



Effect of Agricultural Sector Expenditure on Nigeria's Economic Growth

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Authors' contributions

This work was carried out in collaboration among all authors. Author OOA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors EGO and HSU managed the analyses of the study. Authors OOA and EGO managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

The study examined the Effect of Government Agricultural Expenditure on Nigeria's Economic Growth. Time series data (1981–2015) were generated from the Central Bank of Nigeria and the National Bureau of Statistics. Descriptive Statistics and Vector Error Correction Model were used for data analysis. A unit root test was carried out to ascertain the stationarity of the series. Johansen co-integration test was also carried out to establish co-integration status of the variables in the model. For valid inference, estimated coefficients were subjected to normality, autocorrelation, heteroskedasticity and dynamic stability tests. The null hypotheses in relation to the respective tests statistic could not be rejected at 5% level of significance. The negative sign and statistical significant of Error Correction term of the VEC model, further confirmed the existence of co-integrating relationship among the variables in the model. The descriptive statistics result shows that, for almost a decade, public spending on agriculture consistently decline and was below the 10% benchmark of

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the Maputo declaration. The estimated VECM results showed that on the long-run, only the coefficient of Government Agricultural Expenditure variable influenced the economic growth, which was proxy by National GDP. This influence was positive and statistically significant at 5% probability level. However, on the short run, the result showed that both coefficients of Government Agricultural Expenditure variable and that of agricultural output were both positive and statistically significant in influencing the economic growth (GDP) at 5% probability level. Hence, since government expenditure has positive and significant effect on economic growth both on the short run and long run, it is recommended that government should review upward agricultural expenditure to stimulate growth in Nigerian economy, which could trigger more employment opportunity, increase per capita income, improved agricultural sector infrastructural deficit and reduce poverty.

Keywords: Effect; agricultural expenditure; economic growth.

1. INTRODUCTION

Nigeria until independence was majorly an agrarian based economy with agriculture accounting for about 64% of total Gross Domestic Product (GDP) and more than 60% of the adult work force [1]. Its favourable and diverse agro-ecological conditions support farming of various crops, part of which formed key inputs for the manufacturing sector. Nigeria was the largest net exporter of agricultural produce in West Africa [2]. Some of its major exports included groundnut, soybeans, cocoa and palm oil [2]. However, the discovery of oil, the civil war (1967-1970) and the oil boom of the 1970s saw government spending on agriculture decline and consequently, agricultural sector's contribution to the GDP gradually declined to 48% post-independence from 64% pre-independence. The sector began suffering from poor management, poor funding and inadequate adoption of new technologies to facilitate mechanized farming [2].

Soon after, the economy became oil dependent enjoying the gains from favourable volatilities in oil prices. This saw government total expenditure increase largely by about 83% [3]. Unfortunately, this was short-lived by the oil crisis of 1973 (Arab oil embargo) and 1979 (Iran – Iraq war), which saw global oil prices falling, leaving Nigeria with declining foreign earning and reserves due to its heavy reliance on oil and poor fiscal policies at the time [3]. The Dutch Disease effect soon began to set in with government huge wage bills, overzealous and imprudent expenditure, and an overvalued currency that made exportation expensive and encourage import of cheaper alternatives for consumption and manufacturing inputs [4,5]. Nigeria recorded a negative annual GDP growth rate between 1980 and 1983 [6]. Also, inflation rate went as high as 23.2% and 72.8% in 1983 and 1995, respectively while

unemployment rates of 5.9% and 6.9% were recorded for 1991 and 1996, respectively [7].

To address the slowing growth, the government took a decisive stance towards diversification and began initiating agricultural reforms and implementing diverse intervention programmes for the agricultural sector such as Operation Feed the Nation (OFN, 1976), Green Revolution Programme (GRP, 1979) and the establishment of agencies like the River Basin Development Authorities (RBDAs), National Agriculture Land Development Authority (NALDA), and the Directorate of Food, Road and Rural Infrastructure (DFRRI) just to mention a few. These interventions and reforms saw agriculture expenditure (as a proportion of total government expenditure) increase from about 3% in 1980 to as high as 16.8% in 1985 [8]. The expenditure on agriculture remained volatile with an average of 4.5% per annum between 1994 and 1998 and 3.5% between 1999 and 2005. Also, the average ratio of government recurrent spending on agriculture (as a proportion of total government spending) from 1981 to 2008 stood at 2.5% [9].

The emerging increase in oil prices recorded between 2010 and 2015 gave government a soft landing and allowance for increased investment in agriculture. Thus, recording a relatively stable expenditure pattern from 2010 to 2015 [9]. However, the sector's contribution to GDP declined from an average of 30.7% during the period 2006 - 2010 to an average of 21.7% for the period 2011 to 2015 [9].

This improved agriculture's expenditure performance of 224% between 2009 to 2010 (₦55.00 Billion to ₦178.12 Billion) was once again short-lived as a result of the dwindling oil prices which occurred between late 2015 and all through 2016 leading to 71% decline in

government agricultural expenditure [10,9]. With the record negative growth rate of -2.24% at the end of 2016, it became imperative for the current government to intensify diversification efforts with agriculture at the forefront of its development efforts. This gave rise to the Economic Recovery and Growth Plan (ERGP), which provides the country with a strategic growth plan to build key sectors such as the agricultural sector through infrastructure investment, accessibility to credit by the SMEs, revitalizing the fertilizer Programme and promoting local production [11].

The improvements recorded by the sector in recent times can be attributed to the government's concerted efforts to diversify the economy. These include various allocations to the sector in terms of lending and budgetary provisions. Many financial windows have been made available through the intervention of the Central Bank of Nigeria (CBN), Bank of Industry (BOI), Bank of Agriculture (BOA), and Federal Government Small and Medium Enterprises (SMEs) loans. The Anchor Borrower programme of CBN / FMARD which is aimed at funding critical value chains of rice, tomato, wheat, etc. Also, the Youth Empowerment in Agriculture Programme (YEAP) is providing opportunities to the youths and women to embark on bankable enterprises in agriculture [12]. To ensure improved funding in line with its diversification drive the Federal Government budgeted ₦123.44 Billion for 2017 as against ₦75.80 Billion Agricultural budgets for 2016 [13]. These efforts were further strengthened with the launch of an Agriculture Promotion Policy (APP). Unfortunately, many challenges still continue to hinder development in the sector such as inadequate access to credit, domestic consumption, forex and poor technology adoption. Other specific challenges include insufficient access to variety of seeds, access to land for investment, infrastructural deficiency majorly in power and transportation, poor commodity exchange /off-take agreement [14]. However, the steady increase in agricultural sector expenditure could ameliorate significantly both institutional and non-institutional problems confronting the sector. The knowledge of relationship between the sector expenditure and overall economy can enhance attraction of the national expenditure towards agricultural sector.

In view of the above, this paper is intended to describe the trend in government agricultural

expenditure, and examine the effects of the government agricultural sector expenditure on economic growth. The findings from the study would provide opportunity for the government to make informed decision towards allocation of public expenditure to the agricultural sector of the Nigerian economy.

2. LITERATURE REVIEW

2.1 Empirical Review

Oyakhilomen et al. [15] Examined the agriculture's budgetary allocation and economic growth in Nigeria from an econometric perspective, using Keynesian macroeconomic approach in specifying economic growth as a function of agricultural expenditure. The Augmented Dickey Fuller (ADF) test was used to examine the stationarity of the dataset. The results of the analysis show that the relationship between agriculture's budgetary allocation and economic growth in Nigeria is positive but not significant in the long run, while the relationship is positive and significant only for the two-year lagged value of agriculture's budgetary allocation. This observed relationship is not unrelated to the low budgetary allocations to agriculture over the years in Nigeria. This implies that there is a need for a significant increase in budgetary allocations to agriculture in order to ensure that the agricultural sector plays a pivotal role in the national transformation of Nigeria. The study used the necessary models for its analyses but did not subject the estimated results to necessary diagnostic checks, which is necessary for validity of the results and the generalization of the conclusion.

Yusuf and Okoruwa [16] Executed a study titled "analysis of Federal Government expenditure and monetary policy on agricultural output in Nigeria" using data sourced from the CBN statistical bulletin (various issues), and the National Bureau of Statistics. The data cover 1980-2012 and the analytical techniques used was the Ordinary Least Square (OLS) while the econometric software was the E-view. The result of the analysis shows that Agricultural Credit Guarantee Scheme Fund, previous year GDP and Consumer Price Index contribute positively to the growth of agriculture's share of the GDP. Other variables of interest like the interest rate, exchange rate and government expenditure on agriculture contribute negatively to growth in the share of agriculture in the GDP growth. The study did not mention test for stationarity of the

data; hence the estimated results could be spurious.

Ebere and Osundina [17] examined the impact of government agriculture expenditure on economic growth in Nigeria. Time series data of 33 years sourced from the CBN were used. Ordinary Least Square (OLS) technique was used in analyzing the data. From the findings, agricultural output, government expenditure and GDP are positively related. It was found that a significant relationship exists between government expenditure on agriculture and economic growth in Nigeria. The findings also reveal that the sector still encounters some problems like inadequate finance and poor infrastructure. The study recommended that it is imperative for the country to develop its agricultural sector through enough government spending to set-up its economic growth. However, given the span of period within which the data were collected, the used of OLS regression model in the analysis could be inappropriate as the data series could suffered from stationarity, hence rendered the results and conclusion invalid.

Aina, A [18] examined government spending and the performance of the agricultural sector in Nigeria. It opined that one of the main purposes of government spending is to provide infrastructural facilities and the maintenance of these facilities requires a substantial amount of spending. It was also stated that the relationship between government spending on public infrastructure and economic growth tends to be an important consideration in developing countries, most of which have experienced increasing levels of public expenditure overtime. The author also posited that expenditure on infrastructure investment and productive activities (in state owned enterprises) ought to contribute positively to growth, whereas government consumption spending is anticipated to be growth retarding. Other diagnostic test which is necessary for valid inference was not mentioned.

Eyitope and Ewubare [19] examined the effects of government spending on the agricultural sector in Nigeria. The quasi-experimental research design was employed. The study employed time series data in its analysis (1980-2013). Data adopted in the study were generated from the Central Bank of Nigeria annual statistical bulletin 2013 and National Bureau of Statistics bulletin 2013. The ordinary least square of multiple regression, the Johansen co

integration techniques, and the error correction model were used for the analysis. The coefficient of the Error Correction Term (ECT) appeared with negative sign and statistically significant. The variable Government Expenditure in Agriculture (GEA) were positive and statistically significant. The Deposit Money Bank Loan to Agriculture (DBA) was positive but statically not significant at 5% level. The coefficient of Gross Capital Formation (GCF) was statistically significant at 5% level. The study concludes that funding is very crucial for the development of the agricultural sector in Nigeria, therefore for the agricultural sector to contribute significantly to the Nigerian economy and as a major source of sustainable employment generation in Nigeria. The study recommends for increase funding as additional funding would fast track growth and development of the sector. This study did not link agricultural spending to economic growth

Peter and Lyndon [20] Investigates the effect of agriculture spending on economic growth in Nigeria over a period from 1977 to 2010 with particular focus on sectional expenditure analysis. The study used ex-post facto research design and employs some econometric techniques such as Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root tests, as well as Johansen Cointegration and followed by Error Correction Model (ECM) tests. The empirical results indicate that RGDP was particular influenced by changes in Agriculture Expenditure (AGR), Inflation Rate (INF), Interest Rate (INT) and Exchange Rate (EXR), these variables as they stand contributes or promotes economic growth in Nigeria. The study recommends that government should increase spending on agriculture, since most of the poor but active people still reside in the rural areas and their main source of livelihood is agriculture which can provide food security, generate employment for the teeming youths and creates wealth for the citizens in Nigeria. The current study cover current period.

The focus of [21] study was the impact of government agricultural expenditure on the growth of the Nigerian economy using time series data from 1960 to 2012. The study employed Engle and Granger co-integration procedure to determine the long-run relationship. The pairwise Granger Causality test is used to determine the relationship between economic growth, agricultural output, domestic debt, interest rate, non-oil revenue, and recurrent

expenditure on agriculture. The findings revealed that the agricultural sector has a direct relationship with economic growth even though macroeconomic problems persist. From the results of the findings, the paper recommend that government should ensure that credit is made available to farmers at relatively low interest rate, efforts should be intensified on how to control inflation rate, the budgetary allocation to agricultural sector be increased to 25% as recommended by FAO for agricultural development. Adapting Engle and Co-integration method in determine long-run relationship denied the knowledge of dynamic behaviour of the variables in the model. Furthermore, the method ignored endogeneity, which could lead to small sample bias as well as poor power of the residual based on the co-integration test.

Kamil et al. [22] examined the impact of agricultural sector on the economic growth of Nigeria, using time series data from 1981 to 2013. The study employs some econometric techniques such as Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root tests, as well as Johansen Co-integration and Error Correction Model (ECM) tests. The finding reveals that real gross domestic product, agricultural output and oil rents have a long-run equilibrium relationship. Vector error correction model result shows that, the speed of adjustment of the variables towards their long run equilibrium path was low, though agricultural output had a positive impact on economic growth. The study recommends that, the government and policy makers should embark on diversification and enhance more allocation in terms of budgeting to the agricultural sector. The study dwelled on the impact of agricultural sector on the economy. The current study focus on the relationship between sectoral expenditure and economic growth.

2.2 Theoretical Literature

The Keynesian school of thought suggested that government spending can contribute positively to sectorial growth (like the agricultural sector) in the economy [23]. Thus, an increase in government consumption is likely to lead to an increase in employment, profitability and investment through multiplier effects on aggregate demand. Consequently, government expenditure is capable of increasing the aggregate demand which will bring about an increased output depending on expenditure multipliers. Keynes regards public expenditures

as an exogenous factor which can be utilized as a policy instruments to promote growth. On the other hand, neoclassical growth theory based its conclusion on Solow's (1956) growth model. The neoclassicals are of the view that government expenditure is detrimental to economic growth in the long-run. The argument brought forward is that government expenditure engenders the crowding out effect and in times of budget deficit, taxes are raised which increase production costs and lead to increased price and low demand or the government results to borrowing [23].

However, the current study was based theoretically on the Keynesian school of thought which linked public expenditure to increased economic growth.

3. METHODOLOGY

The study employed secondary data spanned a period of 1981 to 2015 for its analysis. The key sources of the secondary data include Central Bank of Nigeria and National Bureau of Statistics.

3.1 Model Specification

(a) The specification of the economic growth model is given below:

$$GDP_t = F(AGOUT_t, GAE_t) \quad (1)$$

Where,

- GDP = Gross domestic product (₦),
- AGOUT = Agricultural output (₦),
- GAE = Government Agricultural Expenditure (₦),

The stochastic form of the model is as follows:

$$LGDP_t = \delta_0 + \delta_1 LAGOUT_t + \delta_2 LGAE_t + \mu_t \quad (2)$$

- δ_0 = intercept (constant)
- δ_1, δ_2 = Parameters
- μ = Error-Term.

3.1.1 Unit root test

Empirical research based on time series presumes that observed data are stationary. That is, such a series has a mean, variance and autocorrelation structure that do not change over time [24]. However, most macroeconomic and financial time series variables exhibit trends, thus making them non-stationary [25]. When included

in a regression model, non-stationary variables may result in a spurious regression problem except in the case of co-integrated regressions. With spurious regression, forecasting and policy implication drawn from such spurious regression analysis would be misleading [26]. In order to check for the stationarity or otherwise of the variables in the model, this study employed the use of unit root testing procedure. This study adopted Augmented Dickey-Fuller (ADF) method propounded [27]. The general form of the unit root test is given below:

ADF equation:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-1} + \varepsilon_t \quad (3)$$

Where, ΔY = Change in the variable series to be tested; Y_{t-1} = the variable in Lagged depended form, t = trend; β , δ = estimable parameters.

3.1.2 Co-integration test and Vector error CORRECTION Model (VECM)

The Johansen Cointegration Test was employed to examine the long-term relationship between the variables under study after establishing the stationarity of the variables. A linear combination of two or more $I(1)$ series may be stationary or $I(0)$, in which case the series are cointegrated. The null hypothesis for the Johansen Cointegration test ($H_0 : r = 0$) implies that cointegration does not exist, while the alternative hypothesis ($H_a : r > 0$) implies that it does. If the null for non-cointegration is rejected, the lagged residual from the cointegrating regression is imposed as the error correction term in a Vector Error Correction Model (VECM) given below as:

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta Y_{t-1} + \mu + \varepsilon_t \quad (4)$$

Where: ΔY_t = First Difference of An ($n \times 1$) Vector of the n Variables; Π = ($n \times n$) Coefficient Matrix; Y_{t-1} = Lagged Values of Y_t ; Γ = ($n \times (k-1)$) Matrix of Short-Term Coefficients; μ = ($n \times 1$) Vector of Constant, ε_t = ($n \times 1$) Vector of White Noise Residuals

The underlying principle of the Johansen Cointegration Test is that if the coefficient matrix (Π) has been reduced in rank ($r < n$), it can be decomposed into a matrix ($n \times r$) of loading coefficients and a matrix ($n \times r$) of cointegrating vectors. r is the number of cointegrating relations (the cointegrating rank). The loading coefficients indicate the cointegration relationships in the individual equations of the system and of the

speed of adjustment to disequilibrium. This represents the causality in the system and the direction of the causality flows, while the cointegrating vectors represent the long-term equilibrium relationship. [28] Considered two likelihood ratio tests, namely the Trace and the Maximum Eigen Value statistic tests, which are used to determine the number of cointegrating equations given by the co-integration rank (r). The Trace statistic tests the null hypothesis of r -cointegrating relations against the alternative of k -cointegrating relations, where k is the number of endogenous variables for $r = 0, 1, \dots, k - 1$. The Maximum Eigen Value statistic tests the null hypothesis of r -cointegrating vectors against the alternative of $(r + 1)$ - cointegrating vectors.

3.2 Justification of Methods

Econometrics Model and Descriptive Statistics were used to analysis the data. Application of Johansen co-integration text was carried out to ascertain co-integration status of the model. ADF method propounded by [27] was carried out to ascertain the stationarity of the series. Vector Error Correction Model (VECM) was carried out to analyze the data.

4. RESULTS AND DISCUSSION

4.1 The Trend of Government Agricultural Expenditure

The Fig. 1 describe the trend in government agricultural expenditure. The Fig. 1 showed that in the 1980s and 1990s the agricultural spending as a share of total federal spending was relatively better than that of the 2000s. Also, based on the Maputo Declaration, which recommends that 10 percent of the national budget be allocated to agriculture, Fig. 1 showed that the percentage of federal agricultural spending in 1983, 1985, 1986, 1990, 1997, 1999 and 2001 was above the 10 percent benchmark of the Maputo declaration by 10.8%, 17.2%, 15.8%, 10.1%, 11.1%, 39.5% and 10.9%. The outlier in 1985, 1986 and 1999 was as a result of a renewed attention of the government within the period through various reform programmes which includes Structural Adjustment Programs (SAP) in 1986 and National Economic Empowerment and Development Strategy (NEEDS) in 1999 [29]. Fig. 1 showed that between 2000, 2002 – 2015 the percentage of federal government agricultural spending declined. However, between 2008 and 2010, the actual expenditure

on agriculture rose from ₦55.00billion in 2007 to ₦175.72billion in 2008 (264%) through 2010, but it also consistently declined after that to 2015. Also, for the period of 2002 – 2015 agricultural spending as a share of total federal spending averaged only 3.63 percent. This figure is less

than the 10 percent target set by the Comprehensive Africa Agriculture Development Programme (CAADP), [30]. Therefore, compared with other African countries, Nigeria’s Federal Government expenditure on agriculture as a share of total government spending is small.

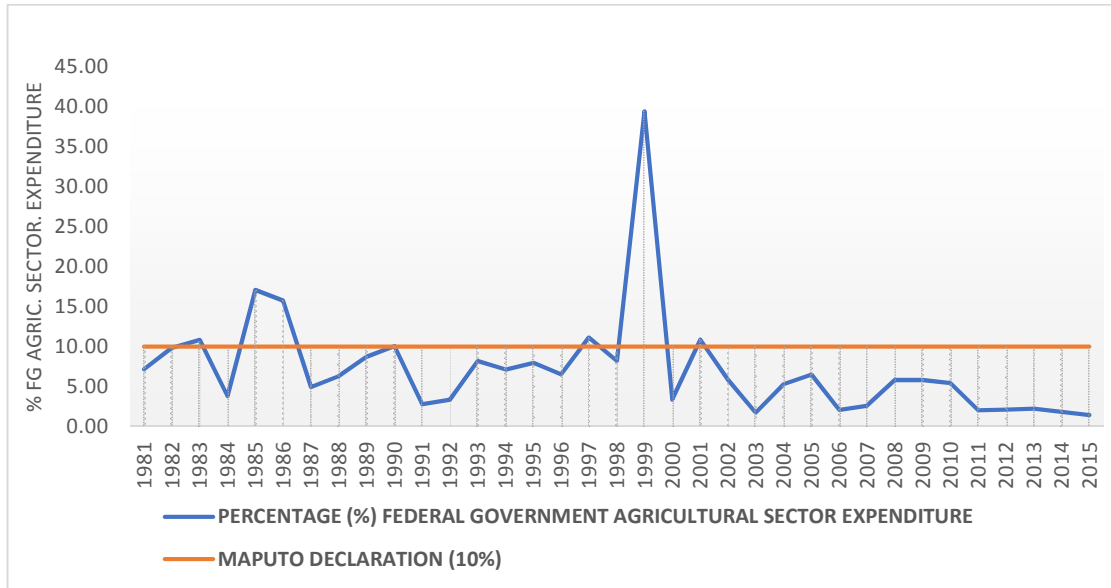


Fig. 1. Trend of government agricultural expenditure

Source: CBN Statistical Bulletin 2015 and FMARD

Table 1. Unit root test for variables

| Variable | Level ADF | First difference ADF | t-statistics at 5% critical value |
|----------|--------------|-------------------------|-----------------------------------|
| LAGOUT | -1.341 | -4.024*** | -2.951 |
| LGDP | -5.324** | | -2.951 |
| LGAE | -3.701** | | -2.951 |

Note: (**) and (***) denote level of significance at 5% and 1% respectively

Table 2. Johansen co-integration test result for variables in a model for economic growth

| Hypothesized | Trace | | 0.05 | Max-eigen | 0.05 |
|--------------|------------|-----------|----------------|-----------|----------------|
| No. of CE(s) | Eigenvalue | Statistic | Critical value | Statistic | Critical value |
| None * | 0.620811 | 53.08270 | 29.79707 | 31.03102 | 21.13162 |
| At most 1 | 0.386886 | 14.05168 | 15.49471 | 13.65456 | 14.26460 |
| At most 2 | 0.181196 | 2.397119 | 3.841466 | 2.397119 | 3.841466 |

Trace and Max-eigenvalue test indicates 1 cointegrating equation(s) at the 0.05 probability level

Table 3. Breusch-Godfrey serial correlation LM test

| Dependent variable | K | F-Statistic | Remarks |
|--------------------|---|-------------|--------------------------------|
| LGAE _t | 4 | 2.198 | H ₀ is not rejected |
| LGDP _t | 2 | 1.577 | H ₀ is not rejected |

K = exogenous variables in each equation

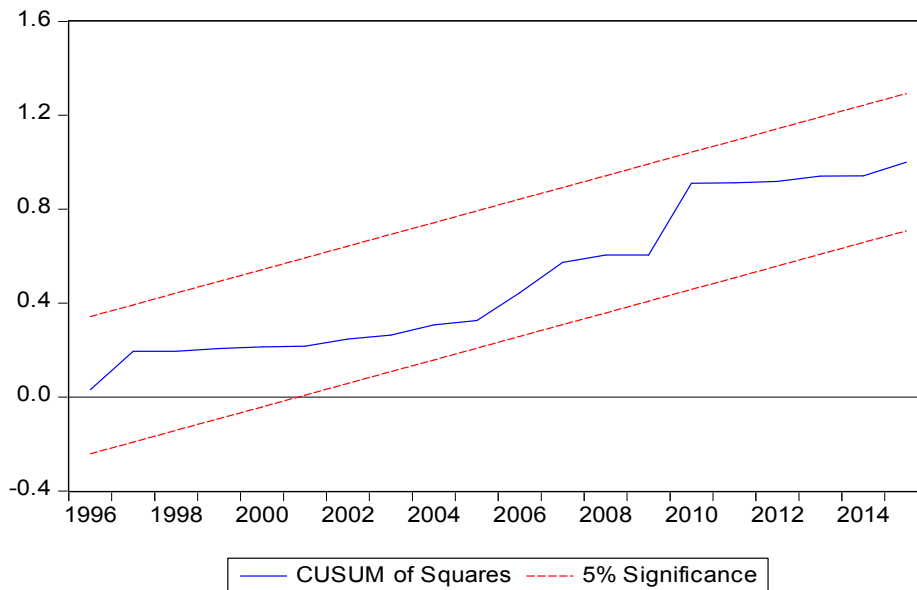


Fig. 2. Dynamic stability test for variables in a model for economy growth

Table 4. Estimated result for the effects of government agricultural expenditure on economy growth

| Variable | Coefficient | Std. error | T-Statistics |
|---------------------------|-------------|------------------------------|--------------|
| Long run | | | |
| C | -5.097 | | |
| lnGDP(-1) | 1.000 | | |
| lnAGOUT(-1) | 0.557 | 0.034 | -0.187 |
| lnTGAE(-1) | 31.340 | 6.651 | 4.986*** |
| Short run | | | |
| C | 6.580 | 3.310 | 1.988 |
| Δ lnGDP(-1) | 0.046 | 0.276 | 0.166 |
| Δ lnGDP(-2) | 0.187 | 0.255 | 0.734 |
| Δ lnGDP(-3) | 0.047 | 0.264 | 0.176 |
| Δ lnGDP(-4) | 0.048 | 0.076 | 0.637 |
| Δ lnAGOUT(-1) | 0.019 | 0.021 | 0.920 |
| Δ lnAGOUT(-2) | 0.036 | 0.022 | 1.634* |
| Δ lnAGOUT(-3) | 0.047 | 0.021 | 2.232** |
| Δ lnAGOUT(-4) | 0.048 | 0.019 | 2.544** |
| Δ lnGAE(-1) | 0.598 | 0.285 | 2.094** |
| Δ lnGAE(-2) | 0.808 | 0.297 | 2.716** |
| Δ lnGAE(-3) | 1.009 | 0.316 | 3.198** |
| Δ lnGAE(-4) | 0.109 | 0.286 | 0.382 |
| ECM(-1) | -0.019 | 0.007 | -2.620** |
| R-squared | 0.560 | Mean dependent var | 3.290 |
| Adjusted R-squared | 0.203 | S.D. dependent var | 3.730 |
| S.E. of regression | 3.330 | Akaike info criterion | 51.599 |
| Sum squared resid | 1.770 | Schwarz criterion | 52.254 |
| Log likelihood | -759.99 | Hannan-Quinn criter. | 51.809 |
| F-statistic | 1.567 | Durbin-Watson stat | 1.814 |
| Prob(F-statistic) | 0.196 | | |

Note: (*) (**) (***) denote level of significance at 10%, 5% and 1% respectively

4.2 Unit Root Test Results

Table 1 shows the variables LGAE (Government Agricultural Expenditure), LGDP (Gross Domestic Product), were stationary at its level form. While for variable LAGOUT (Agricultural Output) was not stationary at their level forms using ADF tests, indicating non-stationarity in level form. To establish stationarity property of variable: LAGOUT first differences of the variable were taken, and became stationary. In summary, Table 1 shows that the order of integration of the series are mixture of I (0) and I (1) variables.

4.3 Johansen Co-integration Test Results

In Table 2, estimated cointegration result shows that there are three co-integrating equations at 5% level of significance, the Trace statistics (53.08) and the Max-Eigen Statistics (31.0) was higher than the critical value (29.80) and (21.13) indicating that there is a long-term relationship between government agricultural expenditure, agricultural output and economic growth in Nigeria; therefore, a Vector Error Correction estimation was used to examine both long-run and short-run relationship among the variables under study. The estimated results satisfied no autocorrelation as shown in Table 3 and were confirmed for dynamic stability through CUSUM of Square test as indicated by Fig. 2. The lag length selection for the equation was determined through minimum value of Schwarz Information Criterion to choose the optimum lag length. The coefficients of the logged variables were subjected to Joint significant-test (Wald Test).

4.4 Vector Error Correction Model (VECM)

The existence of a co-integrating relationship between the dependent and independent variables as indicated by the Johansen Co-integration Test necessitated examining the long-run and short-term dynamics between the variables in the co-integrating equation by estimating the error correction model.

4.4.1 The effects of government agricultural sector expenditure on economy growth

The result of the Vector Error Correction as shown in Table 4 contains long-term estimates, short-term estimates and diagnostic statistics. The R square value 0.56 implies that 56% of the variation in the Gross Domestic Product (LGDP), which is the proxy for economic growth, was

explained by variations in Agricultural Output (LAGOUT) and Government Agricultural Expenditure (LGAE). The Error Correction term (ECT) had the expected negative sign and was significant at the 5% probability level, confirming the existence of a long-term relationship between LGDP, LAGOUT and LGAE. The Error Correction Term implied adjustment speed of 2% of the previous year's disequilibrium from the long-run path. The long-run estimates showed that the coefficient of LGAE variable was positively and significantly influencing LGDP in the long run and therefore consistent with a priori expectation. The coefficients of all the lagged periods of the LGAE variable were positive influencing economic growth on the long-run. On the short run, all the lagged periods LAGOUT variable were significantly influencing economic growth (LGDP) at 5% probability level. Similarly, coefficient of LGAE variable was positively influencing the LGDP variable on the short-run. This result is confirmed by [15], who found that the relationship between government agricultural expenditure and economic growth in Nigeria is positive but not significant in the long run, while the relationship is positive and significant only for the two-year lagged value of agriculture's budgetary allocation. [17] findings also collaborated this results in observing that agricultural output, government expenditure and GDP are positively related.

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This research work examined the effects of government agricultural sector expenditure on economic growth. Owing to the fact that time series data is prone to spurious regression results, unit root tests were executed using diagnostic test on ADF. The test results showed that LGAE and LGDP were stationary at levels, while LAGOUT became stationary after the first difference. Johansen cointegration test, Vector Error Correction Model, Wald Coefficient test, Autocorrelation tests and heteroscedasticity tests were also used after the unit root tests were carried out. The result showed that public spending on agriculture was low from 1981 – 2015. In the 1980s and 1990s, agricultural spending as a measure of total federal expenditure was relatively higher than that of the 2000s. Also, on the basis of the Maputo Declaration which recommended that 10 percent

of the national budget be allocated to agriculture, the percentage of federal agricultural spending in 1983, 1985, 1986, 1990, 1997, 1999 and 2001 were above the 10 percent benchmark by 10.8%, 17.2%, 15.8%, 10.1%, 11.1%, 39.5% and 10.9% respectively. However, in 2000, 2002 to 2015, the percentage of federal agricultural spending consistently declined and was below the 10% benchmark. There was a positive and significant relationship between the independent variable LGAE (Government Agricultural Expenditure) and the dependent variable LGDP (Gross Domestic Product) in both the long-run and the short-run. LAGOUT (Agricultural Output) was positively and significantly related to LGDP on the short-run.

5.2 Conclusion

Agricultural sector expenditure as a percentage to total federal spending averaged 3.63 was below the 10 percent benchmark of the Maputo Declaration. On the long-run, only the coefficient of Government Agricultural Expenditure variable influenced the economic growth, which was proxy by National GDP. This influence was positive and statistically significant at 5% probability level. However, on the short run, both coefficients of Government Agricultural Expenditure variable and that of agricultural output were both positive and statistically significant in influencing the economic growth at 5% probability level.

5.3 Recommendation

Given the above results, it is recommended that government should review upward agricultural expenditure to stimulate growth in Nigerian economy, which could trigger more employment opportunity, increase per capita income, improved agricultural sector infrastructural deficit and reduce poverty.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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