

Financial inclusion and performance of microfinance banks in Nigeria

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Abstract

In this study, the impact of financial inclusion on the performance of microfinance banks in Nigeria was examined considering the continued problem of financial access, inadequate deposit mobilisation and unequal financial institution outreach despite all the efforts made in the financial sector reform. This study specifically looked at the effects of microfinance banks' loans and advances to the private sector, the number of microfinance bank accounts per 100,000 adults, the number of microfinance banks operating and the spread between lending and deposit of microfinance banks on total deposit. The study was based on Financial Intermediation Theory, Information Asymmetry Theory, and Inclusive Finance Theory which offer a comprehensive description of the mobilisation, allocation, and utilisation of financial resources within the financial system. The research design used was an ex post facto with a positivist approach. Secondary data was collected from the Central Bank of Nigeria Statistical Bulletin and other official regulatory publications for the period 1992-2024 (33 years). The Augmented Dickey-Fuller unit root test, Johansen co-integration test and the parsimonious Error Correction Model at 5 percent level of significance were employed in the analysis of the data. The results showed that loans and advances available to the private sector with the microfinance banks, number of microfinance bank accounts per 100,000 adults, and number of operating microfinance bank had positive and statistically significant impacts on the total deposit of the microfinance banks while the lending-deposit spread had a negative but statistically insignificant impact. Results of the error correction showed a stable long-run relationship between the variables. The study has concluded that in strengthening financial inclusion it greatly contributes to the performance of microfinance banks with regard to deposit mobilisation. It suggested making credit more accessible, financial accounts more common, better institutional outreach and more efficient operations. The study has made a significant contribution to knowledge as it has offered empirical evidence with the institution-specific financial inclusion indicators as determinants of the performance of the banks of microfinance in Nigeria.

Keywords: Financial inclusion; Microfinance banks; Total deposits; Financial intermediation; Nigeria

1. Introduction

Financial inclusion is one of the most important policy goals in the areas of inclusive economic development and the strengthening of financial institutions in developing economies. It is the delivery of financial products and services at affordable prices, accessible to all segments of society, including low-income households, small business and economically marginalised populations, which are sustainable. The World Bank (2022) reports that financial inclusion contributes to better savings mobilisation, access to financing, investment, and financial institutions' resilience. Financial inclusion in Nigeria has been a strong thrust of policy attention, including through the Central Bank of Nigeria's financial sector reforms and the National Financial Inclusion Strategy which identifies microfinance banks as critical institutions for delivering financial services to the underserved communities (Central Bank of Nigeria [CBN] 2022). Nevertheless, significant numbers of adults continue to be financially excluded, and microfinance institutions have limited capacity to play their role as an intermediary in the financial system (Enhancing Financial Innovation and Access [EFInA], 2023).

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The microfinance banks are the backbone of the financial inclusion framework in Nigeria as they offer same savings facilities, micro credit, payment services and other financial products to people and micro, small and medium enterprises excluded from conventional banks. One key sign of financial inclusion is financial institutions' loans and advances to the private sector, reflecting the amount of financial resources that are available to productive private sector activities. Raising lending capacity helps entrepreneurs and small businesses grow, create jobs, and raise income; and also boosts the loan portfolio and earning power of microfinance institutions. In the same way, the number of microfinance bank accounts per 100,000 adults is a measure of financial penetration and adoption of financial services, while the number of operating microfinance banks is a measure of institutional outreach and geographic reach of financial services. The growth of these indicators reflects a wider extent of financial inclusion, acquisition of customer base and opportunities for mobilizing deposits. But the efficiency and sustainability of institutions that offer such services are what determine the effectiveness of these outreach indicators (CBN, 2024).

The lending-deposit spread or the gap between the lending rate and the deposit rate of the microfinance banks is another significant financial inclusion indicator. This spread reflects the pricing efficiency, the operational costs, the credit risk management and the institutional competitiveness of the bank. A moderate lending-deposit spread is necessary for the financial viability of microfinance banks, but high spreads can deter loan demand, limit the availability of credit and ultimately undermine financial inclusion. Typically, the performance of microfinance banks is reflected in their total deposits which indicate customers' confidence, their liquidity position and the capacity of the bank to mobilise financial resources for further lending operations. Increased deposits reflect greater trust and the sustainable intermediation of funds, and help the microfinance banks increase credit to productive sectors. While regulatory changes have aimed to enhance outreach and performance of institutions, significant gaps in credit access, unequal institutional outreach, high credit intermediation costs, and poor deposit mobilisation continue to plague many microfinance banks (Nigeria Deposit Insurance Corporation [NDIC], 2023). For formulating evidence-based policies to improve the performance and sustainability of microfinance banks, knowledge about the effect of financial inclusion indicators on total deposits continues to be crucial.

The evidence on financial inclusion has grown significantly in the last decade, but is still disparate in terms of variables, institutions and methodologies. Nwafor and Yomi (2024) explored the financial inclusion and financial system stability in Nigeria and Alalade et al. (2023) examined the contribution of microfinance banking to Nigeria's economic growth. In the same vein, Ogbeide and Akanji (2022) concentrated on financial inclusion and poverty alleviation while Olowookere and Adebayo (2023) examined digital financial inclusion and financial development. Beyond Nigeria, Demirgüç-Kunt et al. (2022) drew evidence on the state of financial inclusion across the world from the Global Findex Database. While these studies have contributed to financial inclusion understanding, they mostly emphasized on macroeconomic outcomes, poverty alleviation, digital finance or economic growth.

Previous studies (Nwafor & Yomi, 2024; Ogbeide & Akanji, 2022; Olowookere & Adebayo, 2023) have specifically analysed the impact of loans and advances given to the private sector, number of microfinance bank accounts per 100,000 adults, number of operational banks and lending-deposit spread of MFBs on total deposits of MFBs. Previous research mostly used composite financial inclusion measures or commercial banking measures of financial inclusion or financial development at the national level rather than microfinance indicators at the institution level. Moreover, total deposits have been overlooked as a direct indicator of the performance of microfinance banks, which is important from the perspective of customer confidence, liquidity position and sustainability of the banks. This study is meant to fill this empirical and methodological lacuna as it studies the effect of institution-specific financial inclusion indicators on the performance of Microfinance Banks in Nigeria.

2. Literature Review

2.1. Conceptual Framework

2.1.1. Financial Inclusion

Financial inclusion is the ability of individuals, households and businesses to access and use formal financial products and services that are suitable to their financial needs, convenient and affordable, and sustainable. These services are comprised of savings, credit, insurance, payments, remittance and investment services, provided responsibly via regulated financial institutions. The concept is more than just access to bank accounts, it's about the effective and sustained use of financial services that enhances economic welfare, poverty reduction and inclusive economic growth. Financial inclusion empowers people and businesses to access opportunities to save in a secure manner, access productive credit, manage financial risks, and make productive investments that can improve productivity, according

to World Bank (2022). Financial inclusion plays a major role in decreasing income inequality by bringing previously unbanked people to the formal sector (Olulu-Briggs & Sunday-Goya, 2023; Demirgüç-Kunt et al., 2022).

In countries like Nigeria, with a high rate of financial exclusion among adults and an inefficient financial intermediation, financial inclusion is now a policy target in the strategy for developing the financial system. According to the Central Bank of Nigeria (2022), financial inclusion is the access and utilization of inexpensive financial services by economically active adults via formal financial institutions. It's a definition that focuses on accessibility, affordability, quality and usage, instead of just having a financial account. Microfinancial banks have a pivotal role to play in reaching this goal as they reach the financial target groups, including low income households, microenterprises, farmers, traders, artisans and rural communities that the traditional commercial banks find non-viable. Thus, the number of microfinance bank accounts per 100,000 adults, the number of operating microfinance banks, the spread between lending and deposits, loans and advances by microfinance banks to the private sector and to individuals are all good indicators of financial inclusion in the microfinance subsector. The indicators reflect the level of financial sector outreach, savings mobilization, credit access, and financial sector inclusion in areas underserved by the financial sector in Nigeria (EFInA, 2023).

2.1.2. Total Deposits

Total deposits refer to the sum of all the deposits made by the customers of a financial institution across different types of deposit accounts such as the savings deposit, current deposit, fixed deposit, and other interest-bearing liabilities. In the banking sector, total deposits are the major source of loanable funds and are significant measures of institutional performance, liquidity, financial stability and public confidence. According to Rose and Hudgins (2022), deposit mobilization is the backbone of banking business as it creates a relatively stable and low-cost source of funds for lending activities, profitability and sustainability. Thus, financial institutions with high deposit shares have greater deposit mobilization capacity to extend credit, mitigate financial shocks, and ensure financial institutions' operational resilience.

Total deposits are especially significant for microfinance banks, as they are an indicator of the confidence of the customers in the credibility of the institution, the quality of its services, its accessibility, and the soundness of its finances. Microfinance banks heavily rely on deposits collected from poor people, small enterprises, co-operatives, farmers and informal sector players as a source of their credit, unlike commercial banks which can access funds from the wholesale market as well as the capital market. Thus, the growth of total deposits suggests that financial inclusion and customer participation is achieved and that financial intermediation is effective. Deposit mobilisation is one of the indicators used by the Central Bank of Nigeria (2024) to gauge the financial health and sustainability of licensed microfinance institutions. Moreover, increased deposits bring about better liquidity, less reliance on outside borrowings, better lending ability and better institutional profitability. This study uses total deposit as proxy for the performance of the microfinance banks as it reflects the sustainability of the banks as well as customers' trust in the banking system. In the context of financial inclusion, increased access to financial services, including credits, higher account penetration, enhanced institutional presence, and better pricing of financial services, would lead to higher deposits mobilized by the microfinance banks which would improve the financial performance of the banks in particular (NDIC, 2023).

2.2. Theoretical Framework

2.2.1. Financial Intermediation Theory

The theory of financial intermediation is initially developed by Gurley and Shaw (1960), extended by Douglas Diamond (1984), and Philip Dybvig (1983). The theory accounts for the basic function of financial institutions in mobilising savings of surplus economic units and allocating them to deficit units needing funds for productive investment. Financial intermediaries lower transaction costs, address information asymmetries, diversify risks, and enhance the efficient allocation of financial resources in an economy. Financial institutions facilitate the intermediation between savers and borrowers and perform the functions of liquidity, maturity transformation and risk management. Diamond (1984) argues that financial intermediaries have comparative advantages in borrower screening, loan performance monitoring and reduction in agency costs, which makes the financial markets more efficient. Rose and Hudgins (2022) also contend that the intermediation functions of deposit mobilisation and credit allocation continue to be the primary functions that financial institutions use to spur economic development and institutional sustainability.

The theory is easily adapted to the microfinance banks as they are specialised financial intermediaries that aggregate savings from households and provide financial services to microenterprises, small businesses, traders, artisans, farmers and others who are not part of the formal financial system. Microfinance institutions enhance financial inclusion by

making credit more accessible and supporting savings by the previously unbanked, through this process. Microfinance banks' loans and advances to the private sector, number of microfinance bank accounts per 100,000 adults, and number of operating microfinance banks directly reflects the intermediation process described by the theory. Deposit mobilisation is expected to improve as more people are involved in formal financial services, as financial inclusion builds confidence and patronage for institutions. Thus, the efficient functioning of financial intermediation will produce a virtuous cycle, with more deposits leading to more loans and more loans drawing more customers into the formal financial system (Central Bank of Nigeria, 2022).

2.2.2. Information Asymmetry Theory

Information Asymmetry Theory was brought to public attention by the innovative research of George Akerlof (1970) *The Market for Lemons*, which showed that when there is an asymmetry of information between the buyer and the seller of a good, then the market outcome is inefficient. The theory states a problem of adverse selection arises before the money is lent and a problem of moral hazard arises after the money is loaned out, because one party to a financial transaction may be better informed than the other. In financial markets, lenders generally have less information about borrowers' repayment ability, investment plans, and risk assessment. Financial institutions thus evolve screening, monitoring and pricing strategies to reduce credit risk and better their lending decisions (Akerlof, 1970). Later research by Stiglitz and Weiss (1981) confirmed the importance of information asymmetry in the allocation of credit, interest rates and efficiency of financial markets.

This theory has a huge bearing on microfinance banking because financial inclusion requires not only an increase in access to financial services, but also access to proper information on borrowers when making financial decisions. Microfinance banks tend to have customers who do not have standard collateral, financial documentation or credit history. Therefore, they use relationship banking, community knowledge, group lending mechanisms and constant monitoring to minimize information gaps and enhance loan performance. Information asymmetry is well managed which leads to an increase in lending in private sector, better confidence in customers and sustainable deposit mobilisation. Likewise, broad account ownership and more extensive institutional outreach improve customer information, ease the process of transaction history and help in credit assessment and build financial intermediation (Central Bank of Nigeria [CBN], 2022).

2.3. Empirical Review

Akani (2026) studied the relationship between Digital Financial Inclusion and Commercial Banks Soundness in Nigeria. Two multiple regression models were developed to check the impacts of the independent variables on the dependent variables. Model one found that that 33 percent of the total variations in the capital adequacy ratio are accounted for, by the explanatory variables while the remainder is attributed to variable that is influenced by other factors not included in the regression model. The t-statistics shows that digital mobile money payment have negative effect on commercial banks capital adequacy, digital payment statistic have positive effect, digital retail agents have positive effect while digital backed serve have negative effect on commercial banks capital adequacy ratio over the periods covered in this study. Model two found that 52.6 percent of the total variations in the asset's quality are accounted for, by the explanatory variables. Based on the t-statistics, it can be seen that the effect of digital mobile money payment is negative while the effect of digital payment statistic is positive which is included in the indicator of asset quality of the commercial banks. The study found that digital financial inclusion is not a significant factor that can account for the differences in soundness of the commercial bank. The study concluded that the efforts of the Central Bank of Nigeria towards promoting digital financial inclusion in Nigeria should be bolstered.

Elufisan et al. (2026) investigated the moderating effect of institutional quality on the link between financial inclusion and inclusive growth using time series data between 1990 and 2023. Estimated results from both the Autoregressive Distributed Lag (ARDL) and Quantile Generalized Method of Moments (QGMM) with robust inference confirmed that financial inclusion has a statistically significant positive impact on both aggregated inclusive growth (using principal component analysis as proxy) and disaggregated inclusive growth (measured as standards of living, life expectancy at birth, and gross domestic product). The study also showed that institutional quality has a pure cautionary effect on inclusive growth and that financial inclusion mitigates the positive effect of institutional quality.

Ismail et al. (2026) analysed the impact of financial inclusion on income inequality in Nigeria. The study was a type of ex post facto research design with annual time-series data for Nigeria. The study population consisted of all macroeconomic observations of the study period pertaining to financial inclusion and income inequality in Nigeria. The results revealed that financial inclusion has a reducing effect on income inequality in Nigeria. Inflation and real interest rate tend to increase inequality, but economic growth contributed to the reduction of inequality. The short-run effect of primary school enrolment is not statistically significant and there is a negative, although weak, effect of government

spending on inequality. The study found financial inclusion as an important tool to promote a more equitable distribution of income in Nigeria.

Iwenya and Igbinosa (2025) analysed the impact of financial inclusion on commercial banks' performance in selected countries in West Africa between 2004 and 2023. The results showed that bank borrowers (BCB) per 1,000 adults has significant positive relationship with return on asset, current account holders (CAH) per 1,000 adults has significant negative relationship with return on asset, depositors with banks has significant positive relationship with return on asset while mobile money agent outlets has no significant relationship with return on asset.

Ghouse et al. (2025) analyzed the complex relationship between financial inclusion, use of financial technology, Human Development Index (HDI), and green finance in promoting environmental sustainability in E-7 countries. The data were used in the study obtained from the World Bank Statistical Bulletin of different issues. The results of structural equation model showed that the direct effect of HDI on environmental sustainability is very significant and green innovation is an important mediator. These findings highlight the crucial role of green innovation in fostering sustainability in developing nations and offer a new lens through which to view the financial practices, human development, and environmental protection.

3. Methodology

The research design used in this study was ex post facto research, since the data used was in the form of historical time series data that has been previously processed without the researcher processing it. The design was deemed appropriate as all the variables investigated were secondary macro-financial indicators that were out of the control of the researcher and were influenced by other factors such as loans and advances of microfinance banks to the private sector, number of microfinance banks accounts per 100,000 adults, number of operating microfinance banks, the spread of lending and deposits and total deposits. Ex post facto design has been widely used in financial and economic research where the data is historical as it allows the researchers to work with the observed phenomena and establish the relationship among variables in an objective manner (Sunday, 2026; Sunday & Olulu-Briggs, 2026; Gujarati & Porter, 2009). So, the design was appropriate to analyze the impact of financial inclusion on microfinance banks' performance in Nigeria between 1992 and 2024.

The positivist research philosophy was used as a foundation for this study. According to positivism, the reality can be objectively measured by using scientific methods through observable facts. It is empirical evidence, objectivity, hypothesis testing and statistical analysis, which is the philosophy in explaining the relationship between variables (Saunders et al., 2019). The positivist paradigm was suitable as the study relied on quantitative secondary data sourced from official documents and the econometric methods were used to prove causal relationship between the financial inclusion indicators and the performance of microfinance banks. Thus, the results were obtained from statistical evidence, which were in line with the purposes of the study in the philosophical approach.

Secondary data was used, specifically annual time-series data from 1992 to 2024 (N = 33). Data were collected from the Central Bank of Nigeria Statistical Bulletin, Nigeria Deposit Insurance Corporation Annual Reports and other official publications of Central Bank of Nigeria. These sources were chosen because they offer reliable, consistent and nationally recognised financial statistics which are used for macroeconomic and banking sector analysis. Annual data was used to provide consistency of all variables as only in this way the long run behaviour of financial inclusion indicators and performance of the MFIs could be adequately covered during the study period.

Financial inclusion (measured as microfinance banks' loans and advances to the private sector (MLA), number of microfinance bank accounts per 100,000 adults (MBA), number of operating microfinance banks (OMB) and microfinance banks' lending-deposit spread (LDS)) was the independent variable. Loans and advances provided evidence of the credit available to productive sectors and the number of accounts provided evidence of financial penetration among adults. Institutional outreach and geographical accessibility were captured by the number of operating microfinance banks, and pricing efficiency and financial intermediation costs were measured by lending-deposit spread. The dependent variable was total deposits (TD) while the performance of microfinance banks was measured by total deposits as it reflects customer confidence, liquidity strength, institutional sustainability, and financial intermediation efficiency (Rose & Hudgins, 2022). These variables were chosen since they adequately represented the multidimensionality of financial inclusion and institutional performance.

The analysis of the data was done in unit root test, Johansen co-integration and vector error correction model techniques. To test the order of integration and to investigate the stationarity properties of each variable, the Augmented Dickey-Fuller (ADF) unit root test was first performed. After the stationarity test, Johansen co-integration

test was used to check if there was a long-run equilibrium relationship among the variables in the study. In cases where co-integration was found, the parsimonious Error Correction Model (ECM) was estimated to provide a description of the long term equilibrium relationship, as well as the short-term dynamic adjustment between variables. It was decided to choose the ECM as it allows correcting short-run disequilibrium without breaking long-run relations between integrated variables (Engle & Granger, 1987; Johansen, 1988). A level of significance of 5 percent was used to assess the statistical significance.

The model adopted in this study is stated below:

$$TOD_t = f(MBLA_t, MBNA_t, NOMB_t, LDSP_t) \quad 3.1$$

$$TOD_t = \alpha_0 + \alpha_1 MBLA_t + \alpha_2 MBNA_t + \alpha_3 NOMB_t + \alpha_4 LDSP_t \quad 3.2$$

$$TOD_t = \alpha_0 + \alpha_1 MBLA_t + \alpha_2 MBNA_t + \alpha_3 NOMB_t + \alpha_4 LDSP_t + \mu_t \quad 3.3$$

On apriori, $\alpha_1 - \alpha_3 > 0$; $\alpha_4 < 0$

The apriori expectations were:

Higher microfinance banks' loans and advances to the private sector were expected to increase total deposits because expanded lending enhances financial intermediation and attracts more customers (Diamond, 1984). A higher number of microfinance bank accounts per 100,000 adults was expected to positively influence total deposits because greater financial participation encourages savings mobilization (Demirgüç-Kunt et al., 2022). An increase in the number of operating microfinance banks was expected to improve total deposits through expanded institutional outreach and greater accessibility to financial services (Central Bank of Nigeria, 2022). A wider lending-deposit spread was expected to negatively influence total deposits because high intermediation costs discourage borrowing, reduce financial participation, and weaken confidence in the financial system (Stiglitz & Weiss, 1981).

4. Results

Table 1 Result of Unit Root Test (Using ADF)

Variables	ADF T-Stat @ Level (5%)	T-Critical @ level (5%)	P-value @ level (5%)	ADF T-Stat @ 1 st Diff. (5%)	T-Critical @ 1 st Diff. (5%)	P-value @ 1 st Diff. (5%)	Order of Integration
TOD	1.359859	-2.957110	0.9984	2.957110	-2.960411	0.0014	I(1)
MBLA	1.989762	-2.991878	0.9997	-7.690824	-2.960411	0.0000	I(1)
NOMB	0.380183	-2.957110	0.9999	-3.828272	-2.960411	0.0068	I(1)
LDSP	-2.157948	-2.957110	0.2247	-5.389085	-2.963972	0.0001	I(1)
MBNA	0.268206	-2.960411	0.9999	-7.708824	-2.960411	0.0000	I(1)

Source: E-views 10 Output

The results in Table 1 indicated that the variables at their levels were not stationary as test statistics were not sufficiently negative for ADF test and the probability values were greater than 0.05. In particular, the total deposits (TOD) had an ADF statistic of 1.359859 with probability value of 0.9984, loans and advances of the microfinance banks (MBLA) showed an ADF statistic of 1.989762 with probability value of 0.9997, the number of operating microfinance banks (NOMB) recorded 0.380183 with probability value of 0.9999, the lending-deposit spread (LDSP) had an ADF statistic of -2.157948 with a probability value of 0.2247 and the number of microfinance bank accounts (MBNA) produced an ADF statistic of 0.268206 with probability value of 0.9999. The null hypothesis of a unit root was not rejected at level and hence all variables were differenced once. At the first difference, statistically significant probability values < 0.05 indicated that each variable was stationary. TOD became stationary with a probability value of 0.0014, MBLA with 0.0000, NOMB with 0.0068, LDSP with 0.0001, and MBNA with 0.0000. Thus, the order of integration of all variables was one (I(1)), which is essential for the use of the Johansen co-integration technique (Gujarati & Porter, 2009; Enders, 2015).

Table 2 Johansen Co-integration Result

Series: TOD MBLA MBNA NOMB LDSP				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.758858	108.1614	69.81889	0.0000
At most 1 *	0.652111	65.49029	47.85613	0.0005
At most 2 *	0.463087	33.81414	29.79707	0.0163
At most 3	0.331686	15.15656	15.49471	0.0562
At most 4	0.097171	3.066661	3.841466	0.0799
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.758858	42.67107	33.87687	0.0035
At most 1 *	0.652111	31.67615	27.58434	0.0140
At most 2	0.463087	18.65758	21.13162	0.1072
At most 3	0.331686	12.08990	14.26460	0.1073
At most 4	0.097171	3.066661	3.841466	0.0799

Source: E-views 10 Output

Variables were found to be integrated of the same order, the Johansen co-integration test was estimated to check for the existence of a stable long-run equilibrium relationship among the variables. The trace statistic showed three co-integrating equations as the trace statistics for the hypothesis of none (108.1614), at most one (65.49029) and at most two (33.81414) all exceeded the corresponding critical value of 69.81889, 47.85613 and 29.79707 respectively with probability value of 0.0000, 0.0005 and 0.0163. Likewise, by using the maximum eigenvalue test, two co-integrating equations were identified and the statistics for none (42.67107) and at most one (31.67615) exceeded their respective critical values with probability values of 0.0035 and 0.0140, respectively. While both the trace and maximum eigenvalue tests varied slightly in terms of the number of co-integrating vectors found, both tests indicated that there is at least one statistically significant long-run equilibrium relationship between total deposits and the financial inclusion indicators. This is the reason that the variables are cointegrated and have long-run equilibrium behaviour, thus justifying the estimation of the parsimonious Error Correction Model (Johansen, 1988; Engle & Granger, 1987).

Table 3 Parsimonious Error Correction Result

Dependent Variable: D(TOD)				
Method: Least Squares				
Sample (adjusted): 1993 2024				
Included observations: 32 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MBLA(-1))	1.624971	0.554848	2.928676	0.0070
D(MBNA(-1))	0.095728	0.039488	2.424246	0.0220
D(NOMB(-1))	0.087129	0.029017	3.002710	0.0058
D(LDSP(-1))	-0.056442	2.002423	-0.028187	0.9777

ECM(-1)	-0.724629	0.144508	-5.014457	0.0000
C	-83.35337	34.26547	-2.432576	0.0222
R-squared	0.953878	Mean dependent var		127.9164
Adjusted R-squared	0.945008	S.D. dependent var		160.2795
S.E. of regression	37.58599	Akaike info criterion		10.25850
Sum squared resid	36730.37	Schwarz criterion		10.53333
Log likelihood	-158.1360	Hannan-Quinn criter.		10.34960
F-statistic	107.5446	Durbin-Watson stat		2.082429
Prob(F-statistic)	0.000000			

Source: E-views 10 Output

In particular, MBLA has a coefficient of 1.624971 with a probability of 0.0070, suggesting that the greater the credit extended by the microfinance banks, the more improved the deposit mobilisation. Similarly, MBNA had a positive coefficient of 0.095728 with a probability level of 0.0220 indicating that the higher the financial inclusion in terms of account ownership, the more the overall deposits. The coefficient of NOMB was also positive (0.087129) and significant ($p = 0.0058$), suggesting that the higher the number of microfinance banks that operated, the greater the institutional outreach and the positive impact on deposit mobilisation. The lending-deposit spread (LDSP) showed a negative coefficient (-0.056442) and was statistically insignificant ($p = 0.9777$), which implies that the changes in lending-deposit spread was not an important factor affecting total deposit during the study period.

The error correction term ECM(-1) was negative (-0.724629) and highly significant ($p = 0.0000$), which confirmed the presence of long-run equilibrium and suggested that 72.46 percent of the short-run disequilibrium was corrected annually. Besides, the model was found to have a high explanatory power as indicated by R^2 adjusted of 0.945008 which means that about 94.50 percent of the variations in total deposits were explained by the financial inclusion indicators. The overall fitness of the model was validated with the value of the F-statistic (107.5446; $p = 0.0000$); and the Durbin-Watson statistic equaled 2.082429, which indicated no first-order serial correlation and that the estimated model was statistically sound for inferences (Gujarati & Porter, 2009; Wooldridge, 2020).

5. Discussion of Findings

The results of the parsimonious error correction model shows that the total deposits of the MBLA had a positive and statistically significant impact on the total loans and advances to the private sector of MBLA in Nigeria. Based on the estimated coefficient of 1.624971 it showed that increment in loans and advances were accompanied by increment in total deposits and the probability value was 0.0070 which was statistically significant at 5 percent. This discovery suggests that credit disbursal to the Household, Microenterprise, Farmers, Traders and Small businesses boosted confidence among the customers in MFI and prompted them to mobilise more deposits. This finding corroborates the Financial Intermediation Theory that asserts that financial intermediaries enhance their performance by effectively mobilising savings and by directing financial resources to the productive sectors (Diamond, 1984). With the rise in the lending activities of microfinance banks, borrowers' banking relationships were also strengthened, leading to enhanced savings retention and deposit accumulation. The result is also consistent with the empirical evidence of Alalade et al. (2023) that the increment of microfinance provision played a significant role in financial sector growth and economic inclusion in Nigeria. Similarly, Bongomin et al. (2018) revealed that provision of microcredit had a significant positive impact on financial intermediation in terms of financial participation and sustainability of the institutions. Thus, the result shows that credit expansion is still a primary determinant of the performance of microfinance banks in terms of improving the mobilization of deposits.

The finding also showed that the number of accounts of the microfinance banks per 100,000 adults (MBNA) showed a positive and statistically significant effect on total deposits. The coefficient of 0.095728 indicated that the more the financial accounts were owned, the more deposits were mobilised and the probability of 0.0220 confirmed that the relationship was statistically significant. This result suggests that higher financial services use led to a higher saving potential within the formal sector and formal financial institutions, providing customers with access to more funding. This aligns with Inclusive Finance Theory that states that as more people get access to affordable financial services, they become more engaged with financial services, save more and institutions are more sustainable (Yunus, 2007). The finding also aligns with the Global Findex evidence of Demirgüç-Kunt et al (2022) that financial inclusion gains through

a higher rate of account ownership have a strong positive impact on saving behaviour in developing economies. In the same vein, Ozili (2021) revealed that access to finance in terms of formal financial account ownership improves the efficiency of the financial system and increases financial intermediation. The effect is that the policies that can lead to more people getting microfinance account would also lead to better microfinance bank deposit base and sustainability in Nigeria.

Further, the parsimonious ECM indicated that the number of operating microfinance banks (NOMB) had a positive and statistically significant impact on total deposits. The estimated coefficient of 0.087129 implied that an increase in the number of microfinance banks that are licensed and operating resulted in better deposit mobilisation and the probability value of 0.0058 confirmed the statistical significance of the relationship. The finding indicated that the greater the presence of institutional presence the greater the geographical accessibility to financial services, the less physical barriers to banking, and the more public was included in formal financial transactions. This finding is in line with Financial Intermediation Theory which posits that greater institutional reach enhances the mobilisation and allocation of financial resources to the economy (Gurley & Shaw, 1960). The finding also aligns with the Inclusive Finance Theory, which argues that financial inclusion can be enhanced through expanding the delivery channels of financial services which in turn will drive more usage of formal financial services (Demirgüç-Kunt et al., 2022). The study result is empirically supported by the findings of Adegbite and Machethe (2020) which revealed that increased financial institution penetration has a significant impact on financial inclusion in African economies. Likewise, Nwafor and Yomi (2024) found that greater institutional coverage had a positive impact on the financial system stability through the provision of regulated financial services coverage. Thus, greater presence of the microfinance banks in the field would still be a good measure to improve their financial performance, by mobilising more deposits.

On the other hand, the results revealed that total deposits had negative but statistically insignificant relationship with the microfinance banks' lending-deposit spread (LDSP). The estimated coefficient of -0.056442 was found to be statistically insignificant with the probability of 0.9777 and has a negative impact on total deposits, as wider lending-deposit spreads were found to have a negative impact on total deposits. This indicates that while higher intermediation costs inhibit borrowing and lower customer participation, their impact on deposit mobilisation was not enough to have a significant effect during the study period. This result is in line with Information Asymmetry Theory that suggests that financial institutions would charge different interest rates to compensate for imperfect information and credit risks encountered by borrowers (Akerlof, 1970; Stiglitz & Weiss, 1981). This could therefore mean that excessively high lending spreads are not necessarily an intentional impediment to financial inclusion, but risk-management practices. The result is in line with Beck and Hesse (2009) who suggested that in less-dhanas developed economies, high lending spreads may be due to structural inefficiencies and high operating costs, instead of influencing deposit growth directly. Likewise, Folawewo and Tennant (2008) concluded that the interest rate spreads in the Sub-Saharan Africa are seldom determined by the interest rate spread but rather by macroeconomics and institutional factors. Thus, although narrowing lending spreads can help increase the affordability and financial inclusion, it seems that other issues like institutional outreach, customer confidence and credit accessibility have more pronounced impact on deposit mobilisation among the Microfinance Banks in Nigeria.

6. Conclusion

The study revealed that financial inclusion had a significant impact on the performance of microfinance banks in Nigeria. In particular, the number of operating microfinance banks, the number of microfinance bank accounts per 100,000 adults, and the loans and advances to the private sector by the microfinance banks positively and significantly influenced the total deposits, while the lending-deposit spread negatively but not significantly influenced the total deposits. The considerable error correction mechanism provided evidence to the presence of a stable long-run relationship between the variables. In general, financial access, institutional outreach and credit delivery will continue to play very critical roles in improving the deposit mobilisation and consequently the sustainable performance of the MFBs in Nigeria.

6.1. Limitations of the Study

There were several limitations to the study that need to be taken into account when interpreting the results. First, the analysis was based only on secondary time series data that were available on an annual basis for the period 1992-2024, which meant that the analysis was limited to the macro-level indicators officially reported by the MFIs and excluded certain operational variables that might be relevant to the performance of the MFIs. Second, financial inclusion was measured with some of the indicators of microfinance and total deposits as the only indicator of performance; other indicators like profitability, asset quality, liquidity, operational efficiency, and financial sustainability may offer further clues. Third, the Error Correction Model used was quite simple, assuming linear relationship between the variables and

thereby ignoring possible nonlinear and asymmetric effects. Finally, the results were specific to the Nigerian microfinance banking environment and not necessarily generalisable to other countries with varying regulatory, institutional and macroeconomic conditions.

6.2. Recommendations

Microfinance banks need to build their credit delivery system by increasing loans and advances to productive private sector activities especially microenterprises, small and medium enterprises, farmers, artisans and women owned businesses. The positive and significant relationship between loans and advances and total deposits of the microfinance banks indicates that the greater the access to credit the more the confidence and deposit mobilisation through their bank. Management should therefore streamline loan application process, avoid imposing stringent collateral requirements, enhance credit appraisal process by introducing digital credit scoring and should put in place continuous monitoring of loans disbursed for better repayment performance. Regulatory institutions should also incentivize refinancing schemes and ensure refinancing programmes to help microfinance banks boost their loan portfolio without compromising on prudence of risk management.

Microfinance banks must step up activities to boost active customer account, with innovative financial inclusion activities. This can be done through the development of digital banking platforms and mobile banking services, agency banking, and community-based financial education programmes aimed at financially excluded populations. Management should devise some savings products which could be suitable for persons with low incomes, the informal sector workers, the rural households, students, and small business operators which can be made affordable. Financial awareness would be even better strengthened and transition towards regulated financial institutions would take place with greater co-operation with telecom firms, cooperatives, market associations and community organisations. These programmes would result in higher financial involvement and enhanced deposit position of the microfinance banks.

Financial sector regulators, especially the Central Bank of Nigeria (CBN), should push for the creation and long-term sustainability of more microfinance banks in the rural and semi-urban areas where formal financial services are still not available. Aside from the licensing policy, effective supervision, institutional capacity development, corporate governance reforms and technological support shall be provided to make newly established institutions financially sustainable. Microfinance banks should also be expected to build-up their branch network, agency outlets, and digital service points (DSPs) to increase geographical reach and ease for customers. Enhanced institutional outreach would lead to high financial services utilisation and to a higher number of new depositors and boost financial intermediation in the country.

While the lending-deposit spread had no significant impact on total deposit, microfinance banks need to continuously strive to achieve operation efficiency that allows them to offer their services at affordable lending rate without jeopardizing the sustainability of the business. Through more use of financial technology and more automation of routine banking processes, better risk management systems and increased productivity of staff, management should do more to reduce operating costs. Regulators need to foster competition in the microfinance subsector, which will benefit its clients, while keeping a prudent regulatory regime in place that deters overpricing of financial products. A streamlined cost structure would result in better customer satisfaction, higher demand for loans, deeper customer relationships and a more conducive environment for deposit mobilization and better institutional performance.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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