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IMPACT OF GOVERNMENT AGRICULTURAL FUNDING ON ECONOMIC GROWTH IN NIGERIA (1981-2022)

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Abstract

The study assessed the impact of government agricultural funding on economic growth in Nigeria over the period of 1981-2022. The analysis of the data was done using ARDL model with the aid of E-views version 10. The analysis showed that all the series are not stationary as most macroeconomic variables. The diagnostics analysis conducted showed that the model designed passed serial and hetroskedasticity tests. The results obtained from the ARDL indicated that both in the short-run and long-run, agricultural credit guarantee scheme fund ($ACGSF_t$) is positive and statistically significant. This implies a 1% increase in $ACGSF_t$ will lead to 2.83% and 0.25% increase in agricultural productivity in the long-run and short-run respectively keeping all other variables held constant. Also, commercial banks' credit to agriculture ($CBCA_t$) is statistically significant and positive in both the long-run and short-run at 5%. This implies an increase in $CBCA_t$ will lead to 0.12% increase in RAGDP in the long-run and 0.13% increase in RAGDP in short-run respectively keeping all variables held constants. Likewise, agricultural food prices (AFP_t) is statistically significant and positive in both the long-run and short-run at 5% and this implies an increase in AFP_t will lead to 24.9% increase in RAGDP in the long-run and 0.18% increase in RAGDP in short-run respectively keeping all variables held constants. Based on the findings of this study, the study recommends that Government is therefore called upon to reinforce its link with farmers in the provision of farm inputs and credit facilities that could be affordable to the farmers, through its agricultural extension workers.

Keywords: Agricultural Funding; Economic Growth; Commercial Banks; ARDL

Introduction

The need for funding agricultural sector of a nation is more important as no one can live without feedings; it is not an overstatement to assert that the growth and development of any nation depend to a large extent on the development of agriculture. Agriculture has been shown to play an important role in promoting economic growth, raising a country's technological level, creating new employment opportunities and offering a source of external capital in developing countries. Governments, donors and development practitioners now recognize that agriculture is central to economic growth and food security – particularly in countries where a significant share of the population depends on the sector. Global Harvest Initiative (2011) In the next fifty years agricultural production needs to be increased more than ever before in spite of the fixed amounts of arable land, dwindling water resources, population increase, decreasing soil fertility and the impact of climate change. These challenges have placed high demand for new technologies to achieve increased agricultural productivity, food security and the post-2015 development goals related to poverty and hunger as well as nutrition and health, (FAO, 2015).

One of the major challenges facing mankind is to provide an equitable standard of living, adequate food, clean water, safe shelter and energy, a healthy and secured environment, an educated public, and satisfying job for this and future generations. It nevertheless underscores the emphasis placed on agriculture as the engine of growth in the Nigerian economy. Generally, the sector contributes to the development of an economy in four major ways-product contribution, factor contribution, market contribution and foreign exchange contribution. Following the oil boom of 1970s the Nigeria economy started to depend rather precariously only on oil both as the major exportable commodity as well as main stay source of government revenue. The government routinely monetized foreign exchange earned in the process; meanwhile the agricultural sector suffers a perpetual neglect (Akomaye 1989). However, the advent of the Boko-Harm insurgency crisis in North-Eastern part of the country at hand, led to serious famine conditions, labor movement and poor governmental policies on agriculture, which in turn brought about chronic food shortage, thereby giving

room for unprecedented high level of food imports. Poor agricultural contribution to the GDP that occurred most noticeably from 1970 to 1990 can be attributed to neglect of the sector. In order to solve this problem government has been allocating funds on different agricultural programmes in order to improve the level of food production in Nigeria. Unfortunately, the effort did not make significant changes in the food production sub-sector unless massive price distortion and even more vulnerable to external shocks. It is important to realize that this disastrous decline in our capacity to feed ourselves is happening to an economy with all necessary resources for food production. Nigeria has suddenly wakened up to the fact that the food problem which begun couple of years back with slight increase in price of food stuff have go up into full circle. The prices of many staple food items have risen to unprecedented levels. Indeed, everywhere you go around the country, you will find that, basic food items are increasingly out of reach of most Nigerians. Nigeria is blessed with vast cultivable land for growing crops, mineral, natural and human resources and a favorable climate that supports agricultural production, but it is astonishing that the potentials of agricultural sector are not optimally controlled and harnessed. The problem of low productivity and lack of improvement in agriculture has been traced to various causal factors. Poor funding or inadequate financing has been identified as one of the principal challenges facing farmers and agro-allied entrepreneurs in Nigeria (CBN, 2020), noted that although the agricultural credit guarantee scheme was instituted to make commercial banks provide loans to farmers, with the government acting as a guarantor in order to reduce possible risks in lending, the scheme has not fully achieved its goals, because, agriculture is a labour and capital-intensive venture. Also, agricultural is a profession that requires long term financing but most agricultural financing by commercial banks are done through short term loan. There is the need to overhaul the entire credit guarantee scheme for maximum efficiency so that there can be sustainable food security in Nigeria. The extent to which agricultural credit facilities can improve farmer's performance has not been greatly explored in Nigeria.

2. Literature Review

Mbah and Ifionu (2022) examine the influence of agricultural financing and economic growth in Nigeria over the period 1981 – 2019. The error correction model and granger causality model were used in this study. The study identified in the long run, that; the agricultural credit scheme, commercial banks, community-micro-finance bank loan shows a positive and significant influence on the gross domestic product in Nigeria.

Adenipekun and Ogunjinmi (2022) examine the causal relationship between government expenditure and agricultural sector productivity in Nigeria for the period, 1986-2019. Using the Granger causality tests, the study found that agricultural employment cause government agricultural expenditure with a feedback. As for agricultural output and exports, government agricultural spending has no causal links with the two variables. It means that government expenditure does not have causal relationship with agricultural output and exports. Meanwhile, it was agricultural employment that causes government agriculture expenditure. There is need to encourage and motivate the young unemployed groups especially in the rural and semi-urban areas to become gainfully employed in agriculture. This will assist to provide employment opportunities, reduce the incidence of vices and illegal adventure and consequently increase agricultural performance as a result of the rise in agricultural employment.

Asmau (2020) examine the impact of government agricultural expenditure on economic growth in Nigeria using Ordinary Least Square Method. The result revealed that the overall model was statistically significant at 5% level of significance. Agricultural output and agricultural credit have a positive effect on economic growth, whereas government agricultural expenditure has a negative effect on economic growth.

Okunlola et al. (2019) used stepwise regression analysis techniques to examine the effects of agricultural guaranteed finance on the economic growth of Nigeria in the farm products such as oil palm, cocoa, groundnuts, fishery, poultry, cattle, roots, and tubers, the result shows that, 81 percent of root and tuber, 87 percent of cocoa, and 90 percent of chicken have a reasonable and statistically significant influence on Nigeria's economic growth.

Megbowon et al. (2019) examined the impact of government expenditure on agricultural productivity in South Africa using annual time series data using ARDL model. The study revealed that government expenditure on agriculture to be of significance effect on agricultural productivity. It showed that there is a long-run positive relationship between government expenditure on agriculture and agricultural productivity. Agricultural financing is as important as other factor inputs like labour and land, for without adequate credit to finance agriculture, agricultural activities would be redundant. The agricultural lending market is constituted by financial institutions that would make funds available for agricultural activities. The agricultural lending market contains the commercial banks, non-financial institutions and other specialized institutions like the Nigerian Agricultural Cooperative and Rural Development Bank (NARCD) and Nigerian Agricultural and Co-operative Bank (NACB).

Medugui et al. (2019) employed the ordinary least square method to examine the role of Commercial Banks' credit on Agricultural output in Nigeria over the period 1980 to 2018. The results indicated that commercial bank credit as well as government expenditure on agriculture influence output level in Nigeria. The interest rate was inversely related with agricultural output; the results were completely consistent with a priori expectations. Thus, the regulatory authority should establish policies that will encourage commercial banks to reduce their interest rates so as to make more funds available to farmers at affordable rates, and increase their expenditure in agriculture with strict compliance monitoring. Dkhar and De (2018) examined the impact of public expenditure on agriculture on economic growth in Meghalaya. Annual time series data for the period 1984-85 to 2013-14 were obtained from Reserve Bank of India Publications, Directorate of Economics and Statistics and RBI publications- State Finances: A Study of Budgets. OLS, ADF unit root test and granger causality methods were used for data analysis. Regression results show that there is a significant positive impact of expenditure through crop husbandry on GSDP and a significant negative impact of expenditure through forestry and irrigation. The expenditure on dairying and agricultural research does not have a significant impact.

Weolebo (2018) examined the impact of agricultural expenditure on economic growth of sub Saharan Africa region. The study used annual panel data sourced from the World Bank reports, UNDP, and IMF publications for the period between 1990-2015. The study employed OLS regression and Panel Fixed effect model. The findings revealed that expenditure on agriculture, health and education has a positive and significant effect on GDP per capita of the region. Public spending on agriculture was strong in stimulating economic growth in Sub Saharan Africa, because agriculture is a primary economic base for many African countries. Olorunsola et al. (2017) investigated the short and long-run link through bank credit to agricultural output in Nigeria. Quarterly data on actual agricultural output growth (AGDPg) and private sector lending to agriculture were used in this study (SCA). The findings disclosed no evidence of short-term and long-term disunity between loan and output lump in the agricultural sector. Hence, suggested that the policy on agric sector credit moratoriums should be enhanced.

Egwu (2016) evaluated the effectiveness of agricultural financing on agricultural output, economic growth, and poverty reduction in Nigeria. T-test, R-square, Standard Error Test, and Durbin Watson test ADF/PP unit root and co-integration test were utilized for data analysis. The empirical findings demonstrated that Commercial Bank Credit to the Agricultural Sector (CBCA) and Agricultural Credit Guarantee Scheme Fund Loans to Nigeria's Agricultural Sector (ACGSF) indicated significant in Agricultural Sector Output as a Percentage of GDP (ASOGDP). Based on the findings, the study advocates that the government should implement policies that encourage agricultural commercialization, such as cooperatives, agricultural subsidies, and zero-tariff agricultural input imports.

Chandio et al. (2016) studied the impact of Government expenditure on agricultural sector and economic growth in Pakistan with time series data covering the period between 1983 and 2011 which were collected from Pakistan Statistical Year Books and Economic Survey of Pakistan 2015. The study applied Augmented Dickey-Fuller (ADF) and Phillip Perron unit root tests, Johansen Co-integration test and Ordinary Least Square (OLS) technique. The Johansen Co-integration test revealed that there is a long-run relationship between Government expenditure on

agriculture, agricultural outputs and economic growth. The results of the regression analysis discovered that agricultural outputs and Government expenditure have significant impact on economic growth. Mathew and Mordecai (2016) studied the impact of public agricultural expenditure on agricultural output in Nigeria from 1981 to 2014 with annual time series data collected from the Central Bank of Nigeria. The study made use of Augmented Dickey-Fuller test, Johansen Co-integration test, Error Correction Method (ECM) and Granger Causality test. The Johansen Co-integration test discovered that there is a long-run relationship between agricultural output, public agricultural expenditure, commercial bank loans to the agricultural sector and interest rates. The results of the ECM model indicated that public agricultural expenditure has a significant but negative impact on agricultural output whereas commercial bank loans to the agricultural sector and interest rate have insignificant positive impacts on agricultural output in Nigeria.

2.1 Theoretical Framework

The study adopted the Structural Change Theory as framework. The Structural Change Theory was developed by Lewis Arthur in the year 1954 and he called it "development with unlimited supply of labour. According to him an economy is made up of two sectors. One is the traditional (agricultural or subsistence) sector and the other is the modern (capitalist, industrial or manufacturing) sector. This gave rise to the two sector model. The theory posits that the development of an economy is dependent on the growth of the two sectors.

$$Y = f(\text{AGRIC}, \text{IND}) \quad (1)$$

Where; Y = Economic development,

AGRIC = Agricultural sector and

IND = Industrial sector.

The agricultural sector and the industrial sector are interrelated. The agricultural sector employs capital inputs, labour expertise and is also a final consumer of the output of the industrial sector while the industrial sector employs labour and output of the agricultural sector. This theory focuses on the mechanism by which underdeveloped economies can transform their domestic economic structures from a heavy emphasis on traditional subsistence agriculture to a more modern and more advanced agricultural practice through heavy

financial support in order to attain industrial breakthrough. The extended version of the theory added that the full benefits of agricultural development cannot be realized unless government support systems are created that provide the necessary incentives, economic opportunities and most importantly access to needed inputs to enable small farmers to expand their output and raise their productivity. Other reforms or strategies are likely to be ineffective and perhaps even counterproductive unless there are corresponding structural changes that control productivity. Examples; bank loans, fertilizer distribution, technical and educational extension service, public credit agencies, finance from various sources, rural transport and feeder roads.

The Solow-Swan model also explains the relationship between the agricultural sector and economic growth. The Solow-Swan model incorporated labour and technology into the production function and shown that the inputs (labour, capital and technology) play a very important role in explaining the dimension of growth overtime and also the disparities in income across countries. Taking cognizance of the classic assumption of constant saving rate of the modern growth theory, Solow-Swan generates a very simple general equilibrium model of the form:

$$Y(t) = f[K(t), L(t), T(t)] \quad (2)$$

where $Y(t)$ denotes output produced at time t , K represents capital that is durable physical input such as machines, buildings and so on, L denotes input associated with human body such as physical strength, skills, health among others and T is the level of technology or knowledge. The Solow-Swan model has four major attributes namely, constant return to scale, positive and diminishing returns to private inputs, marginal product of capital (or labour) approaches infinity as capital (or labour) goes to zero and approaches zero as capital (or labour) goes to infinity and lastly, plausible input-output relationship. The model has been modified by many researchers to investigate the impact of Agricultural sector on economic growth. Among them is Awokuse (2009) who examined the relationship between agricultural productivity and economic growth in 46 developing Countries (Bamidele, Benjamin & Olaifa, 2019).

3. Methodology

3.1 Data and Source

The type of data specified for this study is secondary in nature, as time series spanning from 1981Q₁ to 2020Q₂ employed for the analysis. The variables that used in this study was a quarterly data series, sourced from the National Bureau of Statistics (NBS), and Central Bank of Nigeria (CBN) statistical Bulletin. A total of six (6) variables namely; contribution of agriculture to total real GDP ($RAGDP_t$) proxy to economic growth, agricultural loans guaranteed ($ACGSF_t$), commercial banks' credit to agriculture ($CBCA_t$), Agricultural credit guarantee scheme fund ($ACGF_t$), agricultural food prices (AFP_t) proxy to inflation, and Real Interest Rates ($RINR_t$).

3.2 Model Specification

The model used in this study followed the work of Mubaraq (2021), who examine the evaluate the thresholds of ACGSF on agricultural performance in Nigeria between 1981 and

2019. This study adapted the empirical specification to capture the objectives of the study;. The model specified by Mubaraq (2021), is as follows

$$RAGDP = f(ACGF, FL, RINR) \quad (3)$$

Where;

$RAGDP$ = The contribution of agriculture to total real GDP

$ACGSF$ = The value of agricultural loans guaranteed

$INFL$ = The percentage change in the prices of market basket of goods and services

$CBCA$ = The value of commercial banks' credit to agriculture

$RINR$ = The nominal cost of borrowing money adjusted for inflation

For this study, the general form of the model of this study would be derived within the context of the theoretical link between agriculture funding and economic growth as noted in the literature. The study formulates a multiple linear regression model to assess the effect of agriculture funding and economic growth. However based on the objectives of this study, contribution of bank loans to agriculture was included. The functional form of the model can be specified as follows:

$$\text{Agriculture to Total Real GDP} = f(\text{Agricultural credit guarantee scheme fund,}$$

commercial banks' credit to agriculture, agricultural food prices, Real Interest Rates).

$$RAGDP_t = f(ACGSF_t, CBCA_t, AFP_t, RINR_t) \quad (4)$$

The mathematical form for the first model can be expressed as;

$$RAGDP_t = \beta_0 + \beta_1 ACGSF_t + \beta_2 CBCA_t + \beta_3 AFP_t + \beta_4 RINR_t \quad (5)$$

But equations above are exact or deterministic in nature. In order to allow for the inexact relationship among the variables as in the case of most economic variables, the stochastic error term " μ_t " is added to the three equations. Thus, the study expresses the econometric form of the models as:

$$RAGDP_t = \beta_0 + \beta_1 ACGSF_t + \beta_2 CBCA_t + \beta_3 ACGF_t + \beta_4 AFP_t + \beta_5 RINR_t + \mu_t \quad (6)$$

Where, RAGDP=The contribution of agriculture to total real GDP

ACGF_t=Agricultural credit guarantee scheme fund

AFP_t =The percentage change in the prices of market basket of goods and services

CBCA=The value of commercial banks' credit to agriculture

RINR=The nominal cost of borrowing money adjusted for inflation

μ_t = stochastic error term.

In order to properly estimate the parameters of the postulated models, we rescale some of the variables by logging them, as follow;

$$\text{Log}(RAGDP_t) = \beta_0 + \beta_1 \text{Log}(ACGSF_t) + \beta_2 \text{Log}(CBCA_t) + \beta_4 \text{Log}(AFP_t) + \beta_5 \text{Log}(RINR_t) + \mu_t \quad (7)$$

3.3 Techniques of Data Analysis

To investigate the time series property in order to avoid spurious regression problem, pre-estimation test (Unit root, summary statistics and Stationary test) is conducted. Augmented Dickey-Fuller (ADF) is conducted to test for the order or integration of a series. Augmented Dickey-Fuller test relies on rejecting a null hypothesis of unit root (the series are non-stationary) in favor of the alternative hypotheses of stationary. The tests are to be conducted with and without a deterministic trend (t) for each of the series. A model is constructed to test whether the variable are cointegrated. If the variables are found to be cointegrated, the analysis will continue with Autoregressive Distributed Lag (ARDL) and bound testing approach.

4. Results and Discussion

4.1 Descriptive Statistics

It is necessary to examine the descriptive characteristics of the variables used in this study. The descriptive statistics of the variables is presented in table 1

Table 1 Descriptive Statistics

	RAGDP	ACGSF	CBCA	AFP	RINR
Mean	7458.931	28385.18	140.5919	89.25441	-2.45696
Maximum	31904.14	72322	591.7842	280.63	25.28227
Minimum	17.05218	1076	0.5906	14.74811	-43.5727
Std. Dev.	9390.689	20154.47	192.8258	80.11493	15.14728
Skewness	1.122453	0.447645	1.255773	0.768114	-0.44745
Kurtosis	3.036959	2.172664	2.958661	2.615674	3.418343
Sum	298357.2	1135407	5623.676	3570.176	-98.2784
Observations	40	40	40	40	40

Source computed by the researcher using E-views version 10 (2023)

Table 1 above shows the descriptive statistics of the variables. The series have a total of 140 observations with five (5) time series variables namely Agriculture to Total Real GDP (RAGDP_t), Agricultural credit guarantee scheme fund (ACGSF_t), commercial banks' credit to agriculture (CBCA_t), agricultural food prices (AFP_t) and Real Interest Rates (RINR_t). The summary statistics showed the total sum of RAGDP_t over the

time frame of this study is 298357.2 while the maximum and minimum values of RAGDP_t are 31904.14 and 17.05218 with the mean and standard deviation of 7458.931+10 and 9390.689 respectively. Also, the total sum of agricultural credit guarantee scheme fund (ACGSF_t), over the time frame of this study is 1135407 while the maximum and minimum values of ACGSF_t are 72322 and 1076 with the mean

and standard deviation of 28385.18 and 20154.47 respectively. In addition, the total sums of commercial banks' credit to agriculture (CBCA_t) and agricultural food prices (AFP_t), over the time frame of this study are 5623.676 and 3570.176 respectively. Meanwhile the maximum and minimum values of CBCA_t and AFP_t are 591.7842 and 280.63 and 0.5906 and 14.74811 respectively with the means and standard deviations of 140.5919 and 89.2544 and 192.8258 and 80.11493 respectively. Also, the total sum of real interest rates (RINR_t), over the time frame of this study is -98.2784 while the maximum and minimum values of RINR_t are 25.28227 and -43.5727 with the mean and standard deviation of -2.45696 and 15.14728 respectively. All variables are positively skewed with

the exception of RINR_t. Meanwhile the kurtosis of the variables showed that the variables are positively skewed. This implies that the variables are flatter to the left as compared to the normal distribution and they are of a leptokurtic distribution (i.e. flat or short-tailed).

4.2 Unit Root Test

The unit root test was conducted to determine the stationary conditions of the series and also to know their order of integration. The ADF and PP unit root set were all conducted to know the exact order of integration and the stationary process of the variables. The results of these tests are given in tables 2

Table 2. Unit Root Tests

Level					
Test/Variables	RAGDP	ACGSF	CBCA	AFP	RINR
ADF	2.177346 (0.9999)	-2.012539 (0.2804)	1.572673 (0.9992)	-0.108412 (0.9414)	-5.580913 (0.0000)
First Difference					
Test/Variables	LOGRAGDP	LOGACGSF	CBCA	INF	
ADF	-3.669566 (0.0087)	-4.404397 (0.0012)	-6.632825 (0.0000)	-8.211873 (0.0000)	

Source: computed by the author using E-views. Version 10 (2023)

The results of the unit root test in the table 2 below suggest that there is strong evidence that the null hypothesis of the presence of unit roots cannot be rejected in level form for all the variables with the exception of RINR which is stationary at level. In other words, the results suggest all the series in level are non-stationary with the exception of RINR.

As observed from the results obtained in table 2 it seemed necessary to test the stationarity of the variables at their first difference since the variables were not stationary at levels. The results suggests after differencing the series, the null hypothesis of non-stationarity in each of the series can be rejected at 1%

level of significance. Thus, the series are now integrated of different order 1 i.e. I(1) and I(0). These results suggest the use of ARDL bound test and cointegration test. The ARDL can be used whether the variables are a mixture of I(1) and I(0) or the same level so far as the none of the variables are I(2).

4.3 The ARDL Cointegration Analysis

The table 3 below presents the ARDL bounds testing approach to cointegration results for the model to effect of oil price fluctuations on economic growth in Nigeria

Table 3 ARDL BOUNDS TEST Results, Null Hypothesis: No Long-run Relationship

Test Statistic	Value	K
F-statistic	11.67390	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.2	3.09

5%	2.56	3.49
1%	3.29	4.37
N=36		

Source: computed by the author using E-views. Version 10 (2023)

From the results of the ARDL bounds testing approach to cointegration are the computed F-statistic of 11.67390 since, we have small sample of 36 observations, and this necessitate the use of the critical values provided by Narayan (2005). The critical value for the upper bound in Narayan's table is 3.718 and for the lower bound 2.725 at 5%. The f-statistics for this bound test which is 3.718 is greater than both values of the upper bound and lower bound of 3.718 and 2.725. Therefore, the null hypothesis of no long run relationship is strongly rejected at the 5% level of significance. Hence, this shows that there is long-run relationship between Real Gross Domestic Product (RGDP), Agriculture to Total Real GDP (RAGDP),

agricultural credit guarantee scheme fund (ACGSF_t), commercial banks' credit to agriculture (CBCA_t), agricultural food prices (AFP_t) and Real Interest Rates (RINR_t) for the study period of 1981-2020 in Nigeria.

4.4 ARDL Regression Analysis

Having established the fact there is a long relationship between the variables using the ARDL bounds testing approach to cointegration. The next step is to estimate the both the Long-run and Short-run regression coefficient with an Error-correction terms to ascertain the speed of adjustment between the cointegrating variables. The table 4 below presents the ARDL regression estimates of variables.

Table 4 ARDL Estimates

Dependent Variable: LOGRAGDP				
ARDL Long-Run Estimates				
Variables	Coefficient	S.E	t-values	P-Value
LOGACGSF	2.834998***	0.946989	2.993698	0.0091
CBCA	0.001190**	0.000549	2.166660	0.0468
AFP	0.249648**	0.105414	2.368263	0.0317
RINR	-0.017253	0.029313	-0.588577	0.5649
C	-8.199311	3.511340	-2.335095	0.0338
ARDL Short-Run Estimates				
Variables	Coefficient	S.E	t-values	P-Value
$\Delta(\text{LOGACGSF})$	0.249648***	0.057318	4.355472	0.0006
$\Delta(\text{CBCA})$	0.001288***	0.000330	3.903513	0.0014
$\Delta(\text{AFP})$	0.001839***	0.000335	5.484646	0.0001
$\Delta(\text{RINR})$	-0.002367***	0.000699	-3.384363	0.0041
ECT_{t-1}	-0.098209***	0.010162	-9.663914	0.0000
Diagnostic Tests		Statistic		
R-squared	0.764582	0.757605 0.5352 0.4569 0.4277		
Adjusted R-squared	0.588018			
Durbin-Watson stat	2.342583			
F-statistic	527.1356			
Prob(F-statistic)	0.000000			
χ^2 Normal	0.555186			
χ^2 Serial	0.656151			
χ^2 ARCH	0.566655			
χ^2 RESET	0.667187			

Note: *** Statistical significance at the 1 per cent levels, **Statistical significance at the 5 per cent levels.

*Statistical significance at the 10 per cent levels, Source: computed by the author using E-views. Version 10 (2023)

Starting with the diagnostics, the F-statistics measures the overall significance of the regression model. The F-value provides a test of the null hypothesis that the true slope coefficients are simultaneously zero. F-statistics = 527.1356 and the probability value is 0.000000, which implies at 5% level of significance. This indicates the model has a robust fit and it is statistically significant, that means there is a relationship between the dependent variable and the independent variables.

The R^2 measures the goodness of fit of the estimated model. The R^2 measure the proportion of total variation in the regress and explained by the regression model. From the ARDL regression result the R^2 is 0.764582 while the adjusted R^2 is 0.588018. This means that the model explain about 76% of the total variation in RAGDP explained by the explanatory variables.

Before further analysis of the coefficient of the regression results, it is appropriate to conduct a diagnostics test to examine if the estimated short-run model as met the assumptions of the Classical Linear Regression Model (CLRM). The table 4 above summarizes the diagnostics test carried to see if the model had met the CLRM assumptions.

The results of diagnostic tests suggest that the model passed all the tests that are required in the classical linear regression model (CLRM) such as normality of the error term, the serial correlation and autoregressive conditional heteroskedasticity test.

The normality result shows that with the JB-statistic (X^2) of 0.555186 which is statistically insignificant at 5% given the probability value of 0.757605 is greater than 0.05, this implies that we do not reject the null hypothesis of normality and therefore conclude that the error terms are normally distributed at 5% level of significance.

Also, the result from the Breusch-Godfrey (BG) general test of autocorrelation shows that with F-statistics of 0.656151 which is statistically insignificant at 5% given the probability value of 0.5352 is greater than 0.05, this implies that we do reject the null hypothesis of no serial correlation. Hence, we conclude that there is no serial correlation associated in the model.

In addition, the Autoregressive Conditional Heteroskedasticity (ACH) test to test if the error terms are homoskedastic gave results that showed an F-statistics of 0.566655 which is statistically insignificant at 5% given that the probability value of 0.4569 is greater than 0.05. This implies that we do not reject the null hypothesis of constant variance of the error term and conclude that there is no presence of Heteroskedasticity in the model.

The test of misspecification using Ramsey RESET tests was also carried to test if the model is correctly specified. From the results gave the F-statistics of 0.667187 which is statistically insignificant at 5% given the probability value of 0.4277 is greater than 0.05, this implies that we concluded that there is no specification error. This confirms that the model is well specified.

Starting with the long-run analysis, the variables are all significant in the long-run with the exception of real interest rates (RINR). However, in the short-run the all the variables are significant at 5% level of significance. The result explains that in the long-run and short-run agricultural credit guarantee scheme fund (ACGSF_t) is positive and statistically significant with coefficient values of 2.834998 and 0.249648 respectively. This implies a 1% increase in ACGSF_t will lead to 2.83% and 0.25% increase in agricultural productivity in the long-run and short-run respectively keeping all other variables held constant. In addition, commercial banks' credit to agriculture (CBCA_t) is statistically significant and positive in both the long-run and short-run at 5%. With a coefficient values of 0.001190 and 0.001288, this implies an increase in CBCA_t will lead to 0.12% increase in RAGDP in the long-run and 0.13% increase in RAGDP in short-run respectively keeping all variables held constants.

Furthermore, agricultural food prices (AFP_t) is statistically significant and positive in both the long-run and short-run at 5%. With a coefficient values of 0.249648 and 0.001839, this implies a increase in AFP_t will lead to 24.9% increase in RAGDP in the long-run and 0.18% increase in RAGDP in short-run respectively keeping all variables held constants.

In addition, real interest rate (RINR_t) is statistically significant and negative in both the short-run but insignificant in the long-run at 5%. With a

coefficient values of -0.017253 and -0.002367, this implies a increase in $RINR_t$ will lead to -1.73% decrease in $RAGDP$ in the long-run and 0.24% decrease in $RAGDP$ in short-run respectively keeping all variables held constants.

The estimate of ECT_{t-1} term is negative and significant at 1% level corroborating the proven long run association between Agriculture to Total Real GDP ($RAGDP_t$), Agricultural credit guarantee scheme fund ($ACGSF_t$), commercial banks' credit to agriculture ($CBCA_t$), agricultural food prices (AFP_t) and real interest rates ($RINR_t$) over the study period of 1981-2019 in the case of Nigeria.. The estimate of ECM_{t-1} term is -0.098209, which implies that the

deviations from short-run towards long-run are corrected by 9.8% in each year and it would take almost 10 years and 2 months to reach the stable long-run equilibrium path in case of Nigeria. This empirically implies that for any disequilibrium in the system, the system will automatically adjust itself back to the equilibrium after 10 years and 2 months.

4.5 Stability Test

The stability test is an important test to check if the ARDL model which is estimated is stable. Stability of the coefficient has done using the cumulative sum of recursive residuals test and cumulative sum of squares.

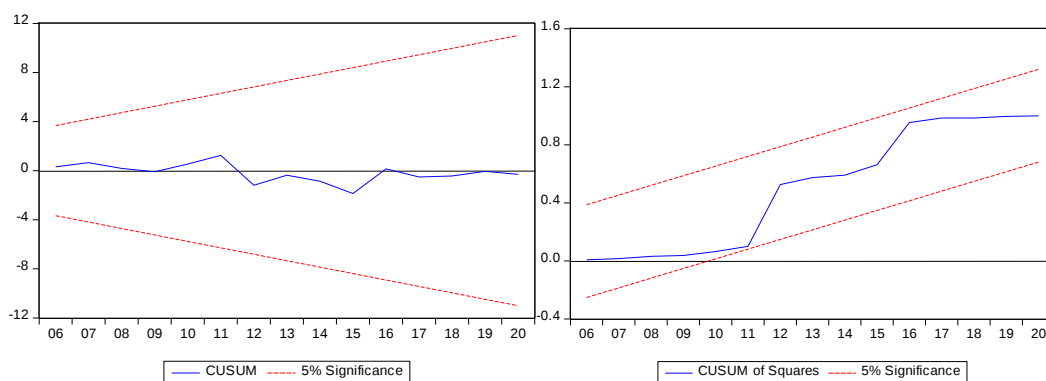


Figure 1

The stability of the ARDL bounds testing estimates which is investigated using the CUSUM and CUSUMsq tests gave results that are shown in Figs 1 and 2. The plots of the CUSUM statistics are well within the critical bounds at 5%. The plots of the CUSUM of squares statistics are slightly within the critical bounds at 5%. This confirms that the ARDL estimates are reliable and consistent. The tests find coefficients to be stable since the cumulative sum (blue lines) does not go outside the area between the two critical bounds (red lines).

5. Conclusion and Recommendations

The study has drawn a number of conclusions based on the findings from the research.

The results show that agricultural credit guarantee scheme fund and agricultural loans has a significant impact on economic growth in Nigeria. ACGSF is important in enhancing agricultural production and economic development in Nigeria.

Figure 2

Based on the findings of this research work, it is necessary to provide a set of policy recommendations.

- (i) Government should be more proactive in insisting on the private sector, especially, the financial sector to set aside funds annually for agricultural financing to compliment government efforts.
- (ii) Government should make efforts through its agencies to enlighten farmers of the availability of such credit facilities
- (iii) Government is therefore called upon to reinforce its link with farmers in the provision of farm inputs and credit facilities that could be affordable to the farmers, through its agricultural extension workers. Above all, the Federal Government needs to take a holistic appraisal of agricultural programmes and schemes, with a view of streamlining them to meet the dynamics of times, for the benefits of the Nigerian citizenry.

- (iv) There is the need for the Central Bank of Nigeria to reduce the cash- reserve ratio. However, funds that accrue from such policies must be added to the agricultural credit portfolios. There is the need to review the land use decree to enable Nigerians have free access to land. This will consequently increase the farmers that could eventually serve as collateral for credit facilities from the banking

system. Finally, agricultural commercialization has been found in the study to be of high significance. To this extent, there is need for government to put in place policies to stimulate agricultural commercialization through cooperative system, agricultural subsidies and zero-tariff for importation of agricultural inputs.

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