

EFFECT OF DEPOSIT MONEY BANKS CREDIT AND GOVERNMENT EXPENDITURE ON AGRICULTURAL SECTOR OUTPUT IN NIGERIA

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ABSTRACT

Inadequate funding of the agricultural sector has been recognized as a leading setback for the agricultural sector productivity in developing countries across the globe. This study evaluates the effect of Deposit money banks credit, government expenditure on agricultural sector output in Nigeria for the periods of 1981 to 2023. Agricultural sector output was measured with contribution of agriculture to Gross Domestic Product. Ex post facto research design was employed for the study. The study used time series data obtained from central Bank of Nigeria Statistical Bulletin. Vector Error Correction Model was utilized. The result revealed that deposit money bank credit to agriculture and has significant positive effect on agricultural sector output in Nigeria in the long run, while government expenditure has no significant effect on agricultural sector output in Nigeria in the long run. The study showed that deposit money bank credit to agriculture and government expenditure on agriculture has no significant effect on agricultural sector output in Nigeria in the short run. The study concludes that agricultural financing enhances agricultural sector output in Nigeria in the long, but the effect of agricultural financing on agricultural sector output is insignificant in the short run in Nigeria. It is recommended that the Central Bank of Nigeria should further direct deposit money banks and other financial institutions to extend more of their credits to agricultural sector for better agricultural sector output.

Keywords: Deposit money banks credit, government expenditure, and Contribution of Agriculture to Gross Domestic Product

INTRODUCTION

Agricultural financing is one of the most important instruments employ in stimulating agricultural sector output across the globe. Because it aims at inducing agricultural sector output in an economy. This finance can be short, medium or long-term depending on its duration.

The Nigeria government have attempted to overcome the challenge of financing agriculture by subsidizing credit, setting up credit guarantee scheme fund, establishing programmes and stimulating institutional innovations that can help to boost agricultural sector output. This is because, many deposit money banks perceived agricultural credit as risky and seek to channel credit to other sectors like general commerce, oil and gas. Agricultural financing policies such as schemes, programmes and institutions have not really fulfilled the expectations on them (Onyiriuba et al., 2020).

Agricultural finance is one of the factors that affect agricultural sector output in Nigeria. Moreover, agricultural finance ensures that loanable funds are provided for agricultural production which is based on proper and timely use of inputs, agricultural finance is important for those farmers who do not have the required finance that could be used to procure agricultural inputs, and this reduces agricultural sector output (Kehinde & Ogundejì, 2022).

Agricultural output is the value of agricultural products which, free of intra-branch consumption, are produced during the accounting period and before processing, are available for export and consumption (Poi, 2018). Agriculture is broadly divided into four sectors in Nigeria: crop production, fishing, livestock and forestry. Crop production remains the largest segment and it accounts for about 87.6 per cent of the sector's total output. This is followed by livestock, fishing, and forestry at 8.1 per cent, 3.2 per cent and 1.1 per cent respectively.

The agricultural sector in the first quarter of 2022 grew by 3.16 per cent in real terms, an increase of 0.88 per cent points from the corresponding period of 2021, and a decrease of 0.42 per cent points from the

preceding quarter which recorded a growth rate of 3.58 per cent. It is based on this backdrop that this study examines the effect of agricultural financing on agricultural sector output in Nigeria.

In Nigeria, agriculture is dominated by small scale farmers most of whom are rural based, with a low level of education; poor access to useful information and market and lack access to credit finance. The inaccessibility of credit by these farmers hinders their acquisition of the required inputs to increase their output and this, in turn, limit agricultural development by reducing farmers' output, expected income, savings and overall welfare of the farmers in Nigeria (Daveze, 2020). The enduring lack of credit access faced by these farmers has significant consequences for their household-level outcomes, as well as, technology adoption, agricultural sector output, food security, nutrition, health, and overall welfare of the farmers' households (Eyo, 2018).

There are controversies in theoretical and empirical literature on the nexus between agricultural financing and agricultural sector output both in developing and developed countries. The empirical studies of Adewale et al. (2022), Onuegbu et al. (2022) and Okore and Anthony (2022) established that agricultural financing has significant effect on agricultural sector output. On the contrary, the works Ogundajo et al. (2022), Nakazi and Sunday (2020) found insignificant relationship between agricultural financing and agricultural sector output. This lack of consensus in theoretical and empirical literatures on the alleged connection between agricultural financing and agricultural sector output is a call for concern and necessitates the need for empirical investigation in a bid to resolve the bone of contention.

Empirical studies like (Ogundajo et al. 2022; Onuegbu et al. 2022; Adewale et al., 2022) specifically focused on specific effect of agricultural financing options on agricultural sector output in Nigeria. examined the effect of bank credits to agriculture on agricultural sector output in Nigeria. Consequently, several studies (Alabi & Abu, 2020; Okpala et al., 2022) were carried out to examine the nexus between government expenditure on agriculture and agricultural sector output in Nigeria. This is one of the gaps identified in prior studies. To bridge this gap, this study combined the effect of bank credits to agriculture and government expenditure on agriculture on agricultural sector output in Nigeria. Likewise, limited studies in Nigeria have been able to examine effect of agricultural financing on agricultural sector output in Nigeria (Marafa, 2021; Obioma et al. 2021; Okre & Anthony, 2022). The studies cited above employed Ordinary Least Square (OLS), Autoregressive Distributed Lag Model (ARDL), while this present study employed Vector Error Correction Model (VECM). Differences in technique of data analysis could result in differences in findings.

The main objective of the study is to examine the effect of agricultural financing (deposit money banks credit to agriculture and government total expenditure on agriculture) on agricultural sector output in Nigeria. The study proxy agricultural financing with deposit money banks credit to agriculture, government expenditure on agriculture and agricultural credit guarantee scheme fund while agricultural sector output is the dependent variable measured with contribution of agriculture to gross domestic product of Nigeria. The study employs time series data for the periods of forty years (40) covering 1981 to 2023.

LITERATURE REVIEW

Agricultural Financing

Agriculture financing is a phrase that is used to describe resources (either public or private) that are provided in the form of equity, gift, or loan to facilitate social well-being through agricultural expansion (Obioma et al., 2021). According to Mbutor et al. (2013), agricultural finance as the acquisition and use of capital in agriculture and it deals basically with the supply of and the demand for funds in the agricultural sector of the economy.

Agricultural finance is an economic science that deals with farmers or an organization borrowing funds from credit agencies with key interest of agricultural investments.

Deposit Money Banks Credit to Agriculture

According to Nnamocha and Eke (2015), banks are monetary institutions owned by either the government or private businessmen for the purpose of trading in money. Banks typically mop savings in the form of savings, deposit, and current accounts from the surplus unit of the economy and lend such monies household and firms in the deficit unit of the economy at agreed interest rate, payable at a determined future date. Banks undertake several functions. Two notable functions of banks include the acceptance of deposits for safe keeping and giving out credit to households and firms to trade.

Anetor et al. (2016) defined credit as any amount of money extended out on contract with a future date of payment. According to the NDIC prudential guideline of 1990, credit include all kinds of financial instruments transferring purchasing power from financial firms to households and business firms and they are, aggregates of all loans, advances, overdraft, commercial papers, bills discounted, leases, bankers' acceptance and guarantee. According to Ayres and Warr (2010), credit has the power to energize and motivate other factors of production, by acting like a catalyst activating the engine of growth and enabling firms to mobilize inherent skills to advance in a planned direction and achieve stated goals.

Government Total Expenditure on Agriculture

Government expenditure, according to Nurudeen and Usman (2010) referred to expenses incurred by the government for the provision of public goods, services and works needed to foster or promote economic growth. While Alfranca and Huffman (2003) viewed government expenditure on agriculture as consisting of expenditures on horticulture, animal production, aquaculture, agricultural mechanization, forestry, agricultural science, biotechnology, and agricultural research. It includes expenditure made by the government on soil management, crop management, water management, disease/pest control and waste management. Government expenditure has both capital and recurrent components (Gabre-Madhin & Haggblade, 2004).

Mulinge (2016) sees capital expenditure as development expenditure on capital goods and projects that are meant to increase national output. Recurrent expenditure on the other hand refers to expenditure on purchase of agricultural goods and services, wages and salaries, operations as well as current grants and subsidies usually classified as transfer payments (Modebe et al., 2012).

Agricultural Output

Agricultural output is the measure of individual crop and livestock output, it comprises; crop/ livestock enterprise, which is the total volume of crops and livestock produced by the farm (other than losses in the field and store) (Ojonta & Ogbuabor, 2023). Agricultural output is the value of agricultural products which, free of intra-branch consumption, are produced during the accounting period and before processing, are available for export and consumption (Poi, 2018).

Empirical Review

Deposit Money Banks Credit to Agriculture and Agricultural Sector Output

Eno and Eze (2023) assessed the relationship between Agricultural Financing and Agricultural Output in Nigeria. The effect was assessed through the relationship between Agricultural Gross Domestic Product and Banks' Credit to Agriculture together with Banks' Lending Rate proxied by Interest Rate, Foreign Exchange Rate, and Government Expenditure on Agriculture for the period 2011 – 2021. The results of the analysis show that banks' credit to the agricultural sector was significant. This simply meant a positive relationship existed between Banks' lending and Agricultural output in Nigeria. High-interest rates lower agricultural credit demand by farmers, reducing agricultural output in Nigeria. The periods covered by the study is too short for time series study of this nature.

Adewale et al. (2022) examined the effect of farmers' credit on agricultural productivity from 1981 to 2016 using data from World Bank Development Index (WDI). The result of the OLS estimation showed that agricultural bank credit exerts a significant positive effect on agricultural output. Bank lending rate and foreign exchange rate do not show a significant effect on agricultural output. It was submitted that

bank credit has a significant positive effect on agricultural productivity in Nigeria. The study reviewed above is limited to the effect of bank credit, bank lending rate and foreign exchange rate on agricultural output, this current study added other forms of agricultural finance such as government expenditure on agricultural productivity in Nigeria.

Ogundajo et al. (2022) examined the relationship between monetary policy and the performance of agricultural sector of Nigeria for the periods of 1992 to 2019. The study employed ARDL analysis and it revealed that credit financing and monetary policy significantly affected agricultural output in Nigeria. Agricultural credit guarantee scheme had significant weak positive effect on Agricultural output; credit to the agricultural sector had an insignificant weak negative effect on Agricultural output; exchange rate has a weak positive and significant effect on Agricultural output; inflation rate has a strong positive and significant effect on agricultural output; real interest rate has a strong positive and significant effect on agricultural output in Nigeria. This present study utilized VECM technique of data analysis which is quite different from ARDL technique of analysis employed by the study reviewed above.

Onuegbu et al. (2022) examined the effect of commercial bank credit on agricultural output in Nigeria. Specifically, the study examined the effect of bank credit, government expenditure, Agricultural Credit Guarantee Scheme Fund and interest rate on agricultural output in Nigeria. The study showed that bank credit on agricultural output, government spending on agricultural sector and Agricultural Credit Guarantee Scheme Fund has positive and significant effect on agricultural output while interest rate has negative and insignificant effect on agricultural output. The study employed OLS, Vector Error Correction estimation technique was not adopted by the study, and this present study utilized VECM technique of data analysis.

Government Total Expenditure on Agriculture and Agricultural Sector Output

Okpala et al. (2022) examined the effect of agricultural credit guarantee scheme fund and government total expenditure on agriculture on agricultural sector's contribution to real gross domestic product was evaluated in this study from 1990 to 2020. The OLS result revealed that agricultural credit guarantee scheme fund has a positive significant effect on agricultural sector's contribution to real gross domestic product. On the other hand, the effect of government expenditure on agriculture on agricultural sector's contribution to real gross domestic product is positive but not significant. The study did not include commercial bank credit to agriculture as part of the explanatory variables.

Ngoben and Chiedza (2022) examined the effects of government expenditure in agriculture, annual average rainfall, consumer price index, food import value, and population on the value of agricultural production in South Africa with a specific focus on government expenditure in agriculture for the period 1983 to 2019. Using the Johansen co-integration test, the results reveal that there is a long-run relationship among the variables. The study utilized VAR as the technique of data analysis, whereas this current study utilized VECM as the technique of data analysis.

Fowowe (2020) evaluated effects of financial inclusion on agricultural productivity in Nigeria noting that farmers are the largest group of financially excluded persons in Nigeria. Findings suggest that financial inclusion has exerted positive and statistically significant effects on agricultural productivity in Nigeria. The focus of the study was on financial inclusion and agricultural productivity, while this present study focused on agricultural financing and agricultural sector output.

Finance-Growth Theory

The origin of the finance-led growth hypothesis can be traced back to Bagehot (1873). This theory acknowledges the lack of access to finance as the main driver of persistent income inequality and slower growth. The Finance and Growth nexus believes that a dynamic efficient environment is generated for growth by a supply leader or demand following impact. Financial growth nexus theories advocate that financial creation produces growth climate through "supply lead" or "demand follow-up." Access to financing is often viewed by theories as crucial to the persistence of income inequality and slower growth.

Access to a stable, fast, and affordable financing source is therefore recognized as a precondition for accelerating growth and reducing gaps in revenue and poverty, creating fair chances, enabling people economically and socially excluded to integrate better into the economy and actively contribute to the development and protect themselves from economic shocks (Serrao et al., 2012).

The overriding research theme that came out of the theoretical models and that has occupied the attention of the empirical researchers for the past decade is a question of whether growth rate of an economy is positively correlated with the level of financial development. A typical method employed to test this theory has been to regress some aggregate growth variables on financial development indicators that are based on some ratio of monetary aggregates to GDP. Simple as it may be in its approach, this line of research has produced an impressive amount of evidence for the finance-led growth theory.

METHODOLOGY

This study adopts *ex post facto* research design to establish the effect of Deposit money banks credit to agriculture and government expenditure on agriculture on agricultural sector output in Nigeria. It employs annual secondary data which were sourced from Central Bank of Nigeria Statistical Bulletin for the period between 1981 and 2023. Error Correction Model was used for estimating both short-term and long-term effects of one time series on another. The term error-correction relates to the fact that last-period's deviation from a long-run equilibrium, the *error*, influences its short-run dynamics. Thus, ECMs was used to directly estimate the speed at which a dependent variable returns to equilibrium after a change in other variables.

The functional representation of the model is:

Agricultural Sector Output = f (Agricultural Financing)

AGDP= f (DMBCA, GEA)1

Where:

AGDP= Contribution of Agriculture to GDP

DMBCA= Deposit Money Banks Credit to Agriculture

GEA = Government Total Expenditure on Agriculture

The Ordinary Least Square regression model is stated as:

$AGDP_t = \beta_0 + \beta_1 DMBCA_t + \beta_2 GEA_t + \mu_t$ 2

β_0 =intercept of the regression line

$\beta_1 - \beta_2$ = Coefficients of the explanatory (independent) variables

μ_t = Error term

t = Time covered by the study

Variables Measurement

Table 1: Variables Measurement

Variables	Measurement	Nature of Data	Source	Empirical Support
Agricultural sector output	Contribution of agriculture to overall GDP	Dependent Variable	Central Bank of Nigeria Statistical Bulletin	Okore & Anthony (2022); Marafa (2021); Obioma et al. (2021).
Deposit Money Banks Credit to Agriculture	All forms of commercial banks credit offered to the agricultural sector and used for the acquisition of capital equipment and operation of the agricultural sector	Independent Variable	Central Bank of Nigeria Statistical Bulletin	Onuegbu et al. (2022); Okuneye & Ajayi (2021); Lawal et al. (2019).
Government Total Expenditure on Agriculture	the total expenses incurred by the government on the agricultural sector	Independent Variable	Central Bank of Nigeria Statistical Bulletin	Okpala et al. (2022); Keji & Efuntade (2020); Atayi et al. (2020); Alabi & Abu (2020).

Source: Author's Compilation, 2024.

RESULTS AND DISCUSSION**Summary of Descriptive Statistics****Table 2: Descriptive Statistics**

	AGDP	DMBCA	GEA
Mean	7070.810	192.6141	20.96488
Median	2410.050	48.56000	7.540000
Maximum	41362.78	1457.820	80.18000
Minimum	19.53000	0.590000	0.010000
Std. Dev.	9527.607	317.8072	25.00884
Skewness	0.744503	0.293063	0.985974
Kurtosis	3.274348	3.304804	2.750832
Jarque-Bera	35.90900	84.00472	6.749047
Probability	0.000000	0.000000	0.034234
Observations	41	41	41

Source: Output from E-views 12, 2024.

Table 2 shows the descriptive analysis of the variables used in this study. From the table, the highest value for AGDP in Nigeria during the period of study is ₦41,362.78Billion. It indicates that in one of the years during the periods under study, agriculture contributed ₦41,362.78Billion to GDP, which is the highest value so far during the periods under study. Also, the maximum values for Deposit Money Banks Credit to Agriculture (DMBCA) and Government Expenditure on Agriculture (GEA) in Nigeria are ₦1,457.820 Billion and ₦8,018 Billion, respectively.

The mean value of AGDP under the periods of study in Nigeria is ₦7,070.81 Billion. However, mean values of DMBCA and GEA in Nigeria are ₦1,926.141Billion and ₦2,096.488 Billion respectively. This indicates that the average value of AGDP is ₦7,070.81 Billion. Nevertheless, the average values of DMBCA, and GEA in Nigeria are ₦1,926.141Billion, ₦2,096.488 Billion respectively under the periods of study in Nigeria. The skewness values of AGDP, DMBCA, GEA are 0.744503, 0.293063 and 0.985974 respectively, these values are all close to zero, it means that the distribution of the variables are symmetric in nature, and they are all positively skewed. Likewise, the Kurtosis values of AGDP, DMBCA and GEA are 3.274348, 3.304804 and 2.750832, these values are within the range of 3, it indicates that the shape is a normal distribution.

The probability value of Jarque-Bera test of AGDP, DMBCA and GEA are less than 0.05 which indicates that they are not normally distributed. However, the Guasian theorem (1929) and Shao (2003) submit that normality of data does not in any way affect the inferential statistics estimate to the Best Linear Unbiased Estimation (BLUE).

Correlation Analysis**Table 3: Correlation Analysis**

Probability	AGDP	DMBCA	GEA
AGDP	1.000000 -----		
DMBCA	0.744925 0.0000	1.000000 -----	
GEA	0.755744 0.0000	0.728593 0.0000	1.000000 -----

Source: Output from E-views 12, 2024.

From table 4, it can be observed that Deposit Money Banks Credit to Agriculture (DMBCA), and Government Expenditure on Agriculture (GEA), have significant positive relationship with Agricultural Output in Nigeria with p values of 0.000, which is less than .05 level of significance.

Table 4 also presents the correlation matrix among the independent variables. It is observed that the variables correlate fairly well between 0.496076 and 0.755744. The common rule of thumb is that if the correlation coefficient between two regressors is greater than 0.8, then multicollinearity is a serious issue. There is no correlation coefficient greater than 0.8. This indicates that multicollinearity is not an issue in the model valuations; hence there is no problem of multicollinearity of data (Wallace & Naser, 2005).

Unit Root Test

Table 4: Augmented Dickey-Fuller Unit Root Test

AT LEVEL				AT FIRST DIFFERENCE					
Variables	ADF Test Statistic	Critical Value @ 5%	Prob-Value	ADF Test Statistic	Critical Value @ 5%	Prob-Value	Max Lag	Order of Integration	
AGDP	1.977773	-2.951125	0.9998	-4.632179	-2.951125	0.0007	6	1(1)	
DMBCA	2.268243	-2.954021	0.9999	-8.057139	-2.954021	0.0000	6	1(1)	
GEA	0.474502	-2.941145	0.9836	-6.885676	-2.941145	0.0000	6	1(I)	

Source: Eview 12 Output, 2024.

From table 5, the Augmented Dickey-Fuller Test results revealed that AGDP, DMBCA, and GEA are not stationary at level since their absolute value of ADF test statistic is less than the critical values at 5%. The ADF test statistic became greater than the critical value at 5% after first difference. Since all the variables are integrated at the same order of I(1), that is first difference, this study proceeds to conduct the co-integration tests to determine the long run relationships among the variables.

Vector Error Correction Model Result

Table 6: Vector Error Correction Model Result

Dependent Variable: AGDP

Variable	Coefficient	Standard Error	t-statistics
Long Run effect of DMBCA, GEA, ACGS on AGDP			
DMBCA	18.93415	1.48336	12.7644
GEA	-25.90914	14.6714	-1.76597
Ecm(-1)	-0.988355	0.27620	-3.57845
Short Run effect of DMBCA, GEA, ACGS on AGDP			
Constant	2141.800	443.833	4.82569
DMBCA	-2.204800	7.49831	-0.29404
GEA	0.830366	20.3374	0.04083
R ²	0.82		
Adj. R ²	0.80		
F-statistic	31.41878		
Prob. F-statistics	0.0000		

Source: Output from E-views 12, 2024.

As expected, the lagged value of ECM is negative and statistically significant at 5 percent level. Since, the coefficient of the lagged ECM is negative and significant; the coefficient reveals the speed at which the entire system adjusts toward the long run equilibrium. The coefficient of ECM is -0.988355 which shows

the speed of adjustment from short run disequilibrium to long run equilibrium, it indicates that approximately 98 per cent discrepancy is corrected each year.

The R-square of 0.82 suggests that DMBCA, GEA and contribute 82% to agricultural output in Nigeria. Also, the F-statistic value of 31.41878 shows that the model employed is statistically significant and fit. Likewise, the adjusted R-square value of 0.80 shows that if additional independent variables are introduced to the model, the R-square will reduce from 82% to 80%, the adjusted R-square reveals the ability of the independent variables to predict the dependent variable when additional independent variable is introduced into the model. Adjusted R-square value of 80 percent is also fit, it shows a good measure of the goodness of fit of the estimated model.

Discussion of Findings

In the long-run, one unit increase in deposit money banks credit to agriculture will lead to 18.93415 units increase in agricultural sector output in Nigeria. This implies that Deposit Money Banks Credit to Agriculture has a positive effect on agricultural sector output in Nigeria in the long run. Regarding the short-run coefficient of Deposit Money Banks Credit to Agriculture, the result revealed that, one unit increase in Deposit Money Banks Credit to Agriculture will lead to 2.204800 reductions in agricultural sector output in Nigeria.

This finding is in consonance with the work of Adewale et al. (2022); Onuegbu et al. (2022); and contradicts the works of Enilolobo and Ode-Omenka (2018); Ogar et al. (2015). This finding supports financial intermediation theory in the sense that DMBs attract funds from the surplus units and channel these funds to farmers which has enhanced their productivity.

The long-run findings showed that one unit increase in government expenditure on agriculture will lead to 25.90914 reductions in agricultural sector output in Nigeria. This implies that government expenditure on agriculture has a negative effect on agricultural output in Nigeria in the long run.

The short-run findings indicate that one unit increase in government expenditure on agriculture will lead to 0.830366 increases in agricultural sector output in Nigeria and this implies that government expenditure on agriculture has a positive effect on agricultural sector output in Nigeria in the short-run. This corroborates the findings of earlier studies done Okpala et al. (2022); Alabi and Abu (2020); and disagrees with the work of Toheeb and Dabo (2020); Iganiga and Unemhilin (2017). This finding supports the Keynesian theory which states that government expenditure in critical sector like agricultural sector stimulates growth of nations because; it leads to growth in output.

CONCLUSION AND RECOMMENDATIONS

This study concludes that agricultural financing enhances agricultural sector output in Nigeria in the long, but the effect of agricultural financing on agricultural sector output is insignificant in the short run in Nigeria. Deposit money banks credit to agriculture inform of loan and advances disbursement to agriculture will enhance agricultural sector output in the long run in Nigeria, but it will not have significant effect on agricultural output in the short run in Nigeria because it takes time before reaping from investment in agriculture.

Government expenditure on agriculture has not significantly improved agricultural sector output in Nigeria. The possible reason why government expenditure in agriculture has not significantly improved agricultural output in Nigeria is the consensus that government expenditure is still poorly allocated to the agricultural sector, considering that poor resource allocation leads to poor increases in sectoral production. The sustain increase in the value of agricultural loans guaranteed and the inclusiveness of more smallholder farmers who dominate the Nigerian agricultural space will translate into robust contribution of the scheme to agricultural sector output in Nigeria in the long run.

The study offers the following recommendations based on the findings of the study.

- i. The monetary policy of the Central Bank of Nigeria (CBN) should further direct deposit money banks and other financial institutions to extend more of their credits to agricultural sector for better agricultural sector output.
- ii. There is need to properly and efficiently allocate government expenditure in agriculture to ultimately boost agricultural output. Government should increase government expenditure on agriculture while considering allocating the expenditure adequately.

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