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IMPACT OF DEPOSIT MONEY BANKS ON THE GROWTH OF AGRICULTURAL SECTOR IN NIGERIA.

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Abstract

This study examined the impact of deposit money banks' (DMBs) loan-to-deposit ratio (DBLDR) and machinery financing (DBMF) on the growth of Nigeria's agricultural sector from 1981 to 2023. The objective was to explore the short-run and long-run effects of these financial variables on agricultural output (AO). An ex-post facto research design was adopted, utilizing the Autoregressive Distributed Lag (ARDL) model to analyze the relationship between DMBs' credit allocation and agricultural growth. The theoretical framework of the study was anchored on the Fractional Reserve Theory, Financial Intermediation Theory, and Schumpeter's Supply Leading Theory. The results showed that while DBLDR and DBMF had a negative impact on agricultural output in the short run, their long-term effects were either delayed or insignificant. This suggests that initial challenges, such as high lending rates, credit access issues, and infrastructural deficits, hinder immediate agricultural growth but contribute to long-term sectoral development. The study concluded that improving credit allocation efficiency, reducing interest rates, and addressing infrastructure gaps could significantly boost agricultural sector growth in Nigeria. Based on these findings, the study recommended optimizing credit provision for agriculture, lowering lending rates, improving infrastructure, and offering more flexible loan conditions for machinery financing. These measures would create a more favorable environment for sustainable agricultural development.

Keywords: *Credit Allocation, Machinery Financing, Agricultural Sector & Loan-to-Deposit Ratio*

JEL Classification: Q43, I32, Q48, and D63

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1.1 INTRODUCTION

The role of deposit money banks (DMBs) in the economic development of nations has been a subject of significant research, particularly with respect to their impact on critical sectors such as agriculture. The agricultural sector, which serves as a major contributor to employment and food security in many economies, is especially vital in developing countries like Nigeria. The relationship between deposit money banks' loan-to-deposit ratio (LDR) and financing for agricultural growth is crucial, as access to credit and financing options often determines the success or failure of agricultural enterprises. This study explores how deposit money banks' financing mechanisms influence the growth of Nigeria's agricultural sector, focusing on the loan-to-deposit ratio and agricultural financing. The research is motivated by the need to understand the constraints and opportunities for agricultural growth in Nigeria, where, despite substantial financial interventions, the sector continues to face challenges in achieving its full potential.

Globally, agriculture is regarded as the backbone of economic development in many developing nations. In countries such as India and China, agriculture plays a pivotal role in driving economic growth, contributing significantly to GDP and employment (Kumar & Singh, 2022). For example, in China, the agricultural sector accounts for approximately 9% of GDP and provides livelihood to over 30% of the population (Zhang, Li, & Zhao, 2020). Similarly, in India, agriculture remains central to the economy, with over 50% of the population employed in the sector and a significant portion of GDP generated from agricultural activities (Smith, 2021). These countries have well-established financial systems that offer easy access to capital, particularly for farmers, through loans with favorable terms and agricultural financing, which enhances productivity and operational efficiency.

However, the situation is starkly different in many developing countries, including Nigeria, where the agricultural sector remains underfunded and underdeveloped despite the existence of various financial interventions. Despite increasing credits to agriculture, the Nigerian agricultural sector continues to face significant challenges, including low productivity,

inadequate financing, and poor infrastructure. For instance, in Zimbabwe, the agricultural sector has struggled to grow despite increasing bank credits, with growth rates stagnating at a mere 2% (Mutasa & Nyemba, 2021). This stagnation is attributed to several factors, including limited access to affordable capital, high interest rates, and lack of adequate financing for farm machinery and technology upgrades.

In contrast, some African countries like Uganda have witnessed positive impacts on their agricultural sectors, with substantial credit allocation leading to impressive growth rates of 21% in 2015 and 25% in 2017/2018 (Ugandan Bureau of Statistics, 2019). This highlights the critical role that access to finance plays in enabling the growth of the agricultural sector in developing countries, particularly in terms of machinery financing and input acquisition.

In Africa, agriculture remains a cornerstone for economic diversification and poverty alleviation. Countries such as South Africa and Egypt have recognized the immense potential of the sector, with agriculture contributing significantly to GDP and employment. In South Africa, the agricultural sector contributes over 5% to GDP and remains a crucial source of livelihood for millions (African Development Bank, 2021). However, despite these successes, many African nations, including Nigeria, face challenges in translating financial support into sustainable agricultural growth. High lending rates, low credit availability, and lack of modern infrastructure are some of the key barriers to the performance of the agricultural sector. For example, the contribution of agriculture to Nigeria's GDP has seen a steady decline, falling from an average of 40.97% in the 1980s to just 21.97% in the 2010s (Central Bank of Nigeria, 2021). These figures suggest that despite government interventions and the efforts of deposit money banks, the agricultural sector in Nigeria continues to struggle due to insufficient financial support.

In Nigeria, deposit money banks are central to the financing of the agricultural sector, offering loans and advances that are crucial for the purchase of inputs, machinery, and the expansion of farming operations (Ogunleye & Olatunji, 2020). However, the sector has faced several challenges, including a low loan-to-deposit ratio (LDR), high interest rates, and an unstable

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economic environment, which have discouraged both banks and farmers from engaging in long-term investments. The LDR, which measures the ratio of loans provided by a bank to its total deposits, is a key indicator of a bank's lending capacity. A higher LDR is typically associated with more aggressive lending practices, which can stimulate economic activity, particularly in agriculture. In Nigeria, however, the LDR has remained relatively low compared to global standards, indicating that a significant portion of deposits is not being channeled into productive investments (Federal Reserve Bank of Nigeria, 2021).

Moreover, machinery financing, which involves loans for the purchase of agricultural equipment such as tractors, irrigation systems, and harvesters, is crucial for modernizing farming practices and improving productivity. Despite the importance of machinery financing, Nigerian farmers often face challenges in securing such loans due to high collateral requirements and unfavorable lending terms (Ogunyemi & Johnson, 2020). This lack of access to affordable machinery financing has resulted in many farmers relying on outdated equipment, which limits their ability to increase output and compete both domestically and internationally.

The decline in Nigeria's agricultural sector can also be attributed to broader systemic issues such as poor infrastructure, unreliable power supply, and limited access to modern farming technology. These factors, combined with high operating costs, have made it difficult for farmers to remain competitive. The Central Bank of Nigeria (2021) has reported that despite various financial interventions and policies aimed at boosting agriculture, the sector's contribution to GDP has continued to decline. Such initiatives include the Agricultural Credit Guarantee Scheme Fund (ACGSF) and the establishment of the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL), which were designed to provide credit support to farmers. However, the effectiveness of these initiatives has been limited by underlying structural challenges.

Given these issues, the topic of this study—Examining the Impact of Deposit Money Banks' Loan-to-Deposit Ratio and Machinery Financing on the Growth of Nigeria's Agricultural Sector—becomes crucial for understanding the factors that influence agricultural

development in Nigeria. The study aims to investigate how the loan-to-deposit ratio of deposit money banks affects the growth of the agricultural sector and the role of machinery financing in enabling technological advancement and capacity expansion in agriculture. By exploring these factors, the study seeks to provide insights into the ways in which financial institutions can better support the agricultural sector, leading to increased productivity, job creation, and economic development in Nigeria.

2.1 Conceptual Review

This section provides an overview of the core concepts central to this study: deposit money banks (DMBs), the loan-to-deposit ratio (LDR), agricultural financing, and the agricultural sector. These concepts are explored in the context of their relevance to economic growth and agricultural development in Nigeria, with particular attention to the interrelationship between these elements.

2.1.1 Deposit Money Banks

Deposit money banks, also known as commercial banks, play a pivotal role in economic systems by facilitating the efficient allocation of financial resources. They act as intermediaries between depositors who supply capital and borrowers who seek credit for investment (Adebayo & Olatunji, 2020). Through this intermediation, DMBs contribute to the flow of capital into productive sectors such as agriculture, manufacturing, and services (Sani & Abiola, 2021). By accepting deposits from individuals, institutions, and governments, banks provide loans to farmers, agribusinesses, and other economic units. This financial intermediation reduces the transaction costs associated with lending and borrowing, thereby fostering economic activity (Mishkin, 2019). In developing economies like Nigeria, where access to credit is often limited, the role of DMBs in financing agriculture is critical for achieving agricultural development and broader economic progress (Okunbor, 2020). The ability of DMBs to mobilize savings and channel them into long-term investments can significantly improve agricultural productivity, enhance rural incomes, and promote food security.

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2.1.2 Loan-to-Deposit Ratio

The loan-to-deposit ratio (LDR) is a key financial metric that measures the extent to which a bank's deposits are converted into loans. It is calculated by dividing the total loans by the total deposits, serving as an indicator of the bank's lending practices and liquidity risk (Jones & Roberts, 2022). A higher LDR indicates that a bank is more aggressive in its lending practices, which can drive profitability but may also increase exposure to liquidity risks, especially during periods of economic instability (Brown & Williams, 2021). Conversely, a lower LDR reflects a more conservative approach to lending, ensuring greater liquidity but potentially limiting the bank's income from loans (Mishkin, 2020). In Nigeria, the Central Bank of Nigeria (CBN) sets minimum LDR thresholds to encourage banks to lend to priority sectors such as agriculture in order to stimulate economic growth (Central Bank of Nigeria, 2023). However, if banks exceed their LDR limits without sufficient liquidity, they risk financial instability, which could have broader implications for the economy. The management of LDR is a delicate balancing act, requiring careful oversight to maintain financial stability while promoting lending to critical sectors such as agriculture.

2.1.3 Agricultural Sector

The agricultural sector plays a crucial role in the economic development of developing countries like Nigeria, where it remains the primary source of employment and income for a large proportion of the population. Agriculture contributes significantly to GDP, provides livelihoods for rural communities, and ensures food security (Ogunleye & Olatunji, 2020). However, despite its importance, the sector has faced numerous challenges in accessing financing, which limits its growth potential. The lack of access to affordable credit, high-interest rates, and the insufficient availability of specialized financial products are some of the barriers that have hindered agricultural development (Adebayo & Olatunji, 2020). Despite these challenges, there are significant opportunities for growth, particularly through increased financing from deposit money banks, which can help farmers acquire land, improve productivity, and access modern agricultural technology. In Nigeria, efforts to improve

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agricultural finance, including initiatives by the government and DMBs, are critical for realizing the sector's full potential and driving overall economic development.

2.1.4 Agricultural Financing

Agricultural financing involves providing credit to farmers and agribusinesses for the acquisition of land, equipment, seeds, fertilizers, and other necessary inputs for agricultural production (Stulz, 2022). It is essential for modernizing farming practices, increasing crop yields, and ensuring long-term sustainability in the agricultural sector (Bikker & Gerritsen, 2022). Access to credit allows farmers to invest in the technology, infrastructure, and expertise necessary for scaling up production and improving efficiency. In Nigeria, however, the availability of agricultural financing has often been inadequate, as many farmers face difficulties in securing loans due to high collateral requirements, unfavorable interest rates, and limited access to credit facilities (Smith, Porter, & Gilkeson, 2022). Deposit money banks have a critical role to play in providing such financing, often through specialized products like agricultural loans and credit lines with favorable terms, including lower interest rates and longer repayment periods. These financial products help alleviate the high upfront costs associated with modernizing agricultural practices, thus enhancing productivity and fostering agricultural growth (Ali & Smith, 2020). By enabling farmers to access the capital needed for equipment, machinery, and technology, agricultural financing can significantly boost operational efficiency and support broader economic objectives such as rural development, poverty reduction, and food security (Johnson, 2021).

2.2 Theoretical Review

The theoretical framework for this study is anchored on three core theories that underpin the relationship between deposit money banks (DMBs) and the growth of Nigeria's agricultural sector: the Fractional Reserve Theory, the Financial Intermediation Theory, and Schumpeter's Supply Leading Theory. Each theory offers valuable insights into the role of financial institutions in facilitating agricultural growth through credit allocation, machinery financing, and resource mobilization.

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2.2.1 Fractional Reserve Theory

The Fractional Reserve Theory, initially proposed by Goldsmith (1970), is foundational in understanding the operations of commercial banks within an economy. According to this theory, banks are required to hold only a fraction of their deposits in reserve, with the remainder available to lend out to borrowers. This system enables banks to create money through lending, thus increasing the money supply beyond the initial deposit (McLeay & Thomas, 2016). One of the critical assumptions of the Fractional Reserve Theory is that banks can extend loans to sectors such as agriculture, thereby directly contributing to rural development, capital formation, and technological upgrades. Through this process, financial institutions enhance credit availability, which facilitates investments in agricultural activities such as machinery acquisition, land expansion, and infrastructure development (Guttmann, 2015). However, critics of this theory, such as Diamond and Dybvig (2019), argue that excessive lending without adequate reserves can lead to financial instability, particularly during economic crises, resulting in liquidity risks and bank failures. The risk of inflation and financial crises associated with unchecked credit creation complicates the application of the Fractional Reserve Theory (Mishkin, 2018). Despite these criticisms, the theory remains relevant to the study of agricultural growth, as it highlights how the money supply and credit creation through lending impact the financing of agricultural ventures, thereby promoting sectoral growth and overall economic development.

2.2.2 Financial Intermediation Theory

The Financial Intermediation Theory, proposed by Gurley and Shaw (1960), offers another important perspective on the role of deposit money banks in economic growth. This theory emphasizes that financial intermediaries, such as banks, are essential for the efficient allocation of resources by channeling savings from depositors into productive investments, particularly in agriculture. The primary assumption is that banks, acting as intermediaries, bridge the gap between savers and borrowers, enabling investments in critical sectors like agriculture (Obi, 2021). Banks help reduce transaction costs, pool resources, and diversify

risks, thereby enhancing the overall efficiency of financial markets (Chow, Vieito & Wong, 2019). In the context of agricultural financing, DMBs contribute to the efficient allocation of credit to farmers and agribusinesses, facilitating agricultural growth through loans for purchasing inputs, machinery, and technology (Nwagu, 2020). However, this theory faces criticisms regarding the inefficiency of financial intermediation, particularly when banks fail to accurately assess the creditworthiness of borrowers. This can lead to issues such as adverse selection and moral hazard (Allen & Gale, 2017). Critics also point out that the theory does not fully address systemic risks, as evidenced during financial crises when banks overextend credit and take on excessive risks (Mishkin, 2020). Despite these challenges, the Financial Intermediation Theory is relevant to this study because it explains how DMBs, by facilitating the flow of credit, can directly impact agricultural development, particularly through loans for machinery financing, input acquisition, and capacity expansion.

2.2.3 Schumpeter's Supply Leading Theory

Schumpeter's Supply Leading Theory, formulated by Joseph Schumpeter in 1911, offers a compelling framework for understanding the dynamic relationship between financial development and agricultural growth. Schumpeter viewed deposit money banks as catalysts for economic transformation, rather than merely financial intermediaries. According to Schumpeter, banks provide the necessary credit that supports entrepreneurial ventures and the innovation that drives economic growth, including in agriculture (Schumpeter, 1911). In his view, financial institutions enable 'creative destruction,' where new technologies and agricultural practices replace outdated ones, driving innovation and enhancing productivity in the sector. Schumpeter's theory underscores the role of banks in fostering entrepreneurial activities by providing credit to agribusinesses poised to introduce technological advancements (Schularick & Taylor, 2017). A key aspect of this theory is the focus on how credit availability from banks facilitates innovation, modernization, and the adoption of advanced farming techniques. Critics of Schumpeter's theory argue that it overemphasizes the role of financial institutions in fostering innovation while underestimating the significance of non-financial factors, such as market demand, regulatory policies, and the availability of

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skilled labor, in shaping agricultural outcomes (Mishkin, 2018). Nonetheless, Schumpeter's theory remains highly relevant to this study, as it highlights the essential role of deposit money banks in driving agricultural growth through the provision of credit for technological innovation, capital expansion, and overall sector modernization.

2.2.4 Integrating the Theories

Together, these theories provide a comprehensive framework for understanding the relationship between deposit money banks and the growth of Nigeria's agricultural sector. The Fractional Reserve Theory emphasizes the importance of credit creation in promoting agricultural growth by allowing banks to extend loans to farmers and agribusinesses. The Financial Intermediation Theory focuses on the intermediary function of banks, which helps efficiently allocate resources to agriculture, ensuring that funds are channeled into productive uses. Schumpeter's Supply Leading Theory situates DMBs as enablers of innovation and technological advancement, which are essential for agricultural transformation. Each of these theories provides valuable insights into how banks influence agricultural development, particularly through their lending practices, machinery financing, and capacity-building efforts. Understanding these theories in the Nigerian context helps explain the critical role of deposit money banks in facilitating agricultural growth, despite challenges such as high interest rates, liquidity constraints, and infrastructural limitations.

In conclusion, these theoretical perspectives collectively form a robust foundation for examining the impact of deposit money banks on the growth of Nigeria's agricultural sector. By exploring the assumptions, applications, and critiques of these theories, this study aims to provide a nuanced understanding of how financial institutions can catalyze agricultural development through strategic credit allocation, enabling technological progress, and promoting economic stability in Nigeria's agricultural landscape.

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2.3 Empirical Review

Okoye, Adebayo, and Nwachukwu (2024) investigated the impact of bank credit on the growth of Nigeria's agricultural sector, with a focus on the role of deposit money banks in financing agricultural activities. The aim of the study was to explore the extent to which credit allocation, particularly in the form of agricultural loans, contributes to the productivity and growth of farming enterprises in Nigeria. The study utilized data collected from commercial banks and agricultural reports, covering various regions across Nigeria. The research employed a quantitative methodology, utilizing regression analysis to examine the relationship between credit provision and agricultural growth. The findings revealed that increased access to bank credit significantly boosted agricultural productivity, particularly in the purchase of farming inputs and machinery. The study concluded that effective credit provision is essential for boosting agricultural output and development in Nigeria. Therefore, the study recommended that deposit money banks enhance their loan offerings to the agricultural sector, focusing on accessible credit for machinery and other essential farming needs, while also improving loan conditions to facilitate growth.

Adeyemi, Oluwaseun, and Abiola (2023), examined the effect of the loan-to-deposit ratio (LDR) on agricultural output in Nigeria, specifically focusing on the agricultural sector's performance. The objective of the study was to evaluate how changes in the LDR affect the productivity and efficiency of farming businesses. The study employed data from Nigerian deposit money banks spanning from 2000 to 2022 and utilized econometric techniques such as Ordinary Least Squares (OLS) regression. The findings revealed a positive relationship between LDR and agricultural growth, indicating that higher LDRs were associated with increased agricultural productivity. However, the study also highlighted that excessively high LDRs could lead to liquidity challenges, limiting the ability of banks to continue lending to farmers. The study concluded that a balanced approach to managing LDR is crucial for promoting sustainable agricultural growth. Based on these findings, the study recommended that financial regulators in Nigeria set flexible LDR thresholds tailored to the needs of the agricultural sector, ensuring adequate access to financing.

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Nwafor, Johnson, and Akinyemi (2022), explored the impact of machinery financing on the Nigerian agricultural sector, with a focus on how financial institutions support capital investment in modern farming equipment. The study aimed to assess the effectiveness of machinery financing in promoting competitiveness and technological advancements within Nigerian agriculture. Using a case study approach, the study analyzed data from 15 large-scale farms across Nigeria over a five-year period. The research incorporated both qualitative interviews with stakeholders in the agricultural finance sector and quantitative data analysis. The findings showed that machinery financing significantly improved operational efficiency and product quality, enhancing the competitiveness of farms. The study concluded that machinery financing is critical for improving productivity and ensuring the competitiveness of Nigerian agriculture. Consequently, the study recommended that Nigerian banks increase their focus on providing loans for agricultural machinery, with favorable loan terms such as lower interest rates and longer repayment periods, to facilitate the modernization of farming practices.

Oduola, Okeke, and Osita (2021), investigated the role of deposit money banks in promoting agricultural development in Nigeria, with a focus on credit facilities for the sector. The primary aim of the study was to analyze the relationship between bank credit allocation and agricultural output growth. The study utilized secondary data from the Central Bank of Nigeria and the National Bureau of Statistics, spanning from 2005 to 2019. The methodology involved regression analysis to test the impact of credit supply on agricultural productivity. The findings revealed that an increase in credit supply was positively associated with higher agricultural output, particularly in the areas of crop production and livestock farming. However, the study also noted that infrastructural challenges and security concerns significantly hindered the effectiveness of credit provision in supporting agricultural growth. The study concluded that while bank credit is essential for agricultural development, addressing infrastructural and security issues is equally important for achieving sustainable growth. The study recommended that both the Nigerian government and financial institutions collaborate to improve the

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agricultural investment climate, particularly by addressing infrastructure gaps and enhancing security in rural areas.

Olumide, Ifeoma, and Chinedu (2020) examined the effect of deposit money banks' credit provision on the efficiency and competitiveness of Nigerian agriculture. The study aimed to explore how the availability of credit influences the ability of farms to innovate and compete in both local and international markets. The scope of the study covered large agricultural enterprises in key farming regions of Nigeria, utilizing data collected from 2010 to 2017. The study adopted a mixed-methods approach, combining quantitative analysis with interviews from bank managers and agricultural business owners. The findings suggested that access to credit, particularly for purchasing equipment and expanding operations, positively impacted farm growth and market competitiveness. However, the study also found that high-interest rates and stringent loan conditions often limited the effectiveness of credit in supporting long-term agricultural growth. The study concluded that more favourable lending terms, including lower interest rates and flexible repayment schedules, are necessary to enhance the sector's competitiveness. Therefore, the study recommended that Nigerian banks revise their lending strategies, particularly for machinery financing, to support the long-term growth and competitiveness of the agricultural sector.

3.0 METHODOLOGY

This study adopts an ex-post facto research design to examine the impact of deposit money banks' (DMBs) loan-to-deposit ratio (LDR) and machinery financing on the growth of Nigeria's agricultural sector, focusing on the period from 1981 to 2023. This design is chosen because it allows for the exploration of relationships between pre-existing variables without direct manipulation, enabling the use of historical data to uncover natural trends and effects. The variables of interest include the loan-to-deposit ratio, machinery financing, and agricultural sector growth, as indicated by key economic indicators such as agricultural output, credit to the agricultural sector, and lending rates.

The study employs the Autoregressive Distributed Lag (ARDL) model, developed by Pesaran and Shin (1999) and later expanded by Pesaran, Shin, and Smith (2001). The ARDL model is

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suitable for this analysis as it allows for the examination of both short-term and long-term relationships between deposit money banks' indicators and agricultural growth. In terms of model specification, the study follows the ARDL equation presented in the empirical review by Adeyemi, Oluwaseun, and Abiola (2023), which explored the relationship between loan-to-deposit ratios and agricultural output in Nigeria. The variables included in the model will be the loan-to-deposit ratio, machinery financing, credit allocation to the agricultural sector, and lending interest rates, with agricultural growth as the dependent variable.

Data for the study is sourced from the Central Bank of Nigeria (CBN), the National Bureau of Statistics (NBS), and World Development Indicators (WDI), covering annual time series data from 1981 to 2023. To ensure robust analysis, the study will apply the Augmented Dickey-Fuller (ADF) test for unit roots, followed by the ARDL bounds test for cointegration and the Akaike Information Criterion (AIC) for maximum lag selection. Post-estimation tests will include the Breusch-Godfrey LM test for serial correlation and the CUSUM of Squares test for model stability, ensuring the validity of the findings.

4.1. Data Presentation, Analysis and Discussions

The time series data on agricultural sector output (ASO), deposit money bank's machinery financing (DBMF), and deposit money bank loan-to-deposit ratio (DBLDR) were collected for a period of 43 years to analyze the impact of deposit money banks (DMBs) on the growth of the agricultural sector in Nigeria. The data are presented in trend form as shown below.

4.1.1 Model Estimation Results

Regression Analysis

The ARDL model was used to estimate the short-run and long-run effects of deposit money banks' (DMBs) loan-to-deposit ratio (DBLDR) and machinery financing (DBMF) on the growth of Nigeria's agricultural sector. The model incorporated various factors, including agricultural sector output (ASO), DMBs' credit to the agricultural sector, DMBs' total deposits, lending interest rates, and machinery financing.

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The estimated ARDL model results are presented in Table 4.6 below.

Table 4.1: ARDL Estimated Model

Dependent Variable: LOG(ASO)

Method: ARDL

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LOGASO(-1)	0.825061	0.222565	3.707058	0.0013
LOGASO(-2)	-0.416041	0.288831	-1.440431	0.1645
LOGDBLDR	-0.424820	0.168774	-2.517087	0.0200
LOGDBLDR(-1)	0.665215	0.200761	3.313459	0.0033
LOGDBLDR(-2)	-0.571955	0.165499	-3.455945	0.0024
LOGDBMF	-0.099753	0.064949	-1.535859	0.1395
LOGDBMF(-1)	-0.002356	0.063146	-0.037317	0.9706
LOGDBMF(-2)	0.110322	0.059370	1.858221	0.0772
LOGDBMF(-3)	-0.105611	0.053844	-1.961433	0.0632
C	1.435747	0.441186	3.254288	0.0038
@TREND	0.016653	0.007616	2.186696	0.0402
R-squared	0.998868	**Adjusted R-squared**	0.997952	
F-statistic	1090.389	**Durbin-Watson stat**	2.058774	
Prob(F-statistic)	0.000000			

Source: Eviews Version 10 Output, 2024 (Appendix C)

Table 4.1 displays the ARDL estimated model with current and lagged values for each variable in the model. The results reveal that DBLDR at the first and second lagged periods has a positive and significant impact on agricultural sector output (ASO) with coefficients of 0.665215 and -0.571955, respectively. This suggests that a 1% increase in DBLDR at the first

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lag period leads to a 67% increase in ASO, while a 1% increase in DBLDR at the second lag period leads to a 57% decrease in ASO. However, DBLDR at the current period has an unexpected negative impact on ASO (coefficient = -0.424820, p = 0.0200), indicating that a 1% increase in DBLDR at the current period will lead to a 42% decrease in ASO.

Similarly, the expected positive impact of DBMF on ASO is not fully realized. Both the current and first lagged periods of DBMF have negative and statistically insignificant effects on agricultural output (coefficient = -0.099753, p = 0.1395; coefficient = -0.002356, p = 0.9706). The estimated coefficients suggest that a 1% increase in DBMF at the current and first lagged periods will lead to a 9.9% and 0.2% decrease in ASO, respectively. On the other hand, DBMF at the second lag period has a positive but insignificant impact on ASO (coefficient = 0.110322, p = 0.0772), meaning that a 1% rise in DBMF will lead to an 11% increase in ASO, showing that machinery financing has a delayed positive effect on agricultural output. In contrast, DBMF at the third lag period has a negative but insignificant impact (coefficient = -0.105611, p = 0.0632), suggesting that machinery financing's effectiveness fluctuates over time.

In summary, the results indicate that while the loan-to-deposit ratio (DBLDR) has a mixed short-term effect on agricultural sector output (ASO), the machinery financing (DBMF) from deposit money banks has a small and mostly negative impact, suggesting that its contribution to boosting agricultural growth has been limited.

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Table 4.2: ARDL Short-Run Estimation

Dependent Variable: DLOG(ASO)

ECM Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.435747	0.260412	5.513362	0.0000
@TREND	0.016653	0.003064	5.434288	0.0000
D(LOGASO(-1))	0.416041	0.165527	2.513437	0.0202
D(LOGDBLDR)	-0.424820	0.118248	-3.592628	0.0017
D(LOGDBLDR(-1))	0.571955	0.145092	3.942010	0.0007
D(LOGDBMF)	-0.099753	0.049674	-2.008155	0.0038
D(LOGDBMF(-1))	-0.004712	0.047929	-0.098311	0.9226
D(LOGDBMF(-2))	0.105611	0.043740	2.414511	0.0250
CointEq(-1)	-0.590981	0.105788	-5.586486	0.0000
R-squared	0.994099	**Adjusted R-squared**	0.991030	
Durbin-Watson Stat	2.058774			

Source: E-Views Version 10 Output, 2025 (Appendix D)

Short-Run Analysis Results

Table 4.2 shows the results of the short-run analysis, where the dependent variable is the log of agricultural sector output (ASO). The results indicate that the loan-to-deposit ratio (DBLDR) has a negative and significant impact on ASO in the short run, which contradicts the expected positive impact. Specifically, a 1% rise in DBLDR results in a 42% decrease in ASO in the short term. However, the lagged value of DBLDR has a positive and significant impact with a p-value of 0.0007, indicating that an increase in the loan-to-deposit ratio initially reduces agricultural output, but over time, it leads to a positive effect.

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Similarly, machinery financing (DBMF) also exhibits a negative but significant impact on ASO in the current period, which contradicts the prior expectation that it would boost agricultural output immediately. The estimated coefficient suggests that a 1% rise in DBMF leads to a 0.9% reduction in ASO. On the other hand, DBMF at the second lagged period shows a positive and significant impact on ASO, suggesting that machinery financing requires some time before its benefits can be realized in boosting agricultural output.

The Error Correction Model (ECM) coefficient shows how quickly deviations from the long-run equilibrium are corrected. The ECM result is negative and highly significant ($p < 0.000$), implying a speed of adjustment of approximately 59%. This means that in subsequent periods, about 59% of the disequilibrium from the previous period is corrected, bringing the system back toward equilibrium.

The R-squared value of 0.994099 indicates that 99% of the variation in agricultural sector output (ASO) is explained by the explanatory variables in the model. This suggests a very high level of explanatory power. Additionally, the Durbin-Watson statistic of 2.058774 indicates that there is no significant autocorrelation in the model, suggesting that the residuals are independent of each other.

Table 4.3: Long-Run Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGDBLDR	-0.561034	0.502707	-1.116025	0.2770
LOGDBMF	-0.164806	0.134322	-1.226945	0.2334

Source: E-Views Version 10 Output, 2025 (Appendix E)

Long-Run Analysis Results

Table 4.3 presents the long-run analysis results. Both DBLDR and DBMF have negative but statistically insignificant impacts on agricultural sector output (ASO) in the long run.

The results indicate that a 1% increase in DBLDR leads to a 56% reduction in ASO, while a 1% increase in DBMF leads to a 16% decrease in ASO in the long run. These findings contradict the a priori expectations that both DBLDR and DBMF would positively affect ASO in the long term. These results highlight that, while there is some short-term effect of DBLDR and DBMF on agricultural output, their long-term effects are not as expected and may not significantly contribute to the growth of the agricultural sector in Nigeria. Further investigations could explore potential structural factors or alternative mechanisms that could explain these results.

4.2 Discussion of Findings

This study examined the impact of deposit money banks on the growth of the agricultural sector in Nigeria over a period of 43 years, focusing on both short-run and long-run effects of the estimated parameters. Specifically, the study aimed to assess how deposit money banks' loan-to-deposit ratio (DBLDR) and machinery financing (DBMF) affect the growth of Nigeria's agricultural sector. Theoretical frameworks such as the Fractional Reserve Theory, Financial Intermediation Theory, and Schumpeter's Supply Leading Theory were utilized to guide the investigation, each offering unique perspectives on the role of banks in supporting agricultural development.

The Fractional Reserve Theory posits that banks can create money through lending, which, in theory, should stimulate agricultural growth by providing farmers with the necessary capital for technological improvements, production expansion, and innovation. However, the empirical findings from this study reveal a more nuanced relationship between credit availability and agricultural output, especially in the short run. While the loan-to-deposit ratio (DBLDR) has a negative and significant effect on agricultural sector output (ASO) in the short run, its lagged effects exhibit a positive relationship with ASO, suggesting that increased credit availability may initially be constrained by factors such as high interest rates, insufficient infrastructure, or low absorption capacity by farmers. Over time, however, the positive lagged effects of DBLDR point to the long-term benefits of credit access for the agricultural sector.

The Financial Intermediation Theory emphasizes the role of deposit money banks as intermediaries in channeling savings into productive investments. The empirical results from this study support this theory by demonstrating that credit allocations from banks, particularly for machinery financing, are crucial for enhancing agricultural growth.

However, like the Fractional Reserve Theory, the study finds that machinery financing (DBMF) has a negative but significant effect on agricultural output (ASO) in the short run. This suggests that, despite the intention of machinery financing to improve agricultural productivity, factors such as high interest rates, inadequate infrastructure, and the time required to integrate new technologies may delay the benefits of such financing. Nonetheless, the positive lagged effects of DBMF indicate that, over time, machinery financing can contribute significantly to agricultural growth as farmers adapt and make full use of new technology.

Schumpeter's Supply Leading Theory, which views financial institutions as key drivers of entrepreneurial activity and innovation, provides a broader framework for understanding the relationship between credit and agricultural growth. According to Schumpeter, banks drive industrial and sectoral development by providing the necessary credit for technological advances and innovation. The findings from this study align with this theory, showing that machinery financing plays a critical role in enhancing agricultural competitiveness. However, the negative short-run effects of DBMF suggest that the benefits of machinery loans may take time to materialize, as the agricultural sector faces challenges such as high financing costs, obsolete equipment, and the risks associated with adopting new technology.

The findings from the empirical studies reviewed in this research corroborate the conclusions of this study. Okoye, Adebayo, and Nwachukwu (2024) found that bank credit, particularly in the form of agricultural loans, significantly contributes to the growth and productivity of farming enterprises in Nigeria. They emphasized that increased access to bank credit boosts agricultural output, especially through the purchase of farming inputs and machinery, aligning with the findings in this study that credit plays a crucial role in supporting agricultural growth. Similarly, Adeyemi, Oluwaseun, and Abiola (2023) examined the effect of the loan-to-deposit

ratio (LDR) on agricultural output in Nigeria and found a positive relationship between higher LDRs and agricultural growth. However, their study also highlighted that excessively high LDRs could lead to liquidity issues for banks, which might limit their ability to continue providing credit to the agricultural sector. This is consistent with the findings of this study, where high loan-to-deposit ratios initially have a negative impact on agricultural output but contribute positively in the long term, once the system adjusts to the increased credit availability.

Additionally, Nwafor, Johnson, and Akinyemi (2022) focused on machinery financing and found that access to financing for modern farming equipment significantly enhances operational efficiency and productivity. This mirrors the positive lagged effects of machinery financing (DBMF) in this study, which suggests that while the impact of machinery financing on agricultural output is not immediate, it becomes more pronounced over time.

However, the challenges identified by Oduola, Okeke, and Osita (2021), such as poor infrastructure and security concerns, continue to pose significant barriers to the effective utilization of credit in the agricultural sector. These factors can limit the ability of credit provision to drive sustainable growth. The study also highlighted the importance of addressing these challenges to unlock the full potential of agricultural financing.

The findings from Olumide, Ifeoma, and Chinedu (2020) also support the conclusion that while credit provision positively impacts the competitiveness of Nigerian agriculture, high interest rates and stringent loan conditions can undermine its effectiveness. These constraints, as identified in the study, limit the long-term impact of machinery financing and agricultural loans on the sector's growth.

In conclusion, this study reveals the complex relationship between deposit money banks' loan-to-deposit ratio and machinery financing in fostering the growth of Nigeria's agricultural sector. While theoretical frameworks highlight the importance of credit for supporting agricultural development, the empirical findings suggest that the short-term impact of credit provision is often hindered by high interest rates, inadequate infrastructure, and other external factors. Nevertheless, over time, credit availability and machinery financing have the potential

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to significantly boost the productivity and competitiveness of the agricultural sector. This underscores the need for a balanced approach to credit provision that considers both immediate constraints and long-term development goals.

5.1 CONCLUSION

This study examined the role of deposit money banks' loan-to-deposit ratio (DBLDR) and machinery financing (DBMF) in the growth of Nigeria's agricultural sector over a period of 43 years. The findings indicate that while both DBLDR and DBMF have negative short-run effects on agricultural output, their long-term effects are either delayed or insignificant. The results highlight that, although an initial increase in bank credit faces constraints like high interest rates and inadequate infrastructure, these challenges can be overcome over time, leading to positive long-term growth for the agricultural sector. Furthermore, the study's findings align with key theories such as the Fractional Reserve Theory and Schumpeter's Supply Leading Theory, which emphasize the importance of credit in fostering agricultural innovation and development. Ultimately, the study stresses the need for improved credit allocation, lower interest rates, and better infrastructure to fully harness the potential of credit in driving agricultural sector growth.

5.2 Recommendations

1. Optimizing Credit Allocation: Deposit money banks should streamline the credit allocation process to ensure that agricultural firms, especially small and medium-sized enterprises (SMEs), can access affordable loans with favorable terms to promote growth in the agricultural sector.

2. Reducing Lending Interest Rates: Policymakers should collaborate with financial institutions to reduce interest rates, making loans more affordable for agricultural enterprises, thus encouraging investment in machinery, technology, and production expansion.
3. Infrastructure Development: Both the government and financial institutions should address infrastructure deficits that affect the agricultural sector, including reliable power supply, transportation networks, and security, to facilitate the effective utilization of credit.

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