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MACROECONOMIC DETERMINANTS OF MICROFINANCE BANKS' CAPITAL STRUCTURE IN NIGERIA

Alade Ayodeji Ademokoya¹, Saheed Olayinka², and Olusegun Oni Opeyemi³

^{1&2}Department of Accounting and Finance, Kwara State University, Malete, Nigeria.

³Agricultural Development Management Department, Agricultural and Rural Management Training Institute (ARMTI), Ilorin, Kwara State, Nigeria.

Corresponding Author: alade.ademokoya@kwasu.edu.ng (+234 80 34452151)

Abstract

The financial stability of Microfinance Banks (MFBs) in Nigeria is pivotal to advancing financial inclusion and stimulating economic development, particularly among underserved populations. However, these institutions operate in a dynamic and often unstable macroeconomic environment, which significantly influences their capital structure decisions. This study investigates the macroeconomic determinants of capital structure among Nigerian MFBs, focusing specifically on inflation, exchange rates, gross domestic product (GDP), and lending rates. Adopting an ex-post facto research design, the study utilizes aggregated secondary data obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin, covering the period from 1992 to 2022. The analysis employs the Auto Regressive Distributed Lag (ARDL) regression technique to examine both short-run and long-run dynamics. The findings show that the inflation rate has a positive association with MFBs' capital structure (coefficient = 0.018, $p = 0.016$) in the short run and (coefficient = 0.008, $p = 0.033$) in the long run. Similarly, GDP negatively impacts capital structure of MFBs with (coefficient = -0.024, $p = 0.035$) in the long run. Other variables, such as exchange rates and lending rates, were not statistical significant. The study concludes that macroeconomic conditions substantially shape the capital structure decisions of MFBs in Nigeria. It recommends among others that MFBs should adopt strategic measures to manage macroeconomic fluctuations, such as implementing inflation-hedging strategies by increasing reliance on equity financing during periods of high inflation.

Keywords: Capital structure, microfinance banks, inflation rate, exchange rate, GDP growth, lending rate.

JEL: G21, G32, E44

INTRODUCTION

Microfinance plays an essential role in the global financial ecosystem by providing essential financial services to individuals and businesses that lack access to traditional banking institutions. The modern concept of microfinance emerged in the 1970s, with institutions like Muhammad Yunus's Grameen Bank in Bangladesh leading the way in offering financial solutions to the economically marginalized (Khan et al., 2023). Over the decades, microfinance has expanded across different regions, including Africa, where it has contributed significantly to economic empowerment, financial inclusion, and poverty reduction (Buchenrieder et al., 2019). However, despite its contributions, the microfinance sector in Africa still faces numerous challenges,

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including financial instability, poor regulatory frameworks, and inadequate capital structures (Nwani & Osuji, 2020).

In Nigeria, microfinance has undergone several transformations aimed at improving its efficiency and outreach. Initially, community banks were introduced as a means to provide financial services to underserved rural populations. However, the inadequacies of these banks, such as high operational costs, weak governance, and ineffective regulatory oversight, led to their decline (Akinlo & Emmanuel, 2022). Consequently, in 2005, the Nigerian government transitioned from the community banking model to the microfinance banking framework, seeking to enhance the financial sustainability and impact of these institutions (Gbago, 2011). Despite these reforms, a significant number of microfinance banks (MFBs) in Nigeria have struggled with sustainability. The Central Bank of Nigeria (CBN) identified 224 microfinance banks that were in distress and subsequently revoked their licenses, highlighting the fragility of the sector (Emokpae, 2021).

An important factor influencing the sustainability of microfinance banks is their capital structure, which determines their ability to expand, withstand financial shocks, and effectively serve their target clientele. Capital structure refers to the mix of equity and debt financing that an institution utilizes to fund its operations. For MFBs, an optimal capital structure is necessary to ensure financial stability, attract investors, and provide affordable credit to low-income individuals and businesses. The capital structure of Nigerian MFBs has evolved over the years, with regulatory bodies such as the CBN implementing minimum capital requirements to strengthen the financial position of these institutions (Arinzech, 2022). For instance, in 2022, the CBN revised capital base requirements, mandating unit MFBs to maintain a minimum of ₦200 million, state MFBs ₦1 billion, and national MFBs ₦5 billion. These regulatory measures aim to enhance the resilience of MFBs, though challenges persist in terms of compliance and access to adequate funding (Saari, 2020). Despite the critical role that microfinance banks (MFBs) in Nigeria play in promoting financial inclusion and supporting low-income segments of the population, they face challenges stemming from a volatile macroeconomic environment (Buchenrieder et al., 2019; Capurro, 2017). Factors such as high inflation and fluctuating exchange rates can erode the value of loans and savings, impacting MFBs' ability to maintain a sustainable capital structure (Bayar, 2019; Ogunleye & Akinwumi, 2021). Also, the lending rates set by financial institutions can either encourage or deter borrowing, further complicating the capital structure decisions of these banks (Dziwornu et al., 2024).

Despite the crucial role of microfinance banks (MFBs) in Nigeria in promoting financial inclusion and supporting low-income populations, they encounter significant challenges due to a volatile macroeconomic environment (Buchenrieder et al., 2019; Capurro, 2017). Macroeconomic factors such as high inflation and exchange rate fluctuations can erode the value of loans and savings, thereby affecting MFBs' ability to sustain a stable capital structure (Bayar, 2019; Ogunleye & Akinwumi, 2021). Additionally, lending rates set by financial institutions can either incentivize or discourage borrowing, further complicating capital structure decisions (Dziwornu et al., 2024). Given these challenges, this study examines the impact of key macroeconomic factors (including inflation rate, exchange rate, gross domestic product, and lending rate) on capital structure of MFBs in Nigeria. Accordingly, the research hypothesis is formulated as follows: H_01 : Macroeconomic determinants do not have a significant impact on the capital structure of microfinance banks in Nigeria.

LITERATURE REVIEW

This section offers conceptual clarifications, as well as theoretical and empirical perspectives, on the macroeconomic determinants of capital structure in Microfinance Banks (MFBs).

Capital Structure of Microfinance Banks (MFBs) in Nigeria

The capital structure of Microfinance Banks (MFBs) refers to the composition of a bank's financing sources, specifically the proportionate use of debt and equity to fund operations and investments (Muhammad et al., 2017). In the context of MFBs in Nigeria, capital structure is a critical determinant of financial stability, risk exposure, and long-term sustainability, particularly given their role in facilitating financial inclusion among low-income and underserved populations.

Debt Ratio

The debt ratio is a key financial metric that measures the proportion of a firm's total assets financed through debt, serving as an indicator of financial leverage (Akingunola et al., 2017). It reflects the extent to which a microfinance bank (MFB) relies on borrowed funds relative to its asset base. The ratio provides insight into the institution's financial risk, solvency, and overall capital structure. The debt ratio is calculated by taking the total amount of debt a firm owes and dividing it by the total value of its assets. The result shows the percentage of the firm's assets that are financed through debt. A high debt ratio indicates that a large proportion of the firm's assets are financed through debt, which can amplify returns during periods of growth but also heighten financial vulnerability during downturns (Ngoc et al., 2017). Conversely, a low debt ratio suggests a more conservative financial position, reflecting lower risk exposure but potentially limiting opportunities for expansion due to constrained external financing (Nzotta, 2018). The debt ratio is a direct measure of the dependent variable capital structure in this study. It captures the degree to which MFBs utilize debt in their financing decisions.

Equity Ratio

The **equity ratio** is a financial indicator that measures the proportion of a firm's total assets that is financed through shareholders' equity rather than debt. It serves as a gauge of financial strength and long-term solvency, particularly important for Microfinance Banks (MFBs) operating in financially vulnerable environments (Adesugba & Olalere, 2021). The equity ratio is calculated by dividing the total equity contributed by shareholders by the total assets of the firm. It shows the extent to which the company relies on internal financing (equity) as opposed to external borrowing (debt). As a core component of capital structure, the equity ratio directly represents the equity portion of the financing mix of MFBs and serves as a dependent variable in this study.

Debt-to-Equity Ratio

The debt-to-equity ratio is a key financial metric that compares a company's total liabilities to its shareholders' equity, providing insight into its capital structure and degree of financial leverage (Sharon & Celani, 2019). It reflects the extent to which a firm finances its operations through borrowed funds relative to owners' equity. The debt-to-equity ratio is calculated as: Debt-to-Equity Ratio = Total Debt divided by Shareholders' Equity. This implies that the ratio quantifies the relationship between external financing (debt) and internal financing (equity). It is a critical indicator of financial risk and long-term solvency. As one of the most prominent indicators of capital structure, the debt-to-equity ratio represents the balance between debt and equity financing in MFBs. It serves as a dependent variable in this study.

Macro-Economic Determinants of MFBs

Macroeconomic factors such as inflation, lending rates, exchange rates, and GDP growth can significantly affect the capital structure of Microfinance Banks (MFBs) in Nigeria (Bassey & Okpukpara, 2014). These variables influence the cost and availability of financing, thereby shaping the composition of debt and equity within MFBs' capital structures (Sharon & Celani, 2019). A clear understanding of these macroeconomic influences enables MFBs to make informed financing decisions, adapt to economic fluctuations, and manage financial risks more effectively.

Inflation Rates

Inflation refers to the general rise in price levels over time, reducing the purchasing power of money. It is commonly measured using the Consumer Price Index (CPI) (Rosario & Chavali, 2019). For Microfinance Banks (MFBs) in Nigeria, high inflation can erode the real value of loan repayments, increase credit risk, and discourage lending (Aziz & Abbas, 2019). It may also reduce savings when interest rates fail to keep pace, limiting available funds for lending (Adegbeye, 2020). As an independent variable, inflation can affect MFBs' capital structure by influencing their cost of borrowing and preference for debt or equity. This study examines its relationship with dependent variables such as the debt ratio, equity ratio, and debt-to-equity ratio.

Lending Rate

Lending rates refer to the interest rates charged by financial institutions on loans granted to borrowers. In Nigeria, they are typically measured by the average prime or commercial lending rate reported by the Central Bank (Cavallaro & Cutrini, 2019). Lending rates directly affect borrowing costs for Microfinance Banks (MFBs), influencing decisions on capital sourcing. High lending rates raise the cost of debt, potentially discouraging MFBs from increasing leverage, while lower rates may encourage borrowing and expansion (Bhattarai, 2015). However, persistently high lending costs can lead to loan defaults and reduced financial stability (Awoyemi & Jabar, 2014). As such, lending rates serve as a key macroeconomic determinant influencing MFBs' capital structure, particularly their debt ratio and debt-to-equity ratio, which are the dependent variables in this study.

Exchange Rate

Exchange rate refers to the price of one country's currency in terms of another, typically measured as the Naira-to-US Dollar rate in the Nigerian context (Ayayi & Wijesiri, 2018). For Microfinance Banks (MFBs), fluctuations in the exchange rate influence both operating costs and funding structures. A depreciating Naira increases the cost of imported goods and services, exacerbating inflationary pressures and introducing volatility into the business environment (Bala et al., 2019). Moreover, MFBs that rely on foreign-sourced funds may benefit from favorable currency conversions when receiving capital but could incur higher repayment costs on foreign-denominated liabilities (Osakwe, 2019). These dynamics affect the capital structure of MFBs by altering the cost and composition of debt, thus linking the exchange rate to dependent variables such as the debt ratio, equity ratio, and debt-to-equity ratio examined in this study.

Gross Domestic Product (GDP) Growth

Gross Domestic Product (GDP) represents the total economic output of a country and is a key indicator of economic health. It is typically measured as the annual growth rate of real GDP. For MFBs, rising GDP reflects economic expansion, enhancing income levels, credit demand, and loan

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repayment capacity (Osakwe, 2019). Conversely, a decline in GDP signals economic contraction, leading to reduced borrowing and increased financial risk (Akpan & Nneji, 2015; Ayayi & Wijesiri, 2018). Thus, GDP growth influences MFBs' capital structure by affecting their ability to attract equity and service debt, linking it directly to debt ratio, equity ratio, and debt-to-equity ratio.

Theoretical Framework

This study is anchored on the Trade-Off Theory of capital structure, originally proposed by Kraus and Litzenberger (1973). The theory posits that firms seek to achieve an optimal capital structure by balancing the benefits and costs of debt and equity financing. Specifically, it emphasizes the tax advantages of debt, since interest payments are tax-deductible and create a tax shield that can enhance firm value. However, the use of excessive debt can expose firms to financial distress, including bankruptcy risk, agency costs, and increased cost of capital, which may outweigh the tax benefits (Omet & Nobanee, 2001).

The relevance of this theory to the present study lies in its practical application to microfinance banks in Nigeria, which operate in a uniquely fragile financial environment. MFBs often rely on debt financing to expand their lending operations and support financial inclusion initiatives. However, given the sector's vulnerability (as evidenced by recurring distress and regulatory interventions) these institutions must carefully weigh the trade-offs associated with debt accumulation. The theory supports the idea that while moderate levels of debt may facilitate growth and operational leverage, excessive borrowing can destabilize MFBs and threaten their mission of serving underserved and low-income populations (Rajan & Zingales, 1995; Strebulaev, 2004).

Empirical Studies

Akinyele and Akinlolu (2023) examined the impact of capital structure on the financial sustainability of Nigerian MFIs between 2015 and 2021, employing a panel data analysis methodology. Their findings revealed that a balanced mix of equity and debt financing significantly enhanced financial sustainability, while excessive reliance on debt threatened long-term stability. The study concludes that MFIs should adopt an optimal capital mix to sustain operations and recommended that policymakers implement measures to encourage equity financing.

Khan and Bhatti (2023) analyzed financial resilience among Pakistani MFIs from 2018 to 2022 using a mixed-method approach, combining regression analysis with qualitative interviews. The study finds that institutions with diversified funding sources exhibited greater resilience during economic shocks, whereas those relying heavily on traditional bank loans faced higher vulnerability. The study concludes that MFIs should diversify their funding base and recommended the promotion of alternative financing mechanisms, such as grants and community-based funding. Osei and Nyamekye (2023) investigated the role of digital finance in shaping the capital structure of MFIs in Ghana from 2019 to 2022 using a quantitative survey-based approach. The study finds that digital finance solutions expanded access to capital and improved financial sustainability but raised concerns over security risks. The study concludes that digital finance plays an essential role in modernizing microfinance but recommended stronger regulatory frameworks to mitigate potential risks.

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Chauhan et al., (2024) explored the impact of capital structure on both the financial and social performance of Indian MFIs through a mixed-method approach, incorporating financial data analysis and stakeholder interviews. Findings from the study revealed that while debt financing facilitated MFI expansion, it also increased credit risk and non-performing assets. The study concludes that MFIs must carefully balance debt and equity to optimize performance and recommended the introduction of financial literacy programs to enhance debt management strategies.

Dang et al., (2023) assessed the impact of capital structure on risk management in MFIs across 26 low- and middle-income countries between 2014 and 2017 using panel regression analysis. Findings from the study indicate that high financial leverage increased institutional risks, prompting the need for stricter regulatory oversight. The study concludes that MFIs with modest equity required enhanced supervision and recommended that governments and financial regulators introduce policies to strengthen equity financing.

Obeng and Afriyie (2023) examined the effect of regulatory reforms on the capital structure of MFIs in Côte d'Ivoire from 2018 to 2022 using a case study approach. Their study finds that regulatory changes led to a preference for equity financing while discouraging excessive debt reliance. The study concludes that regulatory policies play an important role in shaping capital structures and recommended that policymakers continue refining financial regulations to promote MFI sustainability.

Eze and Okeowo (2023) examined capital structure determinants of Nigerian MFBs from 2015 to 2022 using a panel data methodology. The findings of the study indicated that regulatory policies and institutional governance played significant roles in capital structure decisions, with a preference for equity financing linked to better financial performance. The study concludes that regulatory frameworks should encourage equity financing to ensure financial sustainability and recommended broader institutional governance reforms. However, limitations included a small sample size and a relatively short observation period.

Adeleke and Olowookere (2023) explored capital structure determinants from 2018 to 2023 using macroeconomic indicators such as inflation and interest rates. Their quantitative analysis showed that macroeconomic conditions significantly impacted financing decisions, with equity financing enhancing stability. The study concludes that MFBs should incorporate macroeconomic trends into their financial planning and recommended policies to mitigate inflationary risks.

Obinna and Igbokwe (2023) assessed the role of corporate governance in shaping MFI capital structures in Nigeria from 2016 to 2022, using regression analysis to evaluate governance frameworks. The study finds that strong governance structures were associated with lower debt levels and improved financial health. It concludes that effective governance reduces financial risk and recommended strengthening corporate governance policies in the sector. However, its focus on specific governance factors and regional disparities were noted as limitations.

Akanbi and Oladimeji (2023) investigated the influence of financial literacy on capital structure decisions from 2018 to 2022 using survey-based research. The study found that higher financial literacy among managers led to a more balanced capital structure and improved financial

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sustainability. It concluded that financial literacy is essential for sound capital structure decisions and recommended financial literacy training for MFI executives. The study's reliance on self-reported data was identified as a limitation.

Owojori and Adekoya (2023) examined the impact of economic volatility on capital structure from 2015 to 2021, using time-series analysis. Their findings indicated that economic instability negatively affected MFBs' ability to maintain optimal debt levels, leading to increased reliance on equity financing. The study concluded that economic fluctuations should be considered in capital planning and recommended financial hedging strategies to mitigate risks. Limitations included the focus on a limited number of economic indicators.

METHODOLOGY

This study adopted an ex-post facto research design to examine the macroeconomic determinants of capital structure in Nigerian microfinance banks (MFBs). The research relied entirely on secondary data covering the period from 1992 to 2022. Macroeconomic data (including inflation rates, exchange rates, gross domestic product (GDP), and lending rates) were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin.

As of December 2022, there were 876 registered microfinance banks in Nigeria (CBN, 2023). The unit of analysis in this study is the microfinance banking sector, represented by a sample of licensed MFBs with consistent and accessible financial reports. To compute the dependent variable (capital structure, measured by the debt-to-equity ratio) bank-specific financial data were extracted from audited annual reports and financial statements of selected MFBs, accessed through the CBN's Microfinance Bank Returns Portal and corporate disclosures available via regulatory filings.

Model Specification

Capital structure of MFB was used as the dependent variable. The study also adapted and modified capital structure indicators as described in Kazeem et al., (2023).

$$DER_{it} = \alpha_{it} + \beta_{1}AST_{it} + \beta_{2}LQR_{it} + \beta_{3}AGE_{it} + \beta_{4}BSZ_{it} + \beta_{5}CAD_{it} + \varepsilon_{it} \dots \dots \dots (1)$$

Where;

BSZ = Bank size;

DER = Debt to equity ratio;

CAD = Capital Adequacy;

AST = Asset tangibility;

t = Time period;

LQR = Liquidity ratio;

β_0 = regression constant, and

AGE = Banks' age;

β_1 - β_4 = coefficients of the variables.

The model was adjusted by excluding asset tangibility, bank age, and bank size, while introducing macroeconomic factors (inflation rate, exchange rate, GDP, lending rate). The refinement focuses on financial stability, as capital adequacy and liquidity ratios provide a more accurate measure than physical assets. The emphasis on macroeconomic factors is justified, as they are more relevant to current capital structure dynamics in Nigeria's microfinance sector, ensuring the model effectively captures the study's objectives. The modified model is specified as shown below:

$$DR_{it} = \alpha_{it} + \beta_{1}IR_{it} + \beta_{2}EXR_{it} + \beta_{3}GDP_{it} + \beta_{4}LR_{it} + \varepsilon_{it} \dots \dots \dots (2)$$

$$ER_{it} = \alpha_{it} + \beta_{1}IR_{it} + \beta_{2}EXR_{it} + \beta_{3}GDP_{it} + \beta_{4}LR_{it} + \varepsilon_{it} \dots \dots \dots (3)$$

$$DER_{it} = \alpha_{it} + \beta_{1}IR_{it} + \beta_{2}EXR_{it} + \beta_{3}GDP_{it} + \beta_{4}LR_{it} + \varepsilon_{it} \dots \dots \dots (4)$$

Where:

DR = Debt ratio

DER = Debt to Equity Ratio

ER = Equity Ratio

IR = Inflation Rate

EXR = Exchange Rate
 GDP = Gross Domestic Product
 LR = Lending Rate,

t = Time Period,
 β_0 = Regression Constant, and
 $\beta_1 - \beta_4$ = Coefficients of the Variables.

Model Estimation Techniques

The study employed factor analysis, multiple regression analysis, and descriptive statistics. This study used time series data and a regression model to examine the effect of determinant factors on bank capital structure. The estimation of regression parameters was conducted using the ordinary least squares (OLS) method. The study employed factor analysis by identifying variables with high factor loadings on specific factors within the research instrument. Pre-estimation procedures including the unit root test, correlation analysis, and cointegration test was used. The Autoregressive Distributed Lag (ARDL) technique was used to estimate the model.

RESULTS AND DISCUSSION

Descriptive Result

Table 1 presents the descriptive analysis of each of the variables employed in the models specified. The descriptive statistics of the dependent and independent variables were calculated, including the macroeconomic indicators that were selected for this study. This provides depth information on the behavior of these variables over the years.

Table 1: Summary Statistics of the Dependent and Independent Variables

Variables	Mean	Std. Dev.	Min	Max	Obs.
DR	7960.437	12067.28	11.95	38167.35	31
ER	37660.57	45099.47	227	158738.6	31
DER	0.132	0.116	0.011	0.490	31
IR	18.585	16.486	5.388	72.835	31
EXR	111.430	48.878	49.745	272.997	31
GDP	4.204	3.779	-2.035	15.329	31
LR	7.710	1.559	3.268	11.064	31

Source: Author's Computation, 2024: Explanatory Notes: DR = Debt ratio, ER = Equity Ratio, DER = Debt to Equity Ratio, IR = Inflation Rate, EXR = Exchange Rate, GDP = Gross Domestic Product, LR = Lending Rate

The result presented in Table 1 examines key capital structure indicators and macroeconomic variables affecting financial institutions. The debt ratio (DR) has a mean value of ₦7,960.43 million with significant variability, ranging from ₦11.95 million to ₦38,167.35 million. Similarly, the equity ratio (ER) shows a high degree of variation, with an average of ₦37,660.57 million and a range between ₦227 million and ₦158,738.6 million. In contrast, the debt-to-equity ratio (DER) remains relatively stable, averaging 0.132 with limited deviation. These findings indicate that while debt and equity levels fluctuate significantly, the debt-to-equity ratio remains more consistent across institutions.

Macroeconomic factors also exhibit considerable variation. The inflation rate (IR) averages 18.585%, fluctuating widely between 5.388% and 72.835%, while the exchange rate (EXR) shows substantial volatility, with an average of ₦111.430 and a maximum of ₦272.997. Gross Domestic Product (GDP), averaging 4.204%, experiences moderate fluctuations, whereas the lending rate (LR) remains relatively stable at an average of 7.710%, with only slight variations. These results

suggest that while some economic indicators, like lending rates, show stability, others (such as inflation and exchange rates) exhibit significant fluctuations, which may impact capital structure decisions.

Preliminary Estimation Techniques

Table 2 and 3 shows the preliminary estimation techniques such as pairwise correlation, unit root test, and variance inflation factors which is utilized in scrutinizing the distribution of individual variables.

Table 2: Pairwise Correlation Matrix

Variable	DR	ER	DER	IR	EXR	GDP	LR
DR	1.000						
ER	0.570	1.000					
DER	0.544	0.574	1.000				
IR	-0.227	-0.315	0.084	1.000			
EXR	0.025	0.007	0.096	-0.053	1.000		
GDP	-0.431	-0.296	-0.555	-0.425	-0.207	1.000	
LR	0.128	0.044	0.161	-0.130	0.168	-0.168	1.000

Source: Author's Computation, 2024: Explanatory Notes: DR = Debt ratio, ER = Equity Ratio, DER = Debt to Equity Ratio, IR = Inflation Rate, EXR = Exchange Rate, GDP = Gross Domestic Product, LR = Lending Rate

The pairwise correlation analysis presented in Table 2 indicates that most variables exhibit weak relationships, except for a moderately high correlation between the debt ratio and the number of reporting banks. This suggests that including these variables in regression analysis is unlikely to produce spurious results. The correlation coefficients remain below the 0.8 threshold recommended by Gujarati and Porter (2009) and Kennedy (2008), confirming the absence of multicollinearity issues. Additionally, a unit root test was conducted to assess the stationarity of the data, ensuring the reliability of the regression model.

Table 3: Results of the Augmented Dickey-Fuller Unit Root Test

Variables	Unit Root at Level		Unit Root at First Difference		Order of Integration
	T-Statistic	p-value	T-Statistic	p-value	
DR	-1.628	0.468	-3.790	0.003	I (1)
ER	-1.745	0.408	-4.081	0.001	I (1)
DER	-1.948	0.309	-4.309	0.000	I (1)
IR	-3.017	0.033	-	-	I (0)
EXR	-3.107	0.026	-	-	I (0)
GDP	-2.267	0.183	-4.223	0.001	I (1)
LR	-4.181	0.001	-	-	I (0)

Source: Author's Computation, 2024: Explanatory Notes: DR = Debt ratio, ER = Equity Ratio, DER = Debt to Equity Ratio, IR = Inflation Rate, EXR = Exchange Rate, GDP = Gross Domestic Product, LR = Lending Rate

The results of the Augmented Dickey-Fuller (ADF) Unit Root Test in Table 3 indicate that most variables exhibit a unit root at the level, suggesting they are non-stationary in their original form. However, the variables such as Debt Ratio (DR), Equity Ratio (ER), Debt to Equity Ratio (DER), and Gross Domestic Product (GDP) are found to be non-stationary at their level form, but

stationary at their first difference, indicating that they are integrated of order 1, I(1). On the other hand, variables such as Inflation Rate (IR), Exchange Rate (EXR), and Lending Rate (LR), are stationary at level, being integrated of order 0, I(0). These results suggest that the variables need to be different to achieve stationarity.

Table 4: Lag Selection Result for the Debt Ratio Models

VAR Lag Order Selection Criteria (Debt Ratio Model)			Macroeconomic Factors			
Lag	LogL	LR	FPE	AIC	HQIC	SSIC
0	-381.984		1.90E+06	28.6655	28.7368	28.9054
1	-309.905	144.16	61478.3	25.1781	25.6063	26.6179
2	-277.392	65.025*	43615.3*	24.6216*	25.4065*	27.2613*
3	-224.206	106.37	10249.3	22.5338	23.6754	26.3733
4	-139.422	169.57	689.071	18.1053	19.6038	23.1447

Source: Author's Computation 2024

From the result presented in Table 4, the optimal lag length for the debt ratio of microfinance institutions in model 1 is two (2) according to the AIC, which is also consistent with most of the other criteria. Using this optimal lag length, the likelihood ratio test which depends on the Maximum Eigen values of the stochastic matrix of the Johansen (1991) procedure for exploring the number of co integrating vectors was employed.

Table 5: Lag Selection Result for the Equity Ratio Models

VAR Lag Order Selection Criteria (Equity Ratio Model)			Macroeconomic Factors			
Lag	LogL	LR	FPE	AIC	HQIC	SSIC
0	-369.532		769819	27.7431	27.8145	27.9831
1	-305.112	128.84	43107	24.8231	25.2513	26.2629
2	-268.929	72.366*	23301.3*	23.9947*	24.7796*	26.6344*
3	-220.79	96.278	7958.2	22.2807	23.4224	26.1203
4	-143.079	155.42	903.466	18.3762	19.8747	23.4156

Source: Author's Computation 2024

From the result shown in Table 5, the optimal lag length for the equity ratio of microfinance institutions in model 1 is two (2) according to the AIC, which is also consistent with most of the other criteria. Using this optimal lag length, the likelihood ratio test which depends on the Maximum Eigen values of the stochastic matrix of the Johansen (1991) procedure for exploring the number of co integrating vectors was employed.

Table 6: Lag Selection Result for the Debt-to-Equity Ratio Models

VAR Lag Order Selection Criteria (Debt-to-Equity Ratio Model)			Macroeconomic Factors			
Lag	LogL	LR	FPE	AIC	HQIC	SSIC
0	-318.759		17906.5	23.9821	24.0535	24.2221
1	-273.87	89.779*	4260.63*	22.5089*	22.937*	23.9487*
2	-242.849	62.042	3375.81	22.0629	22.8478	24.7025
3	-186.009	113.68	605.215	19.7044	20.8461	23.5439
4	-95.2239	181.57	26.0872	14.8314	16.3299	19.8708

Source: Author's Computation 2024

From the result shown in Table 6, the optimal lag length for the equity ratio of microfinance institutions in model 1 is one (1) according to the AIC, which is also consistent with most of the other criteria. Using this optimal lag length, the likelihood ratio test which depends on the

Maximum Eigen values of the stochastic matrix of the Johansen (1991) procedure for exploring the number of co integrating vectors was employed.

Effect of Macroeconomic Factors on Capital Structure (Model 1, Model 2, Model 3)

This sub-section presents the Auto-Regressive Distributive Lags (ARDL) results of the effect of macroeconomic factors on capital structure of microfinance institutions in Nigeria. This is presented in Table 7.

Table 7: ARDL Estimation Results Showing the Effect of Macroeconomic Factors on Debt Ratio and Equity Ratio

Variables	Model 1 (DR)			Model 2 (ER)		
	Short Run Relationship			Long Run Relationship		
	Coeff	t	p-value	Coeff	T	p-value
IR	0.057	3.80	0.004	0.017	1.27	0.251
EXR	0.006	5.56	0.000	-0.017	-2.33	0.059
GDP	0.315	2.20	0.042	-0.065	-3.14	0.020
LR	-0.082	-3.03	0.014	0.039	1.70	0.140
CointEq(-1)	-0.398	-3.74	0.005	-0.237	3.90	0.003
Diagnostic Tests						
R-Squared	0.910	-	-	0.938	-	-
Adjusted R-Squared	0.740	-	-	0.731	-	-
F-Statistics	84.32	-	0.000	45.39	-	0.000
J.B Normality Test	3.280	-	0.194	5.190	-	0.075
B.G Serial Correlation	2.680	-	0.122	1.752	-	0.203
Heteroskedasticity Test	3.080	-	0.079	0.860	-	0.354
Obs.		30			30	

Author's Computation, 2024: Explanatory Notes: DR is Debt Ratio, ER is Equity Ratio, DER is Debt-to-Equity Ratio, IR is Inflation Rates, EXR is Exchange Rate, GDP is Gross Domestic Products, LR is Lending Rates

The study employs the Autoregressive Distributed Lag (ARDL) model to analyze the impact of macroeconomic factors on the capital structure of microfinance institutions (MFIs) in Nigeria, focusing on debt and equity ratios. As presented in Table 7, the models were evaluated using statistical tests, including the Jarque-Bera normality test, Breusch-Godfrey autocorrelation test, and Breusch-Pagan heteroskedasticity test, confirming that the residuals are normally distributed, free from serial correlation, and homoscedastic. Also, the R-squared values of 0.910 and 0.938 indicate that macroeconomic factors explain 91% and 93.8% of the variation in debt and equity ratios, respectively. The F-statistics confirm that the independent variables significantly influence capital structure decisions. The results suggest that inflation, exchange rates, GDP, and lending rates are key determinants, with their effects varying in the short and long run.

Findings reveal that inflation rates have a significant positive short-run effect on debt ratio, but a negative impact in the long run. Exchange rate fluctuations increase debt ratio while reducing equity ratio in both time horizons. GDP growth raises debt ratio in the short run but negatively affects it in the long run, while its impact on equity ratio remains mixed. Lending rates significantly reduce debt ratio in the short run, with minimal long-term influence. The error correction term (CointEq(-1)) indicates that deviations from equilibrium in debt ratio and debt-to-equity ratio are corrected at speeds of 39.8% and 23.7% per period, respectively, affirming a stable long-run relationship.

Table 8: ARDL Estimation Results Showing the Effect of Macroeconomic Factors on Capital Structure Debt/Equity Ratio

Model 3 (DER)			
Short Run Relationship			
Variables	Coeff	T	p-value
IR	0.018	4.92	0.016
EXR	-0.002	-2.86	0.065
GDP	0.016	2.26	0.108
LR	-0.015	-2.19	0.117
CointEq(-1)	-2.335	-4.41	0.022
LongRun Relationship			
IR	-0.008	-3.74	0.033
EXR	0.004	2.66	0.077
GDP	-0.024	-3.67	0.035
LR	-0.012	-1.08	0.360
Constants	0.145	0.54	0.625
Diagnostic Test			
R-Squared	0.971	-	-
Adjusted R-Squared	0.746	-	-
F-Statistics	14.64	-	0.023
J.B Normality Test	0.700	-	0.705
B.G Serial Correlation	2.020	-	0.143
Heteroskedasticity Test	1.700	-	0.103
Obs.	30		

Author's Computation, 2024: Explanatory Notes: DER is Debt-to-Equity Ratio, IR is Inflation Rates, EXR is Exchange Rate, GDP is Gross Domestic Products, LR is Lending Rates

As presented in Table 8, the ARDL model estimation for the debt-to-equity ratio (DER) of microfinance institutions (MFIs) in Nigeria incorporates key macroeconomic determinants, including inflation, exchange rates, GDP, and lending rates. The model evaluation confirms that the residuals are normally distributed (Jarque-Bera test: $p = 0.705$) and free from autocorrelation (Breusch-Godfrey test: $p = 0.143$) and heteroskedasticity (Breusch-Pagan-Godfrey test: $p = 0.103$). The R-squared value of 0.971 indicates that 97.1% of DER variations are explained by these macroeconomic factors, while the F-statistic (14.64, $p = 0.023$) confirms the model's overall significance. Also, the error correction term (CointEq (-1) = -2.335, $p = 0.022$) suggests a stable long-run relationship, with 23.5% of deviations corrected per period, ensuring a rapid return to equilibrium following short-term shocks.

The findings indicate that inflation rates positively impact DER in the short run but exhibit a negative long-run effect, suggesting that prolonged inflationary pressures encourage a shift from

debt to equity financing. Exchange rates have a marginally significant negative short-run effect but a positive long-run effect, implying that over time, fluctuations in currency values may increase debt financing preferences. GDP growth shows no significant short-run impact but has a negative long-run effect, highlighting a tendency for firms to favor equity financing as the economy expands. Lending rates, despite their role in borrowing costs, demonstrate an insignificant effect on DER in both the short and long run, suggesting that changes in interest rates may not significantly shape capital structure decisions. These insights reinforce the importance of macroeconomic stability in financial planning for microfinance institutions, ensuring adaptability to economic shifts.

Table 9: Joint Coefficient Wald Test

Variables (Factors)	Chi-Square statistics	Probability
Macroeconomic Factors: C(IR) = C(EXR)=C(GDP) = C(LR)=0	16.14	0.000

Source: Author's Computation, (2024)

Based on the joint significance of the indicators presented in Table 9, macroeconomic factors are identified as key determinants of the capital structure of microfinance institutions. This assertion is supported by statistical evidence obtained through rigorous analysis. Therefore, the test results led to the rejection of H_{01} , confirming that macroeconomic determinants have a significant impact on capital structure.

Discussion of Findings

This section discusses the findings derived from the Debt-to-Equity Ratio (DER) in Model 3. The results indicate that inflation rates have a significant and positive influence on the capital structure of microfinance institutions (MFBs) in the short run. In this period, inflation leads to higher borrowing costs, as lenders demand higher interest rates to counteract currency devaluation, making debt financing more costly and less attractive. However, in the long run, persistent inflation has a negative effect on capital structure by eroding the real value of equity and increasing the cost of servicing debt. As a result, MFBs are likely to prioritize internally generated funds and equity financing to maintain financial stability. This highlights the vulnerability of MFBs to macroeconomic fluctuations and underscores the importance of stable inflation for supporting sustainable financial operations. These findings align with previous studies by Rosario and Chavali (2019), Adegbeye et al. (2020), Aziz and Abbas (2019), and Ayayi and Wijesiri (2018), which similarly report both the positive short-run and negative long-run effects of inflation on capital structure.

The study also reveals that Gross Domestic Product (GDP) growth has a significant negative effect on the capital structure of microfinance banks (MFBs), but this effect is observed only in the long run. Economic growth typically enhances the financial stability of borrowers, reduces default risks, and creates a more favorable lending environment, which can generally lead to an increase in the debt-to-equity ratio. However, the negative relationship in this context suggests that during periods of sustained economic growth, MFBs may prioritize internal financing and equity rather than taking on additional debt, possibly due to increased market confidence and better access to equity funding. These findings are in line with the research of Kim and Park (2020), Osakwe (2019), Bala et al. (2019), and Ayayi and Wijesiri (2018), who similarly report complex interactions between

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GDP growth and capital structure, highlighting both positive and negative influences depending on the economic context.

The study's findings on inflation and GDP align with the trade-off theory of capital structure. In the short run, inflation positively impacts MFBs' capital structure by encouraging debt use due to tax shields, despite higher borrowing costs. However, in the long run, persistent inflation erodes equity value and raises debt servicing costs, prompting MFBs to prioritize equity financing for stability. These results mirror those of Rosario and Chavali (2019) and Ayayi and Wijesiri (2018), who report similar effects of inflation. Similarly, GDP growth negatively affects capital structure in the long term, enhancing financial stability and encouraging debt financing. The results support the trade-off theory, which suggests firms adjust debt and equity based on economic conditions for optimal financial stability.

CONCLUSION AND RECOMMENDATIONS

The study concludes that macroeconomic factors are critical determinants of the capital structure of microfinance institutions (MFBs) in Nigeria. Specifically, inflation rates significantly influence the capital structure in both the short and long run, while GDP has a negative and significant impact on the capital structure of MFBs in the long run. Other variables, such as exchange rates and lending rates, were found to be statistically insignificant. Based on these findings, the study recommends that:

- i. Microfinance banks (MFBs) can leverage the positive effects of inflation, such as the potential for increased asset values, to enhance their capital structure. However, given the negative significant effect of inflation on capital structure, MFBs should also adopt inflation-hedging strategies to mitigate its adverse impact. Specifically, MFBs can increase reliance on equity financing during high inflation, as debt becomes more expensive and riskier, thus ensuring financial stability and reducing vulnerability to inflationary pressures. This balanced approach would enable MFBs to navigate both the positive and negative impacts of inflation on their capital structure.
- ii. Considering the negative impact of GDP on capital structure, Microfinance Banks (MFBs) should explore alternative investment strategies during periods of negative GDP growth to hedge against economic downturns and mitigate potential financial instability. On the other hand, during periods of GDP growth, MFBs can take advantage of favorable economic conditions by increasing their reliance on debt financing to expand and scale operations.

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