of the external sector. Economies of countries are inter-dependent in terms of exchange transactions thus, global trade have been found to increase the availability of output in the international market and make mass assortment of goods available for mass consumption. This underscores the significance of the external sectors to the development of any country. Given the world as an economic community, it shows the economic transactions which take place between the citizens of a country and the rest of the world. The major indicators of the external sectors are the exchange rate, balance of payments, foreign exchange and external debt. Trade provides markets for goods and forex (foreign exchange) and allows greater increase in foreign reserves (Loto, 2011; Nwankwo and Kemgbara, 2014). Analysis of the external sector of the Nigerian economy as measured by the overall balance of payments revealed instability since the 1960's owing to chronic and excessive demand for imports within the face of a dwindling forex (foreign exchange earnings). Structurally, the sector, which dominated the economy largely through crude oil export, has remained unaltered for over many years (Afagha and Oluwatobi, 2012).

The sector is dominated in large part with export of crude oil. For instance, crude oil exports accounted for 93.8 %, 95.4% and 96.6% in line with total exports in 1979, 1999, 2009 and 2011 respectively (CBN, 2011). In same period, the magnitude of imports has been constantly on the increase. Notwithstanding the strategic role of the external sector on the

overall performance of the economy, past evaluation of trends in the sector had been largely aggregative and without a thorough empirical analysis (Moses and Michael, 2015). The craving to have higher information of the workings of the external sectors and its effect on the real sector (Agricultural sector) of Nigerian economy motivated for this study. Reliable qualitative information and suitable policy could address the constraints confronting the agricultural sector of the economy (Wosu, Suotor and Egbo-Dick, 2016; Wosu, 2016). Aside the fluctuations in the external sectors variables, the real sector has equally witnessed serious monetary shocks because the agriculture to GDP ratio stood at 48.79% in 1970, 36.76 % in 1980, 31.52% in 1990, 26.03% in 2000 and by 2015, the amount stood at 30.02% (Tajudeen, 2012; Sunday, Ini-mfon, Glory and Daniel, 2012). This study was motivated to empirically determine the effect of external sector on the agricultural sector of the Nigerian economy from 1980 to 2016.

Statement of the problem

The economy of Nigeria is richly blessed with non-oil commodities which include cocoa, groundnut, rubber, cotton and palm produce which still represent exportable commodities in countries like Indonesia and Malaysia. These brought remarkable monetary fortunes though could not be sustained for a long period of time due to the advent of the black gold in 1968 in commercial quantity at Iloibiri city now in Bayelsa state of Nigeria. Agriculture was later abandoned with the emergence of crude oil and accordingly, severe distortion set in, within the external trade of Nigeria. Seemingly, the structure of the external sector changed and same with the balance of payments of the country. Simply put, the trend of the external sector and the position of the BOPs provided an explanation for the dependency of the economy on crude oil. This is why any external fluctuations within the prices of crude oil result to vulnerability in the domestic economy to such external fluctuations (Uma, Eboh and Obidike, 2013).

Even though, the economy is rich, it over depends on foreign exchange for her domestic production and consumption of goods thereby making the depletion of foreign exchange a disturbance factor to the real sectors of the economy. The most recent upsurge in the prices of oil has caused serious domestic recession leading to production shortfall from the agricultural sector, construction, service and industrial sector which constitute the real sectors of the economy (Umaru and Zubairu, 2012). However the present economic downturn together with extreme degree of inflation, rising rate of unemployment, high interest rate, work force downsizing, fluctuating exchange rate, falling standard of living and the depressed nature of the economy requires upturn in programmes of government to be able to increase the economic performance and then save the real sectors from total collapse (Ishola, Olaleye, Ajayi and Femi, 2013). The overall picture shows an economy stunted in growth suggesting an underdeveloped and dependent economy on foreign and developed economies for virtually all her essentials such as imports of goods and services. In line with the above reasoning, the study examines empirically, the effect of external sectors variables on the agricultural sector of the economy from 1980 and 2016.

Objectives of the Study

The aim of this study is to empirically investigate the overall performance of the external sectors variables on Nigeria's real sector from 1980 – 2016. The specific objectives are to;

- i. Determine the impact of official development assistance on the agricultural sector output in Nigeria,
- ii. Analyse the impact of external debt on the performance of the agricultural sector output in Nigeria,
- iii. Investigate the impact of the balance of payments on the overall performance of the agricultural sector in Nigeria,
- iv. Investigate the effect of exchange rate on the performance of the agricultural sector in Nigeria.

Hypotheses

- i. Enhanced official development assistance has not significantly impacted on the agricultural sector performance in Nigeria,
- ii. Increased stock of external debt has not significantly enhanced the agricultural sector performance in Nigeria,
- iii. Improved balance of payments does not significantly enhance the agricultural sector performance in Nigeria,
- iv. A depreciation of the exchange rate does not significantly promote the agricultural sector performance in Nigeria.

Theoretical Literature Review

This section examines two basic theories of external sectors. Among them are the Globalization Theory and the Two-Gap Model of development.

The Globalization Theory

Globalization is the process of making the world a single market meaning that goods and services, capital and labour are traded on the bases of world-wide information due to research flow across countries. This calls for general relaxation of trade barriers among trading partners (Black,2002). The theory of globalization emerged from the global mechanisms of greater integration with particular emphasis on the sphere of economic transactions. However, one of the most important characteristics of the globalization position is its focus and emphasis on cultural aspects of the people. Rather than the economic, financial and political ties, globalization scholars argue that the main modern elements for development explanation are the cultural links among nations. In this cultural communication, one of the most important factors is the increasing flexibility of technology to connect people around the world which in turn helps to develop agricultural sector. The modern communications system implies structural and important modifications in the social, economic and cultural patterns of nations. In terms of the economic activities, the new technological advances is needed to advance the agricultural sector all over the world especially a less developed country like Nigeria.

Apparently, this situation helps to create a completely new environment that can facilitate economic transaction and the utilization of productive resources, equipment, trading products, and taking advantage of the development in the agricultural sector which comes as a result of the mechanization of the sector. (Kaplan,1993).The theory of globalization to a large extent is anchored on the consideration that the main direction of development should be that which was undertaken by the United States and Europe. These schools sustain that the main patterns and the tools to achieve better standards of living originated in those more developed areas. The theory globalization is normative by stating how development issue should be solved (Moore, 1993).Nigeria's agricultural sector can improve with globalization by allowing the inflow of agricultural equipments that can help promote its activities. With globalization, it is expected that mechanized agriculture could become the order of the day thereby increasing the sales of produced agricultural products at the international market. Nigeria as a country in recession can diversify her oil-based economy to agriculture by allowing the use of modern equipment to increase the agricultural sector.

The Two- Gap Model of Development

The two-gap approach was championed by Chenery and Strout (1956) with the idea that serious gap exists in the economy. These are the savings gap and the foreign aid gap. The two-gaps are separate and impose independent constraints on the achievement of the growth target in less developed counties (LDC). To fill the savings gap, foreign aid is required to meet the domestic needs of national income. Correspondingly, the theory has fixed relationship assumed between targeted foreign exchange requirement and net export earnings. In this case, if the net export earnings at any time falls short of the foreign exchange requirements, a foreign exchange is bound to occur and can be filled up by the foreign aid. The two-gap approach can be explained in terms of the national income identities like $E - Y = I - S = M - X = E - F$. E is national expenditure, Y is national income and output, I is investment, S is savings, M represents import, X is export, and F represents net capital inflow. In this analysis, I-S represents domestic savings gap, M-X is the foreign exchange gap. In every economy, savings gap can occur when domestic savings rate fall short of the investment required to attaining the target. Nigeria over the years has been unable to mobilize adequately, savings that are necessary and sufficient to achieve the target in the agricultural sector. Savings - investment gap exist only when available domestic savings becomes too small to the extent necessary to obtain the needed rate of growth.

The trade gap occurs if the marginal import requirement necessary to attain the growth is greater than the most possible level of export. This excessive importation ends up in a short fall in foreign exchange needed to finance other domestic real sectors of the economy (Ahungwa, Haruna and Rakiya, 2014). This model is criticized on the ground that it does not consider the overall performance of the external sectors of the borrower's economy. Borrowing is accessed on foreign denominated currency like the United State of America's dollar (US\$) and repayment also in foreign denominated currency thereby eroding whatever surplus made. The two-gap approach is criticized on the grounds that it presupposes that an increase in domestic savings cannot be used to substitute the need for

London clubs of creditors, amongst others. The study concludes that loans from Paris club if used judiciously are indispensable for the realization of the level of development and growth of the economy. The study recommends that foreign loans be channelled to productive sectors to stimulate or encourage real sector development and growth.

Model Specification

From the theoretical and empirical literature reviewed, the study specifies a model in which Agricultural output (AOP) is the dependent variable while Official development assistance (ODA), Stock of external debt (SXD), Balance of payments (BOP) and Exchange rate (EXR) are the independent variables.

The mathematical model is specified as

$$AOP = f(BOP, EXR, ODA, SXD) \quad (1)$$

And the econometric form is;

$$AOP_t = \Psi_0 + \Psi_1 BOP_t + \Psi_2 EXR_t + \Psi_3 ODA_t + \Psi_4 SXD_t + \mu_t \quad (2)$$

The model is further transformed into natural logarithm as

$$\begin{matrix} LnAOP = \beta_0 + \beta_1 LnBOP_t + \beta_2 LnEXR_t + \beta_3 LnODA_t + \beta_4 LnSXD_t + \mu_t & (3) \\ (-) & (+) & (+) & (-) \end{matrix}$$

Where

AOP_t = Agricultural output at time 't'

BOP = Balance of payments at time 't'

EXR_t = Exchange rate at time 't'

ODA_t = Official development assistance at time 't'

SXD_t = Stock of external debt at time 't'

AOP = Independent variable

BOP, EXR, ODA and SXD are explanatory variables

$$\Psi_i = \beta_i$$

μ_t = Error term

Ln = Natural logarithm

β_0 = Intercept

$\beta_1, \beta_2, \beta_3$ and β_4 are the elasticity coefficients of the target variables with respect to the agricultural sector in Nigeria. The signs and magnitudes will measure the nature of the effect or impact of agricultural sector development.

The behavioural assumptions (a-priori expectation) are that

$$\beta_1, \beta_3 > 0 \text{ while } \beta_2, \beta_4 < 0$$

required foreign exchange to maintain investment for the target growth rate. Again, the LDC is highly aggregative and its approach which treats all types of capital investment as being homogeneous and very mechanistic in nature.

Empirical Literature Review

Wosu (2007) investigated the impact of external debt on the macro - economy of Nigeria using Ordinary Least Square (OLS) of multiple regressions analysis technique which spanned from 1970 to 2004. The result from the analysis showed that external debt positively impacted on the gross domestic product whereas debt servicing had negative and insignificant impact on the gross domestic product. The study concludes that effective system monitoring be enhanced and over borrowing be stopped. The recommendation was that an instant reduction in debt servicing be adhered to, as reasonable amount supposed for development of the economy gets eroded away through debt servicing.

Vaqub (2010) examined the effect of exchange rate on the output in different sectors from 1980 to 2010 by adopting the IS -LM framework and the equation was estimated using behavioural equations as a system in an unrelated regression estimation equation. The estimated result showed that exchange rate had a contractionary impact on the agricultural and the producing sectors. Furthermore, exchange rate had an expansionary impact at the service sector. The study concluded that the existing structures cannot adequately support depreciation of the exchange rate in the review period.

Adaramola and Awoeye (2011) examined the interrelationship between industrial productivity and money supply as proxies for real and the financial sector using the Vector Auto-Regression (VAR) structure from 1970 to 2005. The result showed the existence of unidirectional causality running from the financial sector to the real sector. The study recommends taking advantage of technology and factor productivity in the long run analysis.

Ubom (2014) investigated the effect of foreign loans on the real sector development in Nigeria from 1970 to 2012. The result from the study showed that colossal relationship exists between of gross domestic product, production output and loans from Paris and London clubs, amongst others. The study concludes that loans can contribute immensely to development and growth of the real sector if it is well utilized. It was recommended based on the result that loans be utilized on productive sectors and channelled to real sector development and growth.

Anthonia (2014) evaluated the economic implications of foreign loans on the real sector development in Nigeria. The research assesses the connection existing between loans granted by various developed nations and Paris club on real sector development in Nigeria from 1970 to 2012 with the use of multiple regression analysis. The real sector variables are the manufacturing output, gross domestic product, growth rate and unemployment rate. The study indicated that colossal relationships exist between the growth rate, price, gross domestic product, manufacturing output, loans from Paris and

Results and Discussion of Findings

The extracted result below is from the computer printout using E-view 9.0

Table 1: Short run multiple log-linear regression result

| Variables | Coefficient | Std.Error | t.Statistic | Prob. |
|---|-------------|-----------|-------------|--------|
| C | 12.47901 | 1.541347 | 8.096170 | 0.0000 |
| Lnbop | 0.291755 | 0.086717 | 3.364437 | 0.0021 |
| Exr | -0.020468 | 0.003832 | -5.341762 | 0.0000 |
| Ln oda | 0.199840 | 0.157643 | 1.267671 | 0.2147 |
| Ln sxd | -0.888928 | 0.352878 | -2.519078 | 0.0173 |
| R ² = 0.918369, Adj R ² = 0.907485, F-Stat= 84.37675, D.W = 0,792477; AIC = 2.255732; SCC = 2.332433 | | | | |

Table 1 reveals the result of the short run multiple regressions using the linear techniques. The result indicates that the coefficient of determination R^2 is 0.91839 meaning that 92% total variation in Agricultural output is caused by the independent variables while 8 percent is caused by other factors outside the model. BOPs coefficient of 0.291755 per cent is rightly signed (positive). This implies that 1 per cent increase in BOP increases the AOP by 0.291755 per cent in Nigeria. The result also showed that the t^* value for BOP is 3.364437 and greater than the t-critical value of 2.04 implying that BOPs is statistically significant at the 5 per cent level of significance.

The coefficient of EXR is rightly signed which is -0.020468 per cent which means that an increase in the EXR will decrease AOP by -0.020468 per cent. This could make the foreign demand for locally made goods to increase because of the fall in naira value. The accruable income could become an injection into the agricultural sector hence an improvement in the sector. The t^* value for EXR is 5.341762 and greater than the t-critical value of 2.04 meaning that EXR is statistically significant at the 5 percent level of significance. The ODA coefficient of 0.199840 per cent is rightly signed (positive) which conforms to a-priori expectation and economic theory. As ODA increases by 1 per cent, the AOP increases by 0.199840 per cent. The t^* value for ODA is 1.267671 and lesser than the t-critical value of 2.04. This means that ODA is statistically insignificant at the 5 percent level of significance.

The coefficient of SXD had a negative value of -0.888928 per cent. This means that a unit change/increase in SXD decreases AOP by -0.888928 per cent within the review period. This result however is not to encourage frivolities and reckless borrowing as it has been observed to constitute severe economic clog within the wheel of Nigeria's growth pursuit. The t^* value for SXD is -2.519078 and greater than the t-critical value of 2.04 in absolute term which means that SXD is statistically significant at 5 percent level of significance. The F^* value is 84.3767 and greater than the F-critical value of 2.69. This reveals that the overall model is statistically significant at the 5 percent level of significance. The D.W statistics value of 0.792477 is very high and implies that there is evidence of the presence of positive first order serial autocorrelation within the model hence we resorted to the DOLS approach. The AIC value of 2.255732 and the SC value of 2.332433 are near to zero. Both values therefore mean that the result emanating from the model estimation could be deployed for policy formulation within the review periods.

Table 2: Short- Run Multiple Regressions at Log-DOLS

| Variables | Coefficient | Std.Error | t.Statistic | Prob. |
|--|-------------|-----------|-------------|--------|
| C | 12.57299 | 3.422448 | 3.673683 | 0.0023 |
| Lnbop | 0.933369 | 0.004576 | 5.139451 | 0.0001 |
| Exr | -0.010944 | 0.332059 | -2.391627 | 0.0303 |
| Ln oda | 0.726105 | 0.836245 | 2.186677 | 0.0450 |
| Ln sxd | -2.251298 | 3.422448 | -2.692152 | 0.0167 |
| R ² = 0.980779, Adj R ² = 0.960276; D.W = 2.43675; LR = 0.331640 | | | | |

Source: Computed Result (E-View 9.0)

Table 2 is to complement the result emanating from the log-linear estimation of the model. The DOLS was adopted as a major departure from all other research work on this area of study. From the estimated result, BOPs related with AOP positively given the coefficients value of 0.933369 percent. The t* value of 5.139451 is greater than the t-critical value of 2.04 at the 5 per cent level of significance. EXR and AOP had a negative relationship given the coefficients value of -0.010944 per cent. 1 per cent increase in EXR leads to -0.010944 per cent decrease in AOP. The t* value of -2.391627 is greater than the t-critical value of 2.04 at the 5 per cent level of significance in absolute term. ODA and AOP had positive relationship given the coefficient value of 0.726105 per cent. As ODA increases, AOP is increased by 0.726105 per cent. ODA impacted on the AOP significantly given that the t* value for ODA is greater than the t-critical value of 2.04. The coefficients of SXD had a negative sign (-2.251298) in line with a-priori expectation. 1 per cent increase in SXD leads to -2.251298 per cent in decrease AOP. Although debt acquisition promotes boom if channelled into the productive ventures, however the result is understandable in the case of Nigeria given that the stock of external debt has become a thorn the economy's flesh over the years. The t* value of -2.692152 is greater than the t-critical value of 2.04 meaning that SXD impacted on the AOP significantly at 5 % level of significance. It means that the SXD channelled into the agricultural sector can make a whole lot of difference in the economy of Nigeria within the period under review. The R² value is 0.980779 indicating that about 98 per cent variation in the Agricultural sector is caused by the independent variables while 2 per cent is subsumed into the white noise term. The long run variance value of 0.331640 shows that the study could be deployed for policy formulation and implementation. The D.W value of 2.43675 shows no evidence positive first-order auto-correlation in the DOLS model within the review periods.

Table 3: Unit Root Test Result (ADF)

| Augmented -Dickey Fuller Test | | | | | | | |
|-------------------------------|-----------|--------------------------|-----------|------------------|--------------------------|-----------|----------------------|
| Variables | Levels | | | First difference | | | Order of integration |
| | ADF Stat | Test critical value (5%) | Inference | ADF Stat | Test critical value (5%) | Inference | |
| Ln aop | -1.044832 | -3.544284 | NS | -5.178951 | -3.548490 | S | 1(1) |
| Ln bop | -2.584523 | -3.544284 | NS | -6.351300 | -3.548490 | S | 1(1) |
| Exr | -1.856712 | -3.548490 | NS | -5.023453 | -3.552973 | S | 1(1) |
| Ln oda | -2.633737 | -3.544284 | NS | -6.134633 | -3.552973 | S | 1(1) |
| Ln sxd | -5.051726 | -3.544284 | S | - | - | - | 1(0) |

Note: the ADF tests for H_0X_t as 1(1) against H_1X_t as 1(0)

Source: Authors' computation (E.view 9.0)

The result above in table 3 shows that only SXD was integrated of order 1(0) whereas others were integrated of order 1(1) using the ADF test to determine the time series properties of the model at the 5 percent critical value at their first differences.

Table 4: Unit Root Test Result (P-P)

| P-P Test | | | | | | | |
|-----------|-----------|--------------------------|--------|------------------|--------------------------|--------|----------------------|
| Variables | Levels | | | First difference | | | Order of integration |
| | P-P Stat | Test critical value (5%) | Remark | P-P Stat | Test critical value (5%) | Remark | |
| Lnaop | 1.210283 | -3.544284 | NS | -5.144890 | -3.548490 | S | 1(1) |
| Ln bop | -2.600604 | -3.544284 | NS | -6.446017 | -3.548490 | S | 1(1) |
| Exr | -2.000918 | -3.548490 | NS | -5.021425 | -3.548490 | S | 1(1) |
| Lnoda | -3.340927 | -3.544284 | NS | -13.464339 | -3.548490 | S | 1(1) |
| Lnsxd | -5.051726 | -3.544284 | S | -29.84921 | - | - | 1(0) |

Note: the ADF tests for H_0X_t as 1(1) against H_1X_t as 1(0)

Source: Authors' computation (E.view 9.0)

The result above in table 4 shows that only SXD was integrated of order 1(0) whereas others were integrated of order 1(1) using the P-P test to determine the time series properties of the model at the 5 per cent level of significance.

Table 5: Johansen Co-integration Test Result (Trace test)

| Hypothesized No. of CE(S) | EIGEN-VALUE | TRACE STAT | 5% CRITICAL VALUE | PROB |
|---------------------------|-------------|------------|-------------------|--------|
| None * | 0.833138 | 118.9904 | 88.80380 | 0.0001 |
| At most 1 | 0.493434 | 59.90096 | 63.87610 | 0.1032 |
| At most 2 | 0.404830 | 37.45760 | 42.91525 | 0.1579 |
| At most 3 | 0.344115 | 20.33362 | 25.87211 | 0.2095 |
| At most 4 | 0.176672 | 6.415215 | 12.51798 | 0.4095 |

Source: Authors' computation (E.view 9.0)

From table 5, the trace statistics indicate 1 co-integrating equations at the 5 % level of significance. This confirms that long run relationship is established between the variables and the hypothesised fundamentals from 1980- 2016. The hypothesis of no co-integration is rejected but we do not reject the alternative hypothesis.

Table 6: Johansen Co-integration Test Result (Max-Eigen test)

| Hypothesized No. of CE(S) | EIGEN-VALUE | MAX-EIGEN STAT | 5 % CRITICAL VALUE | Prob |
|---------------------------|-------------|----------------|--------------------|--------|
| None * | 0.833138 | 59.08948 | 38.33101 | 0.0001 |
| At most 1 | 0.493434 | 22.44335 | 32.11832 | 0.4594 |
| At most 2 | 0.404830 | 17.12398 | 25.82321 | 0.4474 |
| At most 3 | 0.344115 | 13.91841 | 19.38704 | 0.2597 |
| At most 4 | 0.176672 | 6.415215 | 12.51798 | 0.4095 |

Source: Authors' computation (E.view 9.0)

From table 6, The Max-Eigen statistics showed 1 co-integrating equation at 5 % significance level which shows that long run relationship exist amongst the variables in the hypothesized fundamentals from 1980- 2016. This confirms that long run relationship is established between the variables and the hypothesized fundamentals from 1980- 2016. The hypothesis of no co-integration is rejected but we do not reject the alternative hypothesis. However, the study cannot proceed to conduct the error correction method since the variables are not integrated of the same order.

Conclusion

The paper investigated the relationship between external sector variable and their effect on the agricultural sector in Nigeria from 1980 – 2016 using the Dynamic Ordinary Least Square (DOLS) as estimation techniques. The result shows that all the variables impacted on the agricultural sectors significantly within the period under review. Furthermore, the result established the existence of a long run relationship on the selected external sectors' variables employed in the model. These findings are therefore capable of improving the agricultural sectors if resources are channeled into its development.

Recommendations

Based on the result from the model analysis, we proffer the followings as recommendations;

- i. That the result revealed that the entire variables are key determinants of the agricultural sectors, it becomes important that government direct the right attention to the external sector variables if improvement is needed in the sector under consideration.
- ii. Considering that the external sectors exhibited a long run relationship with the agricultural sector, government need to make investments critically on the agricultural sector.
- iii. Government need to use monetary policy manipulations to achieve the goals of balance of payments equilibrium and stable exchange rate in the economy.
- iv. External borrowing need to be focused on investment into the productive sector like the agricultural sector which will in turn create employment and income earning stream to individuals in Nigeria. The inflow of ODA has to be managed prudently because it has been proved to be potent in enhancing ailing economies.

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