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FINANCIAL SECTOR DEVELOPMENT AND AGRICULTURAL OUTPUT IN NIGERIA

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Abstract
This paper investigated the impact of financial sector development on agricultural output from 1981 to 2023 both in the short and the long run. The descriptive statistics and stationarity tests were conducted prior to the long run test using the Johansen co-integration and the Vector Error Correction Model (VECM). The Johansen test showed evidence of long run causality among the variables in the model. The serial correlation and the heteroscedasticity tests were conducted in addition. The result revealed the presence of linkage between lending rate, exchange rate and agricultural output. Loan to private sector and loan to agricultural sector as a proxy of financial sector development positively affected agricultural output in the short run. In the long run, lending rate and loans to private sector were negatively related to agricultural output while loan to agricultural sector had positive effect on output. The positive effect was, however, insignificant in the long run. This implies that in addition to finance and credits, peripheral factors such as insecurity, poor infrastructure, supply chain disruptions and low productivity are pervasive in their influence on agricultural performance to agriculture in Nigeria over the long term. The study recommended that the Central Bank of Nigeria through its monetary policy tools should ensure loans through the deposit banks are made accessible to genuine and credit worthy farmers at the lowest possible cost while addressing the insecurity issue.
Keywords: *Agricultural output, Exchange rate, Financial sector development, Lending rate, Loan to agricultural sector, Loan to private sector, Vector Error correction model*

1.0 Introduction

Agriculture is the occupation, business, or science of cultivating land, producing crops, and raising livestock. It encompasses a wide range of activities, including food production, livestock farming, nomadic farming, horticulture, fisheries, aquaculture, apiculture, forestry, wildlife conservation, soil management, crop production, and irrigation. To

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enhance and scale these agricultural activities, various financial inputs are necessary. The financial sector plays a crucial role in this by providing credit to farmers through financial instruments such as lending rates, inflation rates, and interest rates, thus linking financial sector development with agricultural output.

Nnamocha and Charles (2015) observed that in the long-run, bank credit and industrial output significantly contributed to agricultural output in Nigeria, while industrial output has a notable influence on agricultural output in the short run. Their study indicated that the industrial sector supports the growth of the agricultural sector by providing a market for raw materials. As the industrial sector expands, it increases the demand for agricultural products, fostering growth in the agricultural sector. This symbiotic relationship highlights the direct connection between the industrial and agricultural sectors.

Agriculture has significantly contributed to Nigeria's rapid economic growth, poverty alleviation, and food security. In the second quarter of 2024, Nigeria's agriculture sector accounted for 22.61% of the country's GDP in real terms, following contributions of 21.7% and 23.01% in Q1 and Q2 2023, respectively. This slight decline in contribution suggests a moderation in agricultural output relative to overall economic growth. Despite remaining a critical driver of GDP, the sector's performance indicates potential challenges such as weather variability, infrastructure gaps, or policy shifts. Understanding these factors is key to sustaining agriculture's pivotal role in Nigeria's economic structure and growth trajectory (CBN, 2024).

Today, the agricultural sector in Nigeria struggles with low productivity, primarily due to inadequate financing. This lack of finance stems from insufficient credit facilities, which hinder the adoption of new innovations and inventions by farmers. Although credit facilities exist, they are often too costly for farmers because financial variables like high inflation and exchange rates restrict financial institutions from providing adequate funding for agricultural. Thus, key areas requiring large-scale investment include mechanization, processing, and agri-food logistics, according to the World Bank. Additionally, smaller investments are essential for farmers and agriculture-based micro, small, and medium enterprises (MSMEs) to boost productivity while minimizing environmental impact and addressing climate risks (World bank, 2022).

A developed financial sector significantly enhances agricultural productivity. In Nigeria, the financial sector comprises financial institutions, the money market, the capital market, the banking system, and the securities, insurance, and pension sub-sectors. These institutions trade in financial instruments such as domestic and foreign currencies, stocks, bonds, and derivatives. The primary role of the financial sector is to act as an intermediary, mobilizing savings from surplus areas (the wealthy) to deficit areas (the less affluent).

Financial sector development is crucial as it improves the ability of financial institutions to provide financial services. Due to shortcomings in the agricultural sector, the Nigerian government has taken active steps to boost agricultural productivity by launching several large-scale agricultural projects and programs. Additionally, the financial sector has become more loan-friendly, with reduced interest rates and lending rates for agriculture. For instances private sector credits the recorded a 34% increase, rising from N56.46 trillion in July 2023 to N75.5 trillion in July 2024 (CBN, 2024). Despite these government efforts, the agricultural sector still struggles with inadequate output development (Anthony et al., 2010).

Several researchers, including Binuomote and Odeniyi (2013), Aniekan (2015), Francis (2013), Agunuwa et al. (2015), Nnamocha and Charles (2015), and Amassoma et al. (2011), have examined the relationship between financial sector development and agricultural output using various theoretical frameworks such as the Solow growth theory, Modernization theory, Endogenous growth model, Lucas model, and Romer model. Among these, only Nnamocha and Charles (2015) utilized the Domer model in their study, incorporating variables such as agricultural output, private sector credit, bank lending rate, and industrial output.

This study seeks to build upon the work of Nnamocha and Charles (2015) by adjusting their model to incorporate exchange rates and loans to the agricultural sector. It also extends the study period through 2023, following the approach of Ogunbona (2019). The objective is to offer fresh insights and provide guidelines for future research, deepening the understanding of the impact of financial sector development on agricultural productivity.

2.0 Theoretical Framework

The Domar model serves as the theoretical foundation of this study. The Domar Model, primarily known for its application in economic growth theory, provides a robust framework for analyzing the relationship between financial sector development and agricultural output. posits that investment is a key driver of economic growth, which is particularly relevant for sectors like agriculture that require substantial capital input for modernization and expansion. According to Domar (1947), if investment increases productive capacity rises and also creates income. However, the question arises what should be the magnitude of investment in order to make the increase in income equal to that of productive capacity?

Domar (1947) set up an equation one side of which increase of productive capacity was on a side, and income on the other side, and the solution of which would yield the required rate of growth? First, access to credit allows farmers to invest in high-yield seeds, fertilizers, and modern irrigation systems, leading to higher productivity. Second, financial services such as insurance and hedging can mitigate risks associated with agriculture, such as weather variability and price fluctuations, thereby encouraging investment in the sector. Third, financial institutions can facilitate better supply chain financing, reducing transaction costs and improving market access for agricultural products. As the financial sector becomes more sophisticated, it can better meet the diverse needs of the agricultural sector, leading to sustained growth in output. Leveraging the Domar Model, this research aims to empirically investigate the extent to which financial sector development has contributed to agricultural output in Nigeria, providing valuable insights for policymakers and stakeholders.

The Domar model forms the theoretical foundation of this study, offering a robust framework to analyze the relationship between financial sector development and agricultural output. The model posits that investment drives economic growth, particularly relevant for agriculture, which requires substantial capital for modernization and expansion. According to Domar (1947), increased investment boosts productive capacity and income, but the challenge is determining the investment magnitude to balance income growth with productive capacity.

Domar's equation balances, increases in productive capacity with income to determine the necessary growth rate. A key aspect is that access to credit enables farmers to invest in high-yield seeds, fertilizers, and modern irrigation, thereby enhancing productivity. Additionally, financial services such as insurance and hedging help mitigate agricultural risks, including weather variability and price fluctuations, which encourages investment in the sector. Financial institutions can also enhance supply chain financing, reducing transaction costs and improving market access for agricultural products.

As the financial sector evolves, it better meets the agricultural sector's needs and foster sustained growth in output. This research, leveraging the Domar Model, aims to empirically examine how financial sector development has boosted agricultural output in Nigeria, offering valuable insights for policymakers and stakeholders.

2.1 Empirical Review

Awe (2013) analyzed the mobilization of domestic financial resources for agricultural productivity in Nigeria, highlighting the contributions of various finance sources. He argued that federal government capital expenditure, federal government recurrent expenditure, operations of the agricultural credit guarantee scheme fund, and the sectoral distribution of commercial and merchant bank loans significantly contributed to agricultural productivity. However, he noted that federal government recurrent expenditure was insufficient and that financial resources from financial institutions had an insignificant impact on agricultural productivity.

Adewale (2022) also examined the impact of farmer's credit on major sectors in Nigeria. The estimation results indicate that commercial bank credits, particularly those extended to farmers, have had a positive and significant impact on the food production and manufacturing sub-sectors in Nigeria. This suggests that access to credit has been instrumental in boosting agricultural productivity and supporting the manufacturing of food products. Increased financial support to farmers has likely enabled greater investment in inputs, technology, and infrastructure, thereby contributing to the growth of these vital sectors in the economy.

Agunuwa *et al.* (2015) studied the impact of commercial banks' credits on agricultural productivity in Nigeria and found that commercial bank credit did not positively impact agricultural productivity. This indicated a negative relationship between interest rates and agricultural productivity but a significant positive relationship between government spending and agricultural productivity in Nigeria.

Adofu *et al.* (2010) used robust statistical analysis to examine the effects of interest rate deregulation on enhancing agricultural productivity in Nigeria. Their empirical analysis revealed that interest rate deregulation had a significant and positive impact on agricultural productivity during the period under review. Ajudua et al. (2015) investigated the impact of monetary policy variables on Nigeria's agricultural sector from 1986 to 2013.

Nwokoro (2017), using Ordinary Least Squares (OLS) and the Error Correction Model (ECM) on Nigeria's from 1980 to 2014. The study found that banks' credit had a positive impact on agricultural output in Nigeria. This suggests that access to credit from banks significantly contributed to the growth of agriculture over the period. Furthermore, a study by Udoka *et al.* (2016), which analyzed the effect of commercial banks' credit on agricultural output from 1970 to 2014, confirmed a positive and significant relationship

between bank credit and agricultural production in Nigeria. This indicates that commercial banks' credit played a crucial role in enhancing agricultural productivity, enabling farmers to invest in necessary inputs and infrastructure, thereby supporting sectoral growth.

Muftaudeen and Hussainatu (2014) studied the impact of macroeconomic policies on agricultural output, specifically crop production, in Nigeria. Using the Multivariate Vector Error Correction approach, they analyzed both short-run and long-run relationships between the variables over the period from 1978 to 2011. Their findings indicated that in the long run, agricultural output is responsive to changes in government spending, agricultural credit, inflation rate, interest rate, and exchange rate.

Meressa (2017) used random effects generalized least square (GLS) methods on unbalanced short panel data (2010-2016) from 16 private commercial banks in Ethiopia. The study revealed that credit from private commercial banks had no statistically significant impact on agricultural sector growth. This suggests that despite the availability of credit, it did not effectively influence agricultural development during the period analyzed which suggests potential gaps in credit accessibility or utilization within the agricultural sector.

Prabhakar (2015) studied factors influencing financial sector development through banking services in India. He concluded that ease of access to bank products and the purpose of opening bank accounts significantly influence the frequency of banking service usage, while physical distance of bank branches and convenience did not have a significant impact.

In a study on financial sector development and its impact on Africa, with a focus on access to finance for SMEs in South Sudan and Kenya, Garang (2014) found that despite the growth of the financial sector, SMEs face significant constraints in accessing finance due to their size. Additionally, the study highlighted that distance inversely affects access to finance for SMEs. Similarly, a study on financial sector development, regulation, and inclusive growth in Ethiopia supports these findings.

Mago (2014), aligning with the conclusions of Garang (2014) and Getnet (2014), proposed that mobile banking systems are particularly suitable for remote areas. He argued that mobile banking is easily accessible, cheaper, more convenient, and a faster means of sending and receiving money. This accessibility allows low-income earners, who have traditionally relied on the informal sector, to access a full range of financial services through mobile banking. Mago further explained that the introduction of mobile banking to remote areas would increase financial activity and, consequently, boost agricultural output.

Hariharan (2012) found that financial sector development significantly contributes to agricultural output and overall economic productivity. His study using ordinary least square estimates indicated a positive correlation between financial sector development and a country's total factor productivity and capital formation. Similarly, Toxopeus (2007) used regression techniques to show that remittances positively impact agricultural output by promoting financial sector development, thereby enhancing capital formation.

Raichoudhury (2016), employing a multidimensional approach with an index of financial sector development, found that financial and human development levels are positively correlated. Countries with advanced financial sectors also exhibit high human development

indices, suggesting that financial sector development should be integral to broader economic and social development strategies. Supporting this, Sarma (2012) used an endogenous growth model to demonstrate that financial sector development acts as a catalyst for agricultural output. He emphasized the importance of ICT development, particularly mobile phone adoption, in enhancing financial sector growth and overall economic development in African countries.

One school of thought, which includes writers such as Ettah *et al.* (2011); Enang and Frances (2011); Aniekan (2015); Udomah (2015); Awe (2013); Anthony *et al.* (2010); Hariharan (2012); Toxopeus (2017); and Dima (2013), argues that financial sector development positively impacts the growth of the agricultural sector. This implies that advancements in the financial sector lead to increased agricultural productivity.

3.0 Methodology

This section outlines the data collection methods, the techniques employed for data analysis, and the research design. It introduces the model used to make sound statistical inferences. The data utilized are secondary, consisting of time-series and annual data, sourced from the Central Bank of Nigeria's Statistical Bulletin (2022) and the World Bank Development Indicators (2022).

3.1 Model Specification

A model provides a simplified view of reality, allowing researchers to describe the essence and interrelationships within the system or phenomena it depicts (Yomore & Agbonifoh, 1999). This study's model is based on Domar's model (1947), a theory of output, which posits that output is a function of the productivity of investment.

$Y = f(X)$

Where Y = output

X = productivity of investment

Therefore, the model is modified to include:

$SAO = f(LR, LPS, LAS, EXCH)$ ……..... (1)

Y = share of agriculture to GDP (SAO), X_1 = lending rate (LR), X_2 = loan to private sector (LPS), X_3 = loan to agricultural sector (LAS) and X4 = Exchange rate (EXCH).

Long and Short Run Dynamics Model:

$$\Delta SOA_t = a_0 + \alpha_{1t} + \sum_{i=1}^{p} \alpha_{2i}\, \Delta\, SAO_{t-1} \sum_{i=1}^{p} \alpha_{3i}\, \Delta\, LR_{t-1} + \sum_{i=1}^{p} \alpha_{4i}\, \Delta\, \ln LPS_{t-1} + \sum_{i=1}^{p} \alpha_{5i}\, \Delta \ln LAS_{t-1} + \sum_{i=1}^{p} \alpha 6i\, \Delta\, \ln EXCH_{t-1} + + \sum_{i=1}^{p} \beta_1\, \Delta\, SAO_{t-1} \sum_{i=1}^{p} \beta_2\, \Delta\, LR_{t-1} + \sum_{i=1}^{p} \beta_3\, \Delta\, \ln LPSt\text{-}1 + \sum_{i=1}^{p} \beta_4\, \Delta \ln LAS_{t-1} + \sum_{i=1}^{p} \beta_5 \Delta\, \ln EXCH_{t-1} + u_t \quad \text{.....(2)}$$

The equation above is also known as the Conditional Unrestricted Error Correction Model (UECM). Here, Δ represents the first difference operator, while α_0 indicates the constant term, and α_{pe} denotes the trend. The variable *p* refers to the optimal lag length, typically selected using an information criterion. The parameters (α_2 to α_6) capture the short-run dynamics of the model, whereas β_1 to β_5 represent the long-run coefficients. Lastly, u_t is the white-noise error term.

Justification of the model

The model includes lending rate, loans to the private sector, loans to the agricultural sector, and exchange rate as the independent variables in the regression equation. The dependent variable is the share of agricultural output in the total GDP. By incorporating lending rate and exchange rate, the model aims to isolate the impact of agricultural financing on agricultural output. A detailed explanation of each variable is provided below.

SAO (Agricultural Output): Agricultural output which is proxied by share of agriculture to GDP is used to measure the growth in the agricultural sector. Increase in agricultural output will have positive impact on the economic growth as a whole.

LR (Lending Rate): The lending rate is the rate of interest charged by a financial institution for lending money. The lending rate is determined by the federal funds rate which is the interest rate commercial banks charge each other for overnight lending set by the Federal Revenue Board. An increase in lending rate will be detrimental to agricultural output as it will discourage borrowing.

LPS (Loan to Private Sector): Loan to private sector will be used in order to make comparisons between the amount invested into the private sector as against that invested in the agricultural sector.

LAS (Loan to Agricultural Sector): This is a facility which could be used to meet the cost of farming, cultivation and working capital activities for agricultural business and associated activities. Agricultural loans are generally low interest loans that farmers can avail to run their farming business more efficiently. This variable is included in the model because increase in the loan granted to the agricultural sector will have a positive impact on agricultural output.

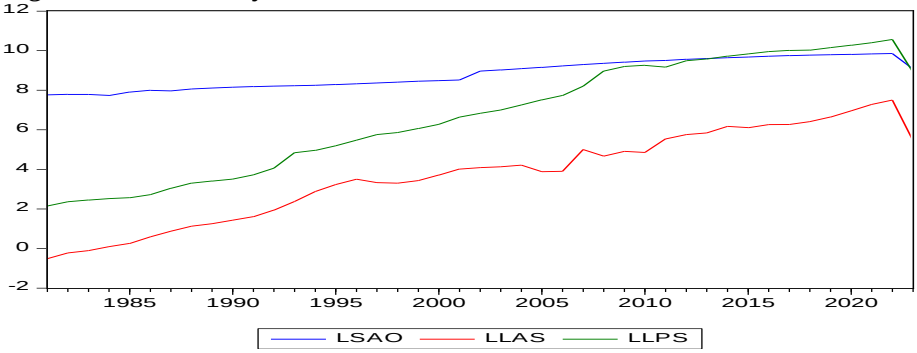
EXCH (Exchange Rate): This has to do with the ratio of price level from abroad and the domestic price level. The price level from abroad is converted to the units of the domestic currency via the current nominal exchange rate. This rate shows the quantity of goods and services that can be purchased abroad rather than in the domestic market, noting the fact that the local currency has been converted into the foreign currency. This variable is included in the model to make provision for importation and exportation of materials and equipment and an increase in exchange rate will have a negative effect on agricultural output.

4.0 Data Presentation, Results and Discussion

This section presents the data and analysis results, including the co-integration tests and the estimated Vector Error Correction Model (VECM). The goal is to assess the impact of the financial sector on agricultural output in Nigeria and offer an interpretation of the findings.

4.1 Data Presentation

Figure 1: Trend Analysis



Source: Authors', (2024)

Figure 1 shows the trend of the log of share of agricultural output, loan to agricultural sector and loans to private sector. Exchange rate and lending rates are isolated from this illustration to give a clear trend and dynamics of agricultural output and loan to agricultural loans over the last four decades. Agricultural loans, loans to private sector and agricultural output displayed a consistent northward movement over the years.

4.2 Unit roots test

Table 1: Augmented Dickey-Fuller and Phillips-Perron Unit Root Result

Variables	Augmented Dickey Fuller				Phillips-Perron			
	ADF	5% Critical Value	Included in the equation	Remarks	PP	5% Critical Value	Included in the equation	Remarks
LSAO	-5.98	-3.53	Trend & Intercept	I(1)	-5.98	-3.53	Trend & Intercept	I(1)
LR	-2.73	-1.95	None	I(1)	-7.32	-3.53	Trend & Intercept	I(1)
LLPS	-4.6	-4.21	Trend & Intercept	I(1)	-4.49	-3.53	Trend & Intercept	I(1)
LLAS	-7.22	-3.53	Trend & Intercept	I(1)	-7.87	-3.53	Trend & Intercept	I(1)
EXR	-4.4	-3.53	Trend & Intercept	I(1)	-5.32	-3.53	Trend & Intercept	I(1)

Source: Authors' computation using E-views 12 (2024)

Table 1 shows that, based on the ADF test, all variables except the lending rate are stationary at first difference, I(1), under both trend and intercept. However, the lending rate is non-stationary. Similarly, the PP test yields almost identical results, confirming that all variables are stationary at first difference, I(1), under trend and intercept. Due to the uniformity in the order of integration, the ARDL Bound test is not applicable. Consequently, the Johansen co-integration method is used to test for co-integration in the model.

4.2 Estimation

Table 2: Johansen Co-Integration Test based on Trace Statistic Result

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob**
None *	0.6	62.21	69.82	0.17
At most 1	0.28	25.14	47.85	0.92
At most 2	0.16	11.85	29.8	0.94
At most 3	0.09	5.11	15.49	0.8
At most 4	0.04	1.46	3.84	0.23

Source: Authors' computation using E-views 12 (2024)

Table 2 presents the results of the Johansen co-integration test using the trace statistic. Across all hypotheses, the null hypothesis is accepted, and the alternative hypothesis is rejected, as the critical values exceed the corresponding trace statistic values. This outcome indicates the acceptance of the null hypothesis, suggesting that there is no long-run relationship among the variables.

Table 3: Johansen Co-Integration Test based on Eigenvalue

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob**
None *	0.6	37.07	33.88	0.02
At most 1	0.28	13.28	27.58	0.87
At most 2	0.16	6.75	21.13	0.96
At most 3	0.09	3.64	14.26	0.89
At most 4	0.04	1.46	3.84	0.23

Source: Authors' computation using E-views 12 (2024)

Table 3 presents the results from the Johansen co-integration test, using the Eigenvalue approach. The findings indicate that one of the variables is co-integrated, as the Max-Eigen statistic for this variable exceeds its critical value or its probability is below the 5% significance level. Across all hypotheses, the Max-Eigen statistic consistently surpasses the critical values, confirming the presence of co-integration. This result signifies that there is a long-run relationship among the variables.

Since the Johansen co-integration test only identifies the long-run relationship between the variables, the research proceeds to apply the error correction model in the following section to also explore the short-run dynamics among the variables.

Table 4: Short Run Relationship of Variables

Error Correction	D(SAO)	D(LLAS)	D(EXR)	D(LR)	D(LLPS)
CointEq1	-0.16	-0.12	-157.51	-11.37	-0.25
	(0.12)	(0.43)	(93.67)	(3.4)	(0.21)
	[-1.33]	[-0.28]	[-1.68]	[2.85]	[-1.22]

Source: Authors' computation using E-views 12 (2024)

Having represented the error correction model in tabular form, then the t-statistics was extracted, and this can be presented in Table 5.

Table 5: Results of the t-calculated Value from the Error Correction Model

Variables	T-Cab	T-Tab	Hypothesis Accepted
D(LLAS)	0.28	2.02	Null
D(EXR)	1.68	2.02	Null
D(LR)	2.85	2.02	Alternative
D(LLPS)	1.22	2.02	Null

Source: Authors' computation using E-views 12 (2024)

Note: T-Cal is in absolute values

The tests conducted involved two hypotheses: the null hypothesis and the alternative hypothesis. The null hypothesis posits that there is no short-run relationship among the variables, while the alternative hypothesis suggests that a short-run relationship does exist. The decision criteria were as follows: if the T-calculated value exceeds the T-tabulated value, the null hypothesis is rejected, and the alternative hypothesis is accepted; however, if the T-calculated value is less than the T-tabulated value, the alternative hypothesis is rejected, and the null hypothesis is not rejected. The results indicate that all variables, except the lending rate, exhibit a short-run relationship with the agricultural output in Nigeria during the period under study.

Given the existence of a long-run relationship in the model, the next step is to estimate and present the long-run estimates, which are shown in Table 6 below.

Table 6: Long Run Relationship of Variables

Variables	Coefficient	Standard Error	t-statistics
LLAS	0.07	0.09	0.07
EXR	0.0002	0.46	0.0004
LR	-0.0005	0.01	-0.47
LLPS	-0.09	0.16	-0.62
C	-1.45	1.95	-0.74
R-Squared (Adjusted R-squared)	0.9681 (0.9575)		
F-statistic, Prob(F-statistic)	0.9575 (0.000)		

Source: Authors' computation using E-views 12 (2024)

Note: The regression was normalized after the co-integration test by multiplying the equation with the minus (-) sign.

The estimated long run model is shown as below

SAO = -1.45 + 0.07LLAS + 0.0002EXR - 0.0005LR - 0.09LLPS …… (3)

Table 6 reveals a positive relationship between the log of loans to agricultural sector (LLAS) and agricultural output. This implied that a percentage change in loans to the sector will lead to a more proportionate change in agricultural output by 7 per cent which conforms with a-priori expectation. Also, Lending rate (LR) corresponded with the a-priori expectation of there being a negative relationship with agricultural output. Exchange rate (EXR) on the contrary had positive effect on agricultural output in the long run. This indicates that a percentage change in lending rate will lead to a less proportionate change in agricultural output by 0.05 percent while an an increase in exchange rate may be associated with rising output. Furthermore, negative relationship between the log of loans to ptivate sector (LLPS) and agricultural output which illustrates that a percentage change

loans in private sector would lead to a less proportionate change in agricultural output in Nigeria by 9 per cent in the long run. This did not corroborate with the a-priori expectation. The coefficient of determination (R^2) being 0.9681 explains that about 96.8% variations in agricultural output are explained by loans to agricultural sector, exchange rate, lending rate and loans to private sector while the remainder are taken care of by the error term.

4.3 Post estimation

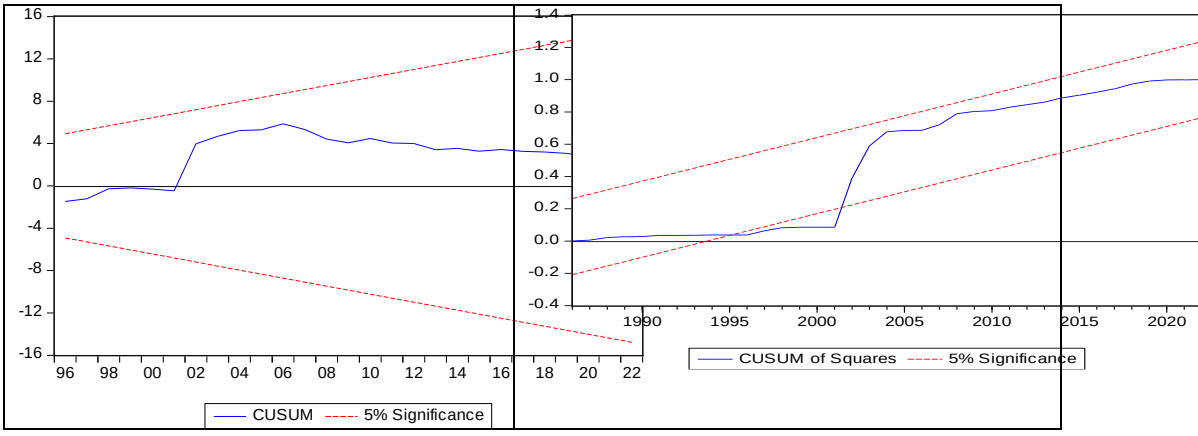
Table 7: Post Estimation tests

Diagnostic test	F- Statistic	Prob. Value
Breusch-Godfrey serial correlation LM test	0.1482	0.8630
Heteroscedasticity Test: Breusch-Pagan Godfrey	0.6057	0.8408
Ramsey-Reset test	8.7895	0.0053
Normality Test: (Jarque-Bera)	407.9474	0.0000

Source: Authors' computation (2024)

Post-estimation tests were conducted to assess the validity and robustness of the model. The Breusch-Godfrey test confirmed the absence of autocorrelation. Additionally, the post-estimation tests indicated no issues with heteroscedasticity and confirmed that the model is linear. However, the normality test revealed that the sample data significantly deviates from a normal distribution, indicating a lack of normality in the model.

The stability of the model was further evaluated using plots of the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMQ). The plots are presented below.



Source: Authors' computation (2024)

Figure 2: Plot of Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Recursive Residuals (CUSUMQ)

The graph on the left displays two important lines: the red lines represent the 5% significance level, while the blue line represents the CUSUM stability line. If the blue line remains between the red lines, the model's mean is considered stable over time. However, if the blue line moves outside the red lines, it indicates instability in the model's mean. In

this case, the CUSUM stability line stays within the red lines, suggesting that the model's mean is stable over time. The CUSUMQ graph, on the other hand, tracks the model's variance. It shows periods of both stability and instability, with stability from 1981 to 1995, instability between 1995 and 2001, and a return to stability from 2001 to 2022.

4.4 Discussion of findings

The study aimed to assess the impact of financial sector development on agricultural output in Nigeria, based on Domar's model (1947), which posits that output is a function of investment productivity. The findings from various tests and results indicate that an increase in loans to both the agricultural and private sectors leads to a rise in agricultural output, as a positive relationship exists between these variables in the short run. This implies that greater financial investment in these sectors results in higher agricultural output, consistent with the model. The relationship is however obscured in the long run such that increases in agricultural financing only yields an insignificantly negative response.

The short-run findings of this research are consistent with those of Nnamocha and Charles (2015), Nwokoro (2017), Aniekan (2015), and Adewale (2022), who also concluded that providing accessible credit facilities to the private sector and farmers significantly enhances production capacity. These studies emphasize the positive and significant impact of agricultural credit on productivity in Nigeria. In the long run, the relationship between agricultural loans and output, though positive, is not statistically significant, aligning with Agunuwa et al. (2015), who found that commercial bank credit to the sector did not have a notably positive effect on agricultural productivity.

5.0 Conclusion

The findings reveal that financial sector development positively impacts agricultural output in Nigeria, with statistically significant results in the short run. This impact is largely due to credits and loans provided to farmers. However, the agricultural sector still lags because policies that prioritize agriculture have been lacking since the discovery of oil in 1956, which shifted focus away from agriculture. Past initiatives like Operation Feed the Nation and the Green Revolution failed due to misallocation of funds. The study suggests that increased attention to the agricultural sector through financing, subsidies, and infrastructure improvements could boost agricultural output, enhance productivity, and potentially increase revenue through exports.

5.1 Recommendations

Nigeria, despite being one of Africa's largest economies with considerable wealth, has not reached the level of development one might expect, particularly in its agricultural sector. The country still has a significant un-monetized sector, leading to missed business opportunities and stunted growth in the informal sector, which in turn hampers the agricultural sector's growth potential. To address this, several recommendations are proposed:

The Central Bank of Nigeria should use its monetary policy tools, such as selective credit control, to ensure that loans from deposit-money banks are accessible to genuine and

creditworthy farmers at the lowest possible cost. This would encourage investment in the agricultural sector and positively impact its output performance.

The Nigerian government should provide inputs and loan facilities to genuine farmers at subsidized rates. These resources should be made available in the right quantities, at the right time, and delivered directly to the farmers. Insufficient funding and inadequate input provision have historically been major reasons for the failure of many agricultural policies in Nigeria. By addressing these issues, the government can better support the agricultural sector's growth and success.

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