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Regression Analysis of the Impact of Disaggregated Government Expenditure on Agricultural Sector Output in Nigeria

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Abstract

The study used dis-aggregated approach to look at the impact of each of government recurrent expenditure on agriculture, government capital expenditure on agriculture, and government capital expenditure on social community services, each forming a specific objective of the study, based on time series data for the period 1986-2022 collected from the Central Bank of Nigeria Statistical Bulletin of 2023. The study used the autoregressive distributed lag method (ARDL) to estimate the multiple regression model which had agricultural gross domestic product (GDP) as the dependent variable to represent agricultural output, whereas the other variables mentioned above were the independent variables. The study found that government recurrent expenditure on agriculture has a negative impact on economic growth in the long run because it results in a loss of -0.02 per cent loss of agricultural output growth; government capital expenditure on agriculture significantly contributes to agricultural growth in Nigeria with the coefficient of 0.095; and government capital expenditure on social and community services significantly contributes to agricultural growth in Nigeria with the coefficient of 0.4496. The government should reduce its recurrent expenditure on agriculture due to the negative impact on the agricultural sector. Those recurrent expenditure are unproductive so the government should keep it low. The Nigerian government should increase its capital expenditure on agriculture so as to boost agricultural output or the performance of the agricultural sector. The federal government should increase its capital expenditure on social and community services. Such services include agriculture extension services such as research and development, advisory services and provision of improved seedlings.

Keywords: ***Government Expenditure; Recurrent Expenditure; Capital Expenditure; Agriculture***

1.0 Introduction

Government involvement in economic activities could be traced to the emergence of the Keynesian school of thought in the early 1930s. The introduction of fiscal policy as a tool of macroeconomic management brought about the use of public expenditure to achieve stability in the economy. Fiscal policy refers to the use of government spending and tax policies to influence economic conditions especially macroeconomic conditions, including aggregate demand for goods and services, employment, inflation, and economic growth. It involves government's use of its expenditure and revenue plans to achieve desirable effects while avoiding those effects that are not desirable on a nation's output, production, and employment levels.

The role of agriculture in the development of any economy can never be over emphasized. Agriculture provides food for the citizens, raw materials for the industries, employment, and income for the farmers, enhances society's well-being. Prior to the discovery of crude oil in Nigeria and even before the civil war in the late 1960s, the Nigerian economy was predominantly agricultural. The revenue from crude oil was so huge that political leaders

began to shift emphasis from agriculture to mining and quarrying. In spite of the neglect of the agriculture sector, agriculture still remains the mainstay of the Nigerian economy; directly, in terms of volume of employment opportunities it offers, as the sector provides for a significant proportion of the country's employed labour force; and indirectly, through the important linkages it provides with the rest of the economy (Udoh, 2011).

Government can directly influence activities in the agricultural sector directly and indirectly using both the capital expenditure and recurrent expenditure. Capital expenditure involves expenditure on the building of feeder roads in rural areas, silos, tractors and other equipment for farmers, resulting in increased output wellbeing of lives of people in those areas. Provision of loan facilities, subsidizing of farm input and financial support to farmers would make the agricultural sector more attractive and raising entrepreneurship in agribusiness, thereby leading to positive externalities to other sectors of the economy.

Over the years, the trend of value of agricultural output has been on the increase over the last four decades. Average annual agricultural output between the years 1981-1991 was 54.86 million Naira. Between the years 1992-2002, agricultural output in Nigeria has risen to 1.32 billion in value. The average figure for agricultural value added between 2003 and 2022 was 33.97 billion (Central Bank of Nigeria, 2022).

However, despite these increases in agricultural output, the problem of food insecurity and poverty continue to bemoan Nigerians. The United Nations World Poverty Clock (2018) reported that 46 percent of Nigerians live in extreme poverty. By July 2022, this figure has increased to 58 percent. This poor outcome has been attributed to erratic and inefficient public expenditure on agriculture. The trend of government expenditure in agriculture has been erratic and fluctuating over the past three decades. Between1981 and 1990, average capital expenditure by the federal government on agriculture was 0.938 billion Naira. This trend increased to 6.103 billion between 1991 and 2000. Average capital expenditure on agriculture for the period 2001 to 2010 was 71.14 billion. The figure for average capital expenditure for the period 2011 to 2022 was 92.06 billion Naira (CBN, 2022). A look at these average figures depicts an increasing trend when one looks at it from decade to decade. However, when the figures are viewed on annual basis, the trend becomes erratic and fluctuating.

This same trend is also observable when examining the trend of recurrent expenditure during the period under study. For example, annual recurrent expenditure on agriculture between 1981 and 1998 was below 2 billon Naira. However, the incoming civilian administration increased the figure for recurrent expenditure on agriculture to 59.32 billion Naira in the year 1999. By the next three years (2000-2002), recurrent expenditure on agriculture fell to 6.34 billion Naira, 7.06 billion Naira, and 9.99 billion Naira, respectively. Between 2004 and 2011, average annual recurrent spending on agriculture rose to 29.40 billion Naira. Afterwards, the trend began to decline by 2012 and began rising again to 36.30 billion Naira, 50.26 billion Naira, and 53.99 billion Naira for 2016, 2017 and 2018respectively (CBN, 2022).

From the research point of view, studies such as Zirra and Ezie (2017) used total government expenditure rather than breaking down government expenditure into capital and recurrent to determine their individual impact on the value of agricultural output. In addition, we will also include government expenditure on social community services to determine whether they influence the impact of government agricultural spending on economic growth in Nigeria. This is a gap which the present study intends to explore.

The general objective of the study is to analyse the impact of government expenditure on agricultural sector output in Nigeria. The specific objectives are to (i) ascertain the degree of impact government recurrent expenditure on agriculture has on agricultural sector output in Nigeria, (ii) determine the degree of impact that government capital expenditure on agriculture has on agricultural sector output in Nigeria, and (iii) ascertain the extent government capital expenditure on social community services impact on agricultural sector output in Nigeria.

2.0 Related Literature

2.1 Theoretical review

2.1.1 The Classical versus the Keynesian Theory

Classical economists believed that government interference in the economy was more harmful than beneficial, advocating for a laissez-faire approach where the private sector takes on the majority of state activities. Adam Smith, in his book "The Wealth of Nations" (1776), strongly argued for a laissez-faire economy, where the pursuit of profit would drive economic growth. However, after the Great Depression of 1929-1930, traditional economists who had previously rejected government involvement recognized the role of market imperfections. They argued that inflexible labour unions obstructed salary adaptability and were a factor in elevated joblessness rates. Conversely, proponents of Keynesian economics endorsed state involvement to correct these market flaws. In his seminal work, "The General Theory of Employment, Interest, and Money" (1936), John Maynard Keynes took issue with classical economic thinkers for their long-term orientation and their trust in a self-regulating, laissez-faire market. Keynes contended that state intervention was essential for mitigating economic slumps, positing that heightened public sector expenditure could energize economic performance, thereby creating additional employment and amplifying consumer spending. He perceived state expenditure as an external catalyst capable of fostering economic advancement, particularly in the near term.

The Keynesian school of thought suggests that government spending can contribute positively to sectorial growth (like the agricultural sector) in the economy. Thus, an increase in government expenditure is likely to lead to an increase in employment, profitability and investment through multiplier effects of agricultural growth on aggregate demand. Consequently, government expenditure increases the aggregate demand which brings 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.

2.1.2 Solow Growth Theory

The neoclassical growth model serves as the theoretical foundation of the study credited to Solow (1956) and Swan (1956). This theory states that output (growth) is a function of capital stock and labour given the state of technology. This technology is a factor which is improved upon by investment in research, education and training. The result is meant to improve the capital stock and the quality of labour force.

The Solow model focuses on a closed economy where output (Q) is produced by the factors labour (L), technology (A) and capital (K). The production function takes the form:

$$Qt = Af(Kt, Lt) \quad 1$$

where t denotes time. The critical assumption of the production function is that it shows constant returns to scale.

Solow (1956) departs here from the classical assumption of scarce land or any non-augmentable resources. Romer (1986) interprets the assumption of constant returns to imply that the economy under consideration is big enough that the gains from specialization have been exhausted. Technically speaking, the neoclassical production function is homogenous of degree one and implies that both factors must be available, or else output would equal zero (i.e. the economy would not exist).

The function allows for an unlimited substitutability between capital and labour, which means that to produce any given output, any amount of capital can be efficiently used with the appropriate amount of labour. To make this model amenable for this present study, we embark on a model specification which specifies agricultural output as a function of agricultural expenditure and other factors that spur growth.

2.2 Empirical Review

In Nigeria, Okorie, Osabuohien and Oaikhenan (2020) examined the effects of electricity consumption and government agricultural spending on agricultural output in Nigeria for the period 1981 to 2017. The Philip Peron's unit root test showed that the time series data were not stationary at level. The autoregressive distributed lag (ARDL) result shows that poor electricity supply has significantly retarded the level of agricultural output in Nigeria while public agricultural spending indicates a weak positive lag effect on agricultural sector performance.

Osabohien, Adeleye, and De-Alwis, (2020) used cointegration equations to examine the impact of agro-financing impacts on food production in Nigeria for the period 1981-2018. After testing the time series data for stationarity, the Canonical Cointegration regression approaches show that agro-financing is statistically significant in explaining the level of food production in Nigeria. One percent increase in farmers' access to agricultural finance is associated with an increase in food production by 0.002%-0.006%.

The study by Apata (2019) investigated the drivers of public-spending policy mechanisms that accounts for growth in the agricultural sector output in Nigeria and China using time series data for the period 1970-2016. The result of the of the Random-effects model shows that the policy of public-expenditure (PUEXP) and intervention (INTEV) variables were significant but negative for Nigeria, while the variables were significant and positive for China.

De and Dkhar, (2018) examined the short and long run relationship between government expenditure on agriculture and its allied sector and agricultural output of Meghalaya for the period 1984 to 2014. Bound test cointegration was used to test for long-run relationship. The result of the ARDL estimation shows that in the long run, the effect of public expenditure through agriculture and allied activities, on agricultural output is significantly negative, while expenditures on education and transport on agricultural output are significantly positive.

Aina and Omojola (2017) examined the impact of government expenditure on agricultural sector performance in Nigeria for the period 1980-2013 using secondary data from the Central Bank of Nigeria (CBN). The result of the error correction modelling shows that there is a significant and positive relationship between government expenditure on agriculture and agricultural production output.

Iganiga and Unemhilin (2011) examined the effect of federal government agricultural expenditure on the value of agricultural output. Co-integration and error correction methodology were used to analyze the data. Result shows that federal government capital

expenditure is positively related to agricultural output. With a one-year lag period, it shows that the impact of government expenditure on agriculture is not instantaneous.

Udoh (2011) estimated the relationship between public expenditure, private investment and agricultural output growth in Nigeria over the period 1970-2008. The bounds test and Autoregressive distributed lag (ARDL) modelling approach was used to analyze both short- and long-run impacts of public expenditure, private investment on agricultural output growth in Nigeria. Results of the error correction model show that increase in public expenditure has a positive influence on the growth of the agricultural output.

Zirra and Ezie (2017) examined government fiscal policy and agricultural sector outputs in Nigeria between 1995 and 2014 using Fully Modified Ordinary Least Square (FMOLS) regression method. Findings from the study show that recurrent expenditure on agriculture is positive and statistically significant, while capital expenditure had no significant impact on agricultural output.

Mathew and Mordecai (2016) carried out an investigation to assess the effects of public agricultural expenditure on agricultural output in Nigeria, spanning the years from 1981 to 2014. Utilizing yearly sequential data gathered from the Central Bank of Nigeria, they deployed a range of statistical measures like the Augmented Dickey-Fuller evaluation, Johansen Co-integration analysis, Error Correction Approach (ECM), and Granger Causeand-Effect assessment. The outcomes from the Johansen Co-integration assessment highlighted a durable connection among agricultural output, public agricultural investment, loans from commercial banks to the farming sector, and interest levels. The ECM model's conclusions signaled that public agricultural expenditure wielded a notable yet detrimental influence on agricultural output, while bank loans to the farming sector and interest rates exerted negligible beneficial impacts on Nigeria's agricultural production.

Uremadu et al. (2018) carried out an independent analysis exploring the effects of government agricultural spending on farming output, making use of chronological data from the years 1981 to 2014. They examined the information through co-integration tests and a vector error adjustment model. The findings from the Johansen co-integration trials indicated a durable relationship between farming output and state agricultural finances. Insights from the vector error modification framework showed that agricultural yield quickly adapted to shifts in comprehensive government agricultural investment, real currency exchange rates, loan accessibility from the banking sector for the farming industry, average annual rainfall metrics, and population growth rate.

De and Dkhar (2021) interrogated the short-term and enduring correlations between farming yields in Meghalaya and state financial allocations to agriculture and correlated sectors. The authors applied the ARDL methodology for co-integration and used an error adjustment version of the ARDL model with annual time-series datasets running from 1984 to 2014. The investigation confirmed a long-term linkage between the variables under consideration and underscored that government agricultural spending significantly decreased agricultural output in the long run.

Sebastian, Florence, and Charity (2018) executed a study to explore how Nigerian state agriculture investments influenced farming yields, considering data from 1990 to 2014. The study included all factors during the unit root evaluation, which was followed by applying a vector error rectification model, co-integration examination, and another unit root evaluation. The Johansen co-integration tests pointed to a sustained linkage between farming yields and government agricultural expenditure. The vector error correction model outcomes demonstrated that alterations in comprehensive governmental agricultural investments, real

currency exchange rates, agricultural sector credit from banks, mean yearly rainfall amounts, and rates of population growth rapidly bore on agricultural production.

3.0 Methodology

3.1 Model specification

To estimate the response of agricultural output to changes in various components of government expenditure, the researcher specified the following regression model,

$$AGO = f(GREA, GCEA, GCES) \quad 2$$

Where, AGO = Agricultural output (proxy by Agricultural GDP), GREA = Government recurrent expenditure on agriculture, GCEA = Government capital expenditure on agriculture, and GCES = Government capital expenditure on social community services. Since the data for the study are natural numbers, we take the logarithms of each variable which converts them to growth rates for easier interpretation. Thus, explicit form of the model in Equation 2 is now expressed as,

$$AGO_t = \beta_0 + \beta_1 GREA_t + \beta_2 GCEA_t + \beta_3 GCES_t + \mu_t \quad 3$$

β_0 = Constant, β_1, β_2, and β_3, are the relative slope coefficients and partial elasticity of the parameters, μt = stochastic error term. A priori expectations: $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$.

3.2 Estimation procedure

The researcher will conduct unit root test using both of the Augmented Dickey-Fuller test and the Phillips-Peron test to determine the order of integration of the time series data to be used. Thereafter, the appropriate method of estimation was be selected based on the result of the unit root test. In this study, the method eventually employed was the autoregressive distributed lag (ARDL) technique.

After the model is estimated, statistical tests of significance of the explanatory variables were conducted using the T-test. The significance of the estimated model was also determined using the F-test. And then the predictor power of the model determined using the adjusted R-squared statistic. Lastly, diagnostic tests such as autocorrelation, heteroskedasticity, normality, and stability, were conducted to check the robustness of the estimated regression coefficients. Such tests include autocorrelation, heteroskedasticity, normality, and stability tests.

3.3 Sources of data

The study will used annual time series data for the period 1986-2022. The data were obtained from Central Bank of Nigeria (CBN) Statistical Bulletin 2023 (available at: https://www.cbn.gov.ng/documents/Statbulletin.asp).

4.0 Results

4.1 Unit Root Test Result

The unit root test was conducted using the Augmented Dickey-Fuller method and the results are summarized in Table 1, whereas the complete results from data analysis using EViews 12 is available in Appendix II.

Table 1: Summary of Augmented Dickey Fuller (ADF) unit root test results

Series	ADF Test Statistic @ level	5% critical value @ level	P-value @ level	ADF Test Statistic @ 1st Difference	5% critical value @ 1st Difference	P-value @ 1st Difference	Order of Integration
LAGO	-0.5345	-2.9458	0.873	-5.645	-2.9484	0.000	I(1)
LGREA	-1.7036	-2.9458	0.421	-6.6283	-2.9511	0.000	I(1)
LGCEA	-4.0349	-2.9678	0.0042	-	-	-	I(0)
LGCES	-1.9917	-2.9484	0.2889	-8.4322	-2.9484	0.000	I(1)

Source: EViews 12 result

The result in Table 1 presents a summary of the unit root test results based on the ADF method. The variables used in the analysis are log values of Agricultural output (LAGO), represented by log agricultural GDP, and then log government recurrent expenditure on agriculture (LGREA), log government capital expenditure on agriculture (LCREA), and log government capital expenditure on social and community services (LGCES). The result shows that only LGCEA is stationary at level because the ADF Test statistic is greater than its 5% critical value, in absolute terms, at level, and the p-value of the Test statistic is less than 0.05. However, the rest of the variables, including the dependent variable, LAGO, is stationary at first difference. In summary, the result shows that the series are a mixture of order zero and order one integration based on the 5% level of significance, as shown in the last column. AS a result, we used the Autoregressive Distributed Lag (ARDL) model to estimate the regression model of the study.

4.2 ARDL Results

4.2.1 Short-run Results

The short-run result from the ARDL method is presented in Table 2.

Table 2: ARDL short-run result

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LAGO(-1)	0.821248	0.052965	15.50560	0.0000
LGREA	-0.048269	3.032010	-2.507944	0.0452
LGREA(-1)	-0.001028	0.033578	-0.030629	0.9758
LGREA(-2)	-0.052850	0.025013	-2.112879	0.0457
LGCEA	0.025036	0.017225	2.453516	0.0196
LGCEA(-1)	0.026586	0.024940	1.066021	0.2975
LGCEA(-2)	-0.062385	0.024350	-2.562048	0.0174
LGCEA(-3)	-0.043906	0.017236	-2.547291	0.0180
LGCES	0.011681	0.021259	3.549462	0.0380
LGCES(-1)	0.068687	0.029974	2.291541	0.0314
C	1.461981	0.403490	3.623338	0.0014

R-squared	0.994651	Mean dependent var	9.046278
Adjusted R-squared	0.992325	S.D. dependent var	0.635446
S.E. of regression	0.055670	Akaike info criterion	-2.682553
Sum squared resid	0.071281	Schwarz criterion	-2.188730
Log likelihood	56.60340	Hannan-Quinn criter.	-2.514145
F-statistic	427.6581	Durbin-Watson stat	2.042593
Prob(F-statistic)	0.000000		

Source: Researcher's computation (2023) from EViews 12

The short-run result in Table 2 shows that one-year lag of log of agricultural output (LAGO), has significant positive impact on the current growth of AGO such that the variable rises by 0.82% in the current year in response to a 1 per cent rise in one-year lag of the variable. That

is to say, increase in AGO in the past year has the tendency to drive the variable upwards in the current year.

The result also indicates that a percentage growth of government recurrent expenditure in agriculture (LGREA) has negative significant impact on the growth of agricultural output (LAGO) in the short run such that a 1% growth in LGEA results in about -0.048% loss of agricultural output growth in the current year. However, the first lag of the variable has no significant impact on the dependent variable, whereas, the second lag has a negative impact on the dependent variable too.

Similarly, government capital expenditure on agriculture (LGCEA) has a positive impact on the growth of agricultural output (LAGO) such that a percentage increase in the latter accounts for an 0.025 per cent growth in agricultural output (LAGO) in the short run and the result is significant at the 5% level. Again, the first lag of the variable has no significant impact on the dependent variable, whereas the second and third lags have negative impact on the dependent variable, only that the impacts are negative. This means that the positive impact of the variable disappears after the first year.

Lastly, the result shows that a percentage increase in the government capital expenditure on social community services (LGCES) contributes to the growth of agricultural output in the short run in Nigeria such that agricultural output is increased by about 0.012 per cent in response to a percentage increase in LGCES in the short run. The positive effect continues after the first year as the result shows that one-year lag of the variable contributes to 0.07 per cent growth of agricultural output in Nigeria in the short run, and the result is significant at the 5% level. The high Adjusted R-Squared (0.99) and the high F-statistic (426, with p-value = 0.000) implies that the results are robust.

4.2.2 ARDL Long-run and Bounds Test Results

The ARDL long-run and Bounds test results are presented in Tables 3 and 4.

Table 3: ARDL long-run and Bounds Test result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGREA	-0.019874	0.228069	-2.087139	0.0483
LGCEA	0.094705	0.115791	3.817896	0.0018
LGCES	0.449602	0.142340	3.158651	0.0044
C	8.178803	0.539796	15.15165	0.0000
EC = LAGO - (0.0199*LGREA -0.0947*LGCEA + 0.4496*LGCES + 8.1788)				

Source: Researcher's computation (2023) from EViews 12

The result in Table 3 shows that a percentage growth in government recurrent expenditure on agriculture (LGREA) results in a loss of -0.02 per cent in the growth of agricultural output (LAGO) in the long run in Nigeria, whereas government capital expenditure on agriculture (LGCEA), and government capital expenditure on social and community services (LGCES) each contribute 0.09 per cent and 0.45 per cent, respectively, to the growth of agricultural output in the long run in the country.

Table 4: ARDL long-run and Bounds Test result

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	9.475480	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
Actual Sample Size	34	Finite Sample: n=35		
		10%	2.618	3.532
		5%	3.164	4.194
		1%	4.428	5.816
		Finite Sample: n=30		
		10%	2.676	3.586
		5%	3.272	4.306
		1%	4.614	5.966

Source: Researcher's computation (2023) from EViews 12

The Bounds test is used to determine whether long-run relationship exists among the variables of the study. The interpretation of the result in Table 4 is that there is long-run relationship if the F-Statistic is greater than the upper bound value at 5% level. The result in the table shows an F-Statistic of 9.475 whereas the 1% and 5% upper bound critical values are 3.67 and 4.66 respectively. The result meets the condition for rejecting the null hypothesis of no long-run relationship. We therefore conclude that there is long-run relationship among the variables of the estimated model.

The error correction is a mechanism that ties short-run disequilibrium to long-run equilibrium. The essence is the determine whether the model has the tendency to restore equilibrium in the event of disequilibrium. The result is presented in Table 5.

Table 5: Error correction result

Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGREA)	-0.048269	3.032010	-2.507944	0.0452
D(LGREA(-1))	-0.052850	0.025013	-2.112879	0.0457
D(LGCEA)	0.025036	0.017225	2.453516	0.0196
D(LGCEA(-1))	0.018479	0.017122	1.079225	0.2917
D(LGCEA(-2))	-0.043906	0.017236	-2.547291	0.0180
D(LGCES)	0.011681	0.021259	3.549462	0.0380
CointEq(-1)*	-0.178752	0.023969	-7.457677	0.0000

Source: Researcher's computation (2023) from EViews 12

In the result in Table 5, the error correction coefficient is denoted as CointEq(-1) and it has a value equal to -0.179 (t* = -7.458, p = 0.00) which means that about 18% of the error arising from disequilibrium in the modeled GDP growth function occurring in the previous year is corrected in the current year. This implies that equilibrium can be restored within a period of

5.6 years (5 years and six months) following a period of disequilibrium. However, this represents a slow speed of adjustment from short-run to long-run equilibrium. Nevertheless, the result is highly significant at the 1% level considering that the absolute value of the t-statistic is 7.46 and its p-value is approximately zero.

4.3 Model Diagnostics

(i) Autocorrelation test

Autocorrelation was tested using the Breusch-Godfrey Serial Correlation LM test and the summary of the result is presented in Table 6 while the complete result is available in Appendix II of this report.

Table 6: Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.697645	Prob. F(2,21)	0.5089
Obs*R-squared	2.118295	Prob. Chi-Square(2)	0.3468

Source: Researcher's computation (2023) from EViews 12

In the result presented in Table 6, the null hypothesis of no serial correlation in the estimated ARDL model is accepted at the 5% level of significance since the P-values of the F-statistic and that of the Chi-Square statistic (i.e., 0.5089 & 0.3468 respectively) are both greater than 0.05. The conclusion is that there is no evidence of positive serial correlation in the estimated model which satisfies one of the assumptions of the traditional regression model.

(ii) Heteroskedasticity test

The heteroskedasticity test shows whether the assumption that the regression residuals are characterized by constant variance is satisfied. The autoregressive conditional heteroskedasticity (ARCH) method was employed to conduct the test in this study and the summary of the result is presented in Table 7.

Table 7: Heteroskedasticity Test: ARCH

F-statistic	0.004668	Prob. F(3,27)	0.4215
Obs*R-squared	0.016070	Prob. Chi-Square(3)	0.3025

Source: Researcher's computation (2023) from EViews 12

The result in Table 7 shows that the null hypothesis of 'no heteroskedasticity' is accepted at the 5% level of significance because the p-values of the F and the Chi-Square statistics are 0.4215 and 0.3025 respectively are each greater than 0.05. This implies that the null hypothesis that heteroskedasticity is present is rejected in favour of the alternative hypothesis that it is not present. The absence of autocorrelation and heteroskedasticity from the estimated model implies that the result is reliable.

(iii) Model Stability Test

We used the Ramsey test to determine whether the estimated model is stable. The test is called the regression specification error test. It tests whether the model was correctly specified in the linear form, or whether a non-linear form would be more appropriate. The summary of the test result is presented in Table 8.

Table 8: Ramsey Reset Test Result

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: LAGO LAGO(-1) LGREA LGREA(-1) LGREA(-2) LGCEA LGCEA(-1) LGCEA(-2) LGCEA(-3) LGCES LGCES(-1) C

	Value	Df	Probability
t-statistic	1.471002	22	0.1555
F-statistic	2.163848	(1, 22)	0.1555
Likelihood ratio	3.189716	1	0.0741

Source: Researcher's computation (203) from EViews 12

The result in Table 8 shows that the p-values of the T and F statistics are each 0.1555 which is greater than 0.05. This means that the result is not significant at the 5% level. Thus, we accept the null hypothesis that there is no specification error in the estimated model. This means that the model was correctly specified in its linear form.

4.4 Test of Hypotheses

4.4.1 Hypothesis One

H_0: Government recurrent expenditure on agriculture has no significant impact on agricultural sector output in Nigeria.

Decision Rule: Reject H_0 if the estimated t-Statistic of the log of government recurrent expenditure on agriculture (LGREA) variable is greater than the 2.0 rule of thumb, or its p-value is less than 0.05; otherwise, do not reject H_0.

Result: The estimated short-run coefficient of LGREA in the ARDL error correction model result is -0.048 with t-Statistic equal to -2.51 and p-value equal to 0.045 Similarly, the long-run coefficient of the variable is -0.01987 with t-Statistic equal to -2.087 and p-value equal to 0.0483. Since the results are both significant at the 5% level, the null hypothesis is rejected. We therefore conclude that government recurrent expenditure on agriculture has a significant and negative impact on agricultural sector output in Nigeria.

4.4.2 Hypothesis Two

H_0: Government capital expenditure on agriculture has no significant impact on agricultural sector output in Nigeria.

Decision Rule: Reject H_0 if the estimated t-Statistic of the log of government capital expenditure on agriculture (LGCEA) variable is greater than the 2.0 rule of thumb, or its p-value is less than 0.05; otherwise, do not reject H_0.

Result: The estimated short-run coefficient of LGCEA in the ARDL error correction model result is 0.025 with t-Statistic equal to 2.45 and p-value equal to 0.0196. Likewise, the long-run coefficient of the variable is 0.0947 with t-Statistic equal to 3.818 and p-value equal to 0.0018. Since the results are both significant at the 5% level, the null hypothesis is rejected. We therefore conclude that government capital expenditure on agriculture has a significant and positive impact on agricultural sector output in Nigeria.

4.4.3 Hypothesis Three

H_0: Government capital expenditure on social community services has no significant impact on agricultural sector output in Nigeria.

Decision Rule: Reject H_0 if the estimated t-Statistic of the log of government capital expenditure on social community services (LGCES) variable is greater than the 2.0 rule of thumb, or its p-value is less than 0.05; otherwise, do not reject H_0.

Result: The estimated short-run coefficient of LGCES in the ARDL error correction model result is 0.012 with t-Statistic equal to 3.549 and p-value equal to 0.038, and the long-run coefficient of the variable is 0.4496 with t-Statistic equal to 3.159 and p-value equal to 0.0044. Since the results are both significant at the 5% level, the null hypothesis is rejected. We therefore conclude that government capital expenditure on social and community services has a significant and positive impact on agricultural sector output in Nigeria.

5.0 Discussion

The agricultural sector is important to the growth of Nigeria's economy. In recognition of this, the Nigerian government spends funds in various ways aimed at boosting the performance of the agricultural sector. In this study, we dis-aggregated government expenditure on agriculture into recurrent, capital, and that of capital expenditure on social community services. The study found that government recurrent expenditure on agriculture has a negative impact on agricultural growth whereas government capital expenditure on agriculture and government capital spending on social community services contributes to the growth of the agricultural sector in the country. The implication of the findings of the study is that reducing recurrent expenditure and increasing capital expenditure on agriculture will boost the performance of the agricultural sector in Nigeria.

Based on the findings, the study concludes that reducing recurrent expenditure and increasing capital expenditure on agriculture will boost the performance of the agricultural sector in Nigeria. Therefore, the federal government of Nigeria should reduce its recurrent expenditure on agriculture due to the negative impact on the agricultural sector. Those recurrent expenditure are unproductive so the government should keep it low. Also, the Nigerian government should increase its capital expenditure on agriculture so as to boost agricultural output or the performance of the agricultural sector. It is also important that the government increase its capital expenditure on social and community services. Such services include agriculture extension services such as research and development, advisory services and provision of improved seedlings.

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