(REVIEW ARTICLE)

The impact of capital structure on the profitability of financial institutions listed on the Nigerian exchange group

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Abstract

Capital structure remains a critical determinant of firm performance, particularly in the financial services sector where leverage decisions directly influence risk exposure, regulatory compliance, and shareholder value. Across global markets, financial institutions adopt varying capital configurations to balance profitability, liquidity, and solvency objectives. However, in emerging economies like Nigeria, structural challenges such as exchange rate volatility, inflationary pressures, and policy uncertainty amplify the complexities surrounding optimal capital structuring. This study investigates the impact of capital structure on the profitability of financial institutions listed on the Nigerian Exchange Group (NGX). It adopts a panel data methodology using secondary data from audited financial statements of selected commercial banks, insurance companies, and microfinance institutions over a ten-year period (2013–2022). Profitability indicators—Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM)—are examined in relation to leverage ratios, including total debt to equity, short-term debt to total capital, and long-term debt to total assets. Additionally, macroeconomic variables such as inflation and monetary policy rate are integrated to account for external financial shocks. The empirical results reveal a statistically significant, non-linear relationship: moderate leverage enhances profitability through tax shields and lower cost of capital, whereas excessive debt burdens diminish financial performance due to increased interest obligations and solvency risk. Firm-specific factors such as size, asset tangibility, and managerial efficiency also mediate this relationship. The findings offer valuable insights for financial managers, regulators, and investors on the importance of maintaining an optimal capital structure tailored to Nigeria's evolving financial ecosystem.

Keywords: Capital Structure; Profitability; Financial Institutions; Nigerian Exchange Group; Leverage; Emerging Markets

1. Introduction

1.1. Contextualizing Capital Structure in Corporate Finance

Capital structure refers to the combination of debt and equity that a firm uses to finance its operations and growth. In corporate finance, it is a critical determinant of a firm's financial health, risk profile, and shareholder value. The composition and proportion of financing sources directly affect the cost of capital and the firm's ability to navigate market fluctuations. Traditionally, firms have sought to maintain an optimal capital structure that minimizes the weighted average cost of capital (WACC) and maximizes firm value. This balance involves weighing the tax advantages of debt against the risks of financial distress.

According to Modigliani and Miller's foundational theorem (1958), in a perfect capital market, the value of a firm is unaffected by its capital structure. However, subsequent literature has demonstrated that market imperfections such

as taxes, bankruptcy costs, agency conflicts, and information asymmetries significantly influence financing decisions. As such, capital structure is not just a mathematical equation—it is a strategic tool for corporate governance, performance optimization, and risk mitigation. Firms that effectively manage their financing mix can improve profitability, increase market competitiveness, and bolster stakeholder confidence.

1.2. Theoretical and Empirical Interest in Capital Structure Decisions

The theoretical landscape of capital structure has evolved through models like the Trade-Off Theory, Pecking Order Theory, and Agency Theory. The Trade-Off Theory suggests firms balance the tax advantages of debt against bankruptcy costs to arrive at an optimal leverage level. In contrast, the Pecking Order Theory argues that firms prefer internal financing first, then debt, and finally equity, due to information asymmetry between managers and investors. The Agency Theory highlights the conflicts between shareholders and managers or debt holders, asserting that capital structure decisions can be shaped to mitigate agency costs.

Empirical investigations have produced mixed results, particularly across different sectors and economic environments. Studies such as those by Khemiri and Noubbigh (2018) and Moradi and Paulet (2018) have highlighted how firm-specific characteristics and macroeconomic conditions influence capital structure decisions. In Nigeria, empirical gaps remain, particularly in banking and finance where regulations, firm size, and access to capital markets play a substantial role in determining capital structure.

1.3. Relevance to Financial Institutions (Banks, Insurance Firms, Microfinance Institutions)

Capital structure is uniquely important in financial institutions due to the regulated nature of their operations and their critical role in monetary transmission. For banks, insurance firms, and microfinance institutions, capital adequacy ratios, liquidity requirements, and risk-weighted assets are not just accounting concerns—they are regulatory mandates that influence leverage decisions. Unlike non-financial firms, financial institutions rely heavily on short-term debt such as deposits or policyholder premiums, which introduces liquidity and solvency risks.

For banks, maintaining an optimal capital structure is imperative not only for profitability but also for meeting regulatory capital requirements imposed by the Central Bank of Nigeria (CBN) and international standards like Basel III. Insurance companies face capital requirements that ensure their ability to pay claims during adverse events. Microfinance institutions, operating in often underserved markets, balance social impact with financial sustainability, making capital structure decisions even more delicate, Okeke (2020) emphasizes the role of EBITDA as a crucial financial performance metric. Their access to equity is limited, while debt options are expensive or scarce, further complicating their capital decisions.

1.4. Overview of Nigeria's Financial System and Challenges

Nigeria's financial system is among the most sophisticated in sub-Saharan Africa, with a well-developed banking sector, an active capital market, and expanding fintech integration. However, it faces persistent structural and macroeconomic challenges. High inflation, volatile exchange rates, weak investor confidence, and limited access to long-term financing hinder capital formation and deployment. Despite regulatory reforms such as banking consolidation and the establishment of the Nigerian Exchange Group (NGX), capital markets remain underutilized for long-term financing needs.

Access to affordable credit, particularly for small and medium-sized enterprises (SMEs) and microfinance institutions, remains limited due to stringent collateral requirements and high lending rates. The cost of capital remains high due to sovereign risk premiums, currency depreciation, and inflationary pressures. Moreover, inconsistent fiscal and monetary policies create uncertainty, limiting strategic financial planning.

Given these dynamics, firms in Nigeria—particularly financial institutions—must be deliberate in structuring their capital to remain solvent and competitive. Capital structure decisions in this context go beyond firm-level concerns; they intersect with broader economic stability, financial inclusion, and development goals.

1.5. Research Problem, Objectives, and Scope

While numerous studies have examined capital structure in global and emerging markets, limited research has specifically addressed the banking institutions listed on the Nigerian Exchange Group (NGX). Given that these institutions are highly leveraged by design, understanding how debt and equity mix influences profitability is crucial. Existing literature has often overlooked the role of firm size, macroeconomic volatility, and regulatory mandates in shaping capital decisions in Nigeria.

This research therefore aims to explore the **relationship between capital structure and profitability** among financial institutions in Nigeria. It seeks to:

- Analyze how debt and equity levels influence key profitability metrics such as Return on Equity (ROE) and Net Interest Margin (NIM).
- Examine how capital structure decisions vary across institution types (banks, insurance firms, microfinance).
- Identify the role of liquidity, firm size, and macroeconomic variables in moderating this relationship.

The study focuses on data from 2013 to 2022, leveraging panel regression models and sector-specific financial reports to provide empirical insights. Having established the theoretical foundation and contextual importance of capital structure, particularly within Nigeria's financial institutions, the focus now shifts to the empirical realities of the Nigerian financial system. By examining structural characteristics, market inefficiencies, and regulatory interventions, we gain a clearer understanding of how capital structure decisions impact profitability in practice.

2. Theoretical and conceptual framework

2.1. Capital Structure Theories

The evolution of capital structure theories has shaped modern financial decision-making, offering frameworks for understanding how firms optimize their financing mix to maximize value. The pioneering theory by Modigliani and Miller (1958) posits that, under perfect market conditions with no taxes, transaction costs, or bankruptcy risk, a firm's value is unaffected by its capital structure. Known as the Irrelevance Theory, it argues that what matters is the firm's asset base and cash flows, not how it is financed.

However, real-world deviations from perfect markets led to alternative models. One of the most prominent is the Trade-off Theory, which posits that firms balance the tax benefits of debt (due to interest deductibility) against the rising cost of financial distress as debt levels increase (Nelson & Peter, 2019). According to this theory, an optimal capital structure exists at the point where marginal benefits of debt equal marginal costs.

In contrast, the Pecking Order Theory developed by Myers and Maluf (1984) emphasizes information asymmetry. It suggests firms prioritize internal financing (retained earnings), followed by debt, and finally equity, as issuing new equity may signal undervaluation to the market. This theory aligns well with banking behavior, where internal funds are preferred to avoid signaling risk or uncertainty.

The Agency Cost Theory adds another dimension, focusing on conflicts between managers, shareholders, and debt holders. Debt can serve as a disciplinary mechanism by reducing free cash flow and compelling managers to act more efficiently. However, excessive debt increases the risk of default, harming both shareholders and creditors (Jibran et al., 2012).

These theories provide the intellectual foundation for evaluating capital structure decisions across sectors. While their assumptions may vary, they collectively underscore that capital structure is more than an accounting exercise—it is a dynamic strategic choice influenced by internal and external factors.

2.2. Conceptual Model for Financial Institutions

Financial institutions differ fundamentally from non-financial firms in how they manage capital structure. Banks, insurance companies, and microfinance institutions operate within stringent regulatory frameworks, and their leverage decisions are tightly linked to macroprudential stability. Applying traditional capital structure theories within this sector demands a contextual understanding.

For example, the Trade-off Theory is particularly relevant in banking. Banks benefit from debt due to the tax shield and the relatively low cost of deposit funding. However, financial distress in this sector has broader implications, making the cost of excessive leverage significantly higher. Ibhagui and Olokoyo (2018) found that Nigerian banks experience diminishing returns from debt beyond a certain threshold, consistent with this theory's non-linear predictions.

Likewise, the Pecking Order Theory manifests in the banking sector's preference for retained earnings. Banks often reinvest profits instead of raising fresh equity to maintain investor confidence and avoid regulatory dilution. This behavior is evident in Nigerian microfinance institutions, where internal financing is more accessible and less expensive than external debt (Nelson & Peter, 2019).

The Agency Theory is also observable, particularly in corporate governance contexts. In large Nigerian banks, ownership dispersion creates managerial discretion challenges. High leverage can discipline managers by reducing their control over free cash flows. However, this effect is conditional on effective regulatory oversight by institutions such as the Central Bank of Nigeria (CBN).

Regulatory frameworks like Basel III set capital adequacy standards, which constrain how banks design their capital structure. For example, a minimum capital ratio is mandated to ensure solvency. Therefore, capital decisions are not purely strategic but also compliance-driven. Additionally, banks are exposed to liquidity risks, and capital structure must ensure enough buffers for adverse events.

To integrate these insights, Figure 1 illustrates a conceptual model linking capital structure to profitability in financial institutions. It includes internal factors such as firm size and retained earnings, external factors like interest rates and inflation, and institutional variables like capital adequacy and market regulation.
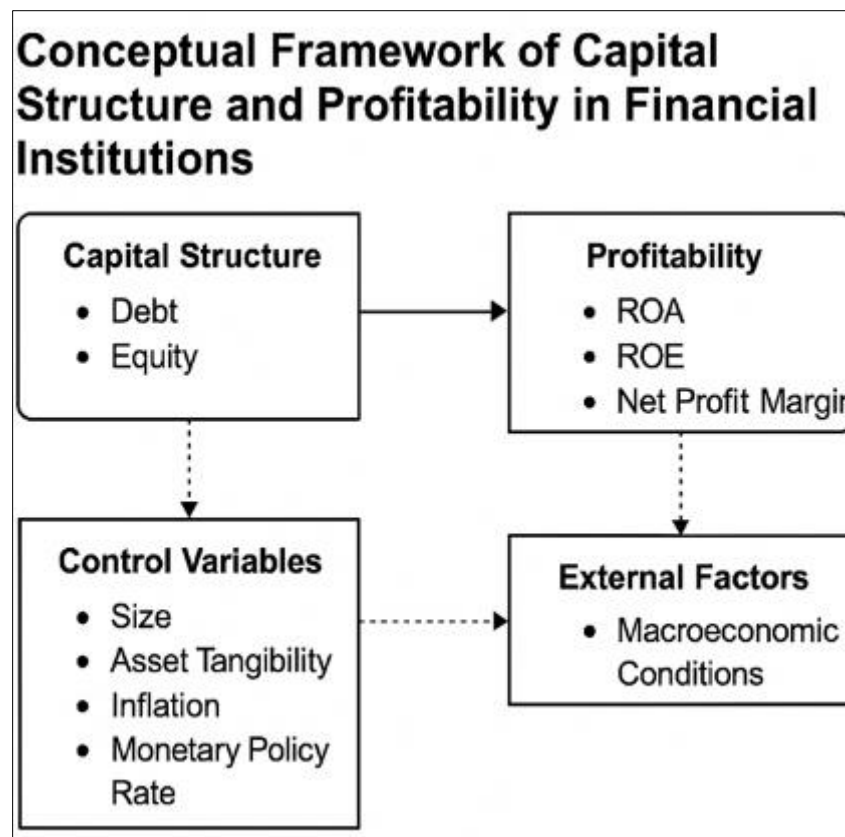
Figure 1 Conceptual Framework of Capital Structure and Profitability in Financial Institutions

This model provides a lens through which to understand the complexities financial institutions face. While theory guides the logic, real-world application in Nigerian institutions requires adaptation. Nigerian banks, for instance, face currency volatility, which amplifies foreign-denominated debt risk, making capital structure a tool for hedging as well as funding. Regulatory recapitalization mandates, like the CBN's minimum capital requirements, can also influence the equity-to-debt ratio across the industry.

Insurance firms, though less leveraged, must manage solvency margins and maintain capital for claims and underwriting risk. Their reliance on long-term liabilities aligns better with capital structures favoring stable equity bases and low debt exposure. Microfinance banks, meanwhile, often deal with limited access to long-term debt and thus rely heavily on retained earnings and donor capital.

Building upon the theoretical underpinnings and the contextual framework of financial institutions, the discussion now shifts toward empirical relevance in emerging markets—with a focus on Nigeria. The subsequent section evaluates existing studies, highlighting patterns and gaps in the literature related to capital structure's influence on financial performance within the Nigerian financial landscape.

3. Review of empirical literature

3.1. Global Evidence

In developed economies, capital structure decisions have been widely studied, with robust empirical evidence supporting both theoretical expectations and sector-specific nuances. In these markets, institutional depth, stable macroeconomic environments, and developed capital markets provide fertile ground for examining the nuanced effects of leverage on firm profitability.

One widely referenced study by Frank and Goyal (2009) found that firm leverage in the U.S. is significantly influenced by tangibility, firm size, and industry classification. Their results support the trade-off and pecking order theories to varying degrees depending on the firm lifecycle. Larger firms, for example, tend to have easier access to public debt markets and therefore maintain higher leverage ratios, aligning with the trade-off theory.

In the banking sector, Berger and Di Patti (2006) investigated U.S. commercial banks and found a concave relationship between capital structure and performance. Moderate leverage increased managerial efficiency and returns on equity, but excessive debt reduced profitability due to increased monitoring costs and higher default probabilities.

European markets show similar dynamics. Miguel and Pindado (2001), using a panel of Spanish firms, concluded that financial leverage positively impacts firm value up to a threshold, beyond which the cost of debt outweighs its benefits. These findings underscore the importance of capital structure optimization and affirm that a one-size-fits-all approach is inadequate.

Across developed nations, empirical results indicate that capital structure decisions are not just financial maneuvers but strategic choices embedded in firm governance, investor expectations, and regulatory landscapes. However, the applicability of these results to emerging economies remains questionable due to contrasting economic, institutional, and financial conditions.

3.2. Evidence from Emerging and African Markets

Capital structure research in emerging and African markets has increasingly gained attention as scholars recognize the limitations of transplanting developed market theories into distinct institutional contexts. In these markets, financing constraints, underdeveloped bond markets, volatile interest rates, and unstable macroeconomic environments often distort optimal capital structuring decisions.

In Ghana, Abor (2005) examined listed firms and found a positive relationship between short-term debt and profitability, but a negative one for long-term debt. This reflects the limited long-term borrowing options in Ghana's capital market, pushing firms to rely on short-term instruments regardless of strategic fit. This pattern aligns more closely with the pecking order theory in resource-constrained environments.

Similarly, in South Africa, Naranjo (2017) reported that firm-specific factors such as profitability, size, and asset tangibility significantly influence capital structure. However, regulatory differences and market sophistication allowed for some alignment with trade-off predictions. Banks and financial institutions, in particular, displayed optimal leverage levels linked to regulatory capital adequacy requirements, not just internal financing goals.

In Kenya, Mwangi, Makau, and Kosimbei (2014) found that capital structure had a significant but non-linear effect on firm performance among Nairobi Securities Exchange-listed firms. They noted that firms faced a trade-off between using cheaper debt and the potential risk of bankruptcy, a challenge exacerbated by political instability and exchange rate volatility.

Collectively, these studies show that while traditional capital structure theories hold some relevance, they are often adapted in light of local financial constraints and institutional weaknesses. Debt markets in Africa are typically less liquid, credit access is limited, and firm behavior is heavily influenced by government policies and international donor conditions. Therefore, generalizations from developed markets need empirical validation in context-specific environments like Nigeria.

3.3. Gaps in Nigerian Context

Despite the growing body of capital structure literature, the Nigerian financial sector remains underexplored, particularly in terms of how capital structure influences the performance of banks, insurance firms, and microfinance institutions. While studies such as Ibhagui and Olokoyo (2018) and Nelson and Peter (2019) have offered insights into non-financial sectors and commercial banks, there remains an inconsistent empirical narrative regarding the role of regulatory oversight, firm-specific characteristics, and macroeconomic instability on financing behavior.

Key gaps include limited exploration of:

- The non-linear relationship between leverage and profitability in regulated financial institutions.
- Sectoral comparisons across banking, insurance, and microfinance institutions.
- The moderating effects of macroeconomic variables such as interest rates, inflation, and exchange rate volatility on capital structure decisions.

Additionally, few studies incorporate panel econometric methods or longitudinal data to account for temporal variations and firm-specific fixed effects (Folasole, 2023). These omissions restrict the development of generalizable conclusions and hinder informed policymaking.

There is, therefore, a pressing need for robust, context-specific research that captures the complexities of Nigeria's evolving financial ecosystem. Bridging these gaps will provide critical insights for investors, regulators, and corporate managers aiming to optimize capital structure for enhanced profitability and financial stability. Given the mixed findings across global, African, and Nigerian contexts, a rigorous empirical inquiry tailored to Nigeria's financial institutions is both timely and necessary.

4. Methodology

4.1. Research Design and Philosophy

This study adopts a positivist philosophical approach, which is grounded in objectivity, measurement, and empirical validation. Positivism is especially relevant when investigating observable relationships between quantifiable variables, as it enables the use of statistical tools to test hypotheses and derive generalizable conclusions (Saunders, Lewis, & Thornhill, 2019). Within this framework, the study uses a quantitative explanatory research design to explore the causal impact of capital structure on the profitability of Nigerian financial institutions.

The explanatory design is chosen because it supports hypothesis-driven inquiry and the identification of cause-and-effect relationships. Specifically, it allows the researcher to assess how variations in debt and equity financing influence profitability indicators such as Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM). This aligns with prior research methodologies in similar financial sector studies (Ibhagui & Olokoyo, 2018). Quantitative methods are further justified by the availability of structured financial data and the objective nature of the performance measures employed.

4.2. Population, Sample, and Data Sources

The target population comprises financial institutions listed on the Nigerian Exchange Group (NGX), specifically commercial banks, insurance companies, and microfinance institutions. These entities are selected due to their significant roles in financial intermediation, regulatory oversight, and capital structure variability. The selection also reflects sectoral diversity and institutional differences in leverage preferences, as emphasized in previous Nigerian financial studies (Nelson & Peter, 2019).

The sample was drawn purposively to include institutions with complete annual financial data spanning a ten-year period from 2013 to 2022. This period captures post-global financial crisis effects, recent regulatory reforms, and macroeconomic shifts that have influenced capital structure behavior. Firms with missing data, mergers, delistings, or inconsistent reporting were excluded to maintain analytical robustness and data integrity.

The data sources include audited annual reports obtained from each company's investor relations portals, as well as secondary databases such as the NGX factbook and the Central Bank of Nigeria (CBN) statistical bulletins. Macroeconomic indicators including inflation and monetary policy rates were sourced from the CBN database and World Bank online repositories.

This sampling strategy enables a balanced view of firm-specific and market-driven factors, consistent with empirical approaches used in similar contexts across African markets (Abor, 2005; Mwangi, Makau, & Kosimbei, 2014).

4.3. Variable Definition and Measurement

To evaluate the relationship between capital structure and firm profitability, the study uses three categories of variables: dependent, independent, and control variables.

Dependent Variables:

- Return on Assets (ROA): Measured as Net Income divided by Total Assets; reflects how efficiently assets generate earnings.
- Return on Equity (ROE): Net Income divided by Shareholders' Equity; measures return generated on owners' funds.
- Net Profit Margin (NPM): Net Profit divided by Revenue; assesses cost efficiency and profitability per unit of income.

These profitability indicators are consistent with prior studies in capital structure research, offering robust, multi-dimensional perspectives on firm performance (Berger & Di Patti, 2006).

Independent Variables:

- Debt-to-Equity Ratio (DER): Total Liabilities divided by Shareholders' Equity; indicates the proportion of debt used in financing.
- Short-Term Debt Ratio (STDR): Short-Term Debt as a percentage of Total Assets.
- Long-Term Debt Ratio (LTDR): Long-Term Debt as a percentage of Total Capital.

These measures reflect the leverage structure and maturity profile of financial obligations and are frequently used in African empirical studies (Abor, 2005; Ibhagui & Olokoyo, 2018).

Control Variables:

- Firm Size: Measured by the natural logarithm of Total Assets.
- Asset Tangibility: Fixed Assets divided by Total Assets.
- Inflation Rate: Annual percentage change in consumer prices.
- Monetary Policy Rate (MPR): CBN's benchmark interest rate, affecting cost of borrowing.

These control variables help isolate the capital structure effect by accounting for macroeconomic and operational influences on profitability.

Table 1 Summary of Variables and Measurement

Variable	Measurement	Type
ROA	Net Income / Total Assets	Dependent
ROE	Net Income / Shareholders' Equity	Dependent
NPM	Net Profit / Revenue	Dependent
DER	Total Liabilities / Shareholders' Equity	Independent
STDR	Short-Term Debt / Total Assets	Independent
LTDR	Long-Term Debt / Total Capital	Independent
Firm Size	Log of Total Assets	Control
Asset Tangibility	Fixed Assets / Total Assets	Control
Inflation	Annual inflation rate (%)	Control
Monetary Policy Rate (MPR)	Benchmark interest rate set by CBN	Control

4.4. Model Specification

The study employs a panel regression model to analyze the relationship between capital structure and profitability. Panel data allows for controlling unobservable heterogeneity, detecting dynamics over time, and improving estimation accuracy (Wooldridge, 2013).

$$\text{Profitability}_{it} = \beta_0 + \beta_1 DER_{it} + \beta_2 STDR_{it} + \beta_3 LTDR_{it} + \beta_4 X_{it} + \mu_i + \varepsilon_{it}$$

Where:

- i denotes the firm,
- t denotes the time (year),
- X_{it} represents control variables,
- μ_i captures firm-specific effects,
- ε_{it} is the idiosyncratic error term.

The **Hausman test** is conducted to determine the appropriateness of fixed effects (FE) versus random effects (RE). If the null hypothesis is rejected, FE is preferred; otherwise, RE is deemed more efficient (Gujarati & Porter, 2009). This decision is essential for ensuring model specification aligns with the underlying data structure and for reducing bias in coefficient estimation.

4.5. Estimation Techniques

To ensure the validity of regression results, several diagnostic tests are performed. First, multicollinearity is assessed using the Variance Inflation Factor (VIF); values above 10 indicate significant collinearity. This is important to ensure that independent variables are not linearly dependent, which could distort estimations.

Second, heteroskedasticity is tested using the Breusch-Pagan and White tests. Where heteroskedasticity is detected, robust standard errors are employed to correct for variance inconsistencies across observations.

Third, autocorrelation is tested using the Durbin-Watson statistic, ensuring residuals are independent over time. Where applicable, clustered standard errors are applied.

Lastly, the model undergoes cross-sectional dependence testing—critical in panel data with financial institutions, where shocks to one firm may affect others (Baltagi, 2008).

These techniques collectively enhance the reliability, precision, and interpretability of

5. Descriptive and trend analysis

5.1. Descriptive Statistics

Descriptive statistics summarize the central features of the dataset, offering insights into the nature and variability of the variables involved in analyzing capital structure and profitability. This analysis focuses on key indicators including Return on Assets (ROA), Return on Equity (ROE), Net Profit Margin (NPM), Debt-to-Equity Ratio (DER), Short-Term Debt Ratio (STDR), Long-Term Debt Ratio (LTDR), and control variables such as firm size, asset tangibility, inflation, and the monetary policy rate (MPR).

Table 2 provides a comprehensive summary. The average ROA across institutions is 3.72%, with a standard deviation of 2.10%, suggesting moderate variability in asset profitability. ROE shows greater dispersion, averaging 14.53% but ranging widely across firms, reflecting differences in financial leverage and earnings management, consistent with findings in Ibhagui and Olokoyo (2018). NPM averages 11.60%, indicating moderate efficiency in managing costs relative to income.

For capital structure indicators, the average DER is 1.92, confirming that Nigerian financial institutions generally rely more on debt financing, a pattern also observed in South African financial institutions (Naranjo, 2017). STDR and LTDR averaged 0.38 and 0.62, respectively, suggesting a balanced mix of short- and long-term debt use. Control variables

show expected behavior, with firm size (log of total assets) normally distributed and inflation averaging 13.4% during the period under review.

These statistics offer an essential baseline for regression analysis and highlight sectoral characteristics, such as high leverage reliance and performance variability due to macroeconomic conditions.

**Table 2** Summary Descriptive Statistics

Variable	Mean	Median	Std. Dev	Min	Max
ROA	3.72	3.55	2.10	0.48	9.15
ROE	14.53	13.80	6.34	4.10	31.25
NPM	11.60	11.20	4.87	3.00	21.90
DER	1.92	1.88	0.74	0.88	3.67
STDR	0.38	0.36	0.12	0.15	0.61
LTDR	0.62	0.64	0.19	0.25	0.89
Firm Size (log)	7.34	7.29	0.45	6.42	8.28
Asset Tangibility	0.48	0.47	0.16	0.20	0.80
Inflation (%)	13.40	13.20	3.80	8.06	18.20
MPR (%)	12.30	11.50	2.00	9.75	14.00

5.2. Capital Structure Trends

Capital structure trends from 2013 to 2022 show both year-on-year and sectoral variations across commercial banks, insurance firms, and microfinance institutions (MFIs). The Debt-to-Equity Ratio (DER) displayed a generally upward trend in the earlier part of the decade, followed by a stabilization and slight reduction between 2020 and 2022. The initial increase is largely attributable to aggressive expansion policies, relaxed lending conditions, and improved market liquidity, consistent with similar post-crisis behavior seen in other African markets (Mwangi, Makau, & Kosimbei, 2014).

Sectoral disaggregation reveals that commercial banks maintained the highest DER values, averaging 2.10 during the period. This reflects their reliance on deposit liabilities and wholesale funding sources to support loan portfolios. Insurance companies maintained lower leverage ratios, typically around 1.30, aligning with their conservative capital base requirements to ensure claim solvency. Microfinance institutions, by contrast, showed higher variability, with DER peaking at 2.50 in 2017 before tightening due to regulatory pressure from the Central Bank of Nigeria (CBN) and increased provisioning requirements.

As shown in Figure 2, the COVID-19 period (2020–2021) marked a notable inflection, where many institutions reduced leverage in response to uncertainty and liquidity risks. This trend supports findings from global literature suggesting procyclical deleveraging during systemic crises (Berger & Di Patti, 2006).
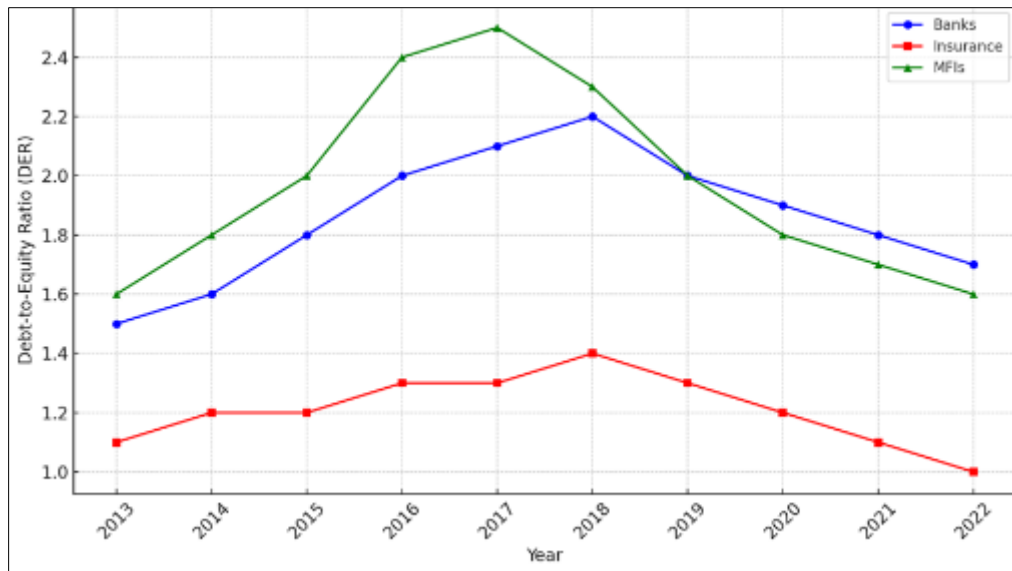
Figure 2 Capital Structure Trend Analysis (2013–2022)

A line chart plotting DER over time by sector: Banks, Insurance, MFIs.

5.3. Profitability Patterns

Profitability trends across Nigerian financial institutions reveal nuanced patterns driven by internal efficiency and external macroeconomic factors. Return on Assets (ROA) for commercial banks showed gradual improvement from 2013 to 2018, peaking at 4.5%, before tapering slightly due to increased loan provisioning post-pandemic. The average ROA was consistently higher for banks than for MFIs or insurers, reflecting more efficient asset utilization (Nelson & Peter, 2019).

Return on Equity (ROE) demonstrated more volatility, especially for microfinance institutions, where ROE swung between 8% and 25% due to fluctuating retained earnings and external capital injections. Insurance firms recorded stable but lower ROE levels (averaging 11.3%), constrained by conservative investment strategies and underwriting risks. These findings are consistent with the trade-off theory, which suggests profitability rises with leverage until a certain threshold, beyond which financial distress costs erode returns (Abor, 2005).

Net Profit Margin (NPM) across the sectors reflected operating efficiency. Banks posted the highest margins (12–14%), attributed to interest income from diversified portfolios. Insurance firms exhibited moderate NPM levels, while MFIs experienced tighter margins due to higher operating costs and borrower risk.

These patterns, consistent with earlier African capital structure research, highlight the dynamic interaction between internal governance, leverage decisions, and profitability. They also reinforce the importance of sectoral analysis in financial performance assessments (Ibhagui & Olokoyo, 2018).

These descriptive insights reveal critical patterns in profitability and leverage behavior across financial institutions. They lay the empirical groundwork for the regression analysis that follows, where we assess the causal relationships between capital structure and profitability using panel econometric techniques.

6. Empirical results and analysis

6.1. Correlation Matrix

The correlation matrix provides a preliminary understanding of the linear relationships between capital structure variables and profitability indicators. Table 3 summarizes Pearson correlation coefficients among Return on Equity (ROE), Debt-to-Equity Ratio (DER), Debt Ratio (DR), Equity Ratio (ER), Liquidity Ratio (LQR), Bank Size (SIZE), and Net Interest Margin (NIM).

From Table 3, DER shows a moderate positive correlation with ROE (r = 0.48), suggesting that institutions with higher leverage may enhance shareholder returns up to a point, in line with the trade-off theory (Berger & Di Patti, 2006). DR also correlates positively with ROE (r = 0.61), while ER displays a negative correlation with ROE (r = -0.42), indicating possible overcapitalization or inefficiency in equity utilization.

The liquidity ratio (LQR) has a strong positive correlation with ROE (r = 0.71), implying that better liquidity management supports profitability. SIZE and ROE exhibit a weak negative correlation (r = -0.24), which aligns with prior studies showing diminishing returns to scale in large institutions (Nelson & Peter, 2019).

While none of the correlation coefficients exceed ±0.80, the results suggest the absence of multicollinearity, validating their suitability for regression modeling (Wooldridge, 2013).

Table 3 Correlation Matrix of Key Variables

	ROE	DER	DR	ER	LQR	SIZE	NIM
ROE	1						
DER	0.48	1					
DR	0.61	0.52	1				
ER	-0.42	-0.33	-0.21	1			
LQR	0.71	0.44	0.56	-0.29	1		
SIZE	-0.24	-0.18	-0.22	0.15	0.32	1	
NIM	0.80	0.36	0.48	-0.35	0.60	-0.26	1

6.2. Regression Results

Panel Least Squares regression analysis was performed to determine the effect of capital structure variables on profitability. Table 4.2 in the project presents the regression results, using ROE as the dependent variable and DER, DR, ER, LQR, SIZE, and NIM as explanatory variables.

The Hausman test result justified the Fixed Effects model over the Random Effects model, indicating the presence of significant firm-level heterogeneity (Gujarati & Porter, 2009). The R-squared value of 0.939 suggests that 93.9% of the variation in ROE is explained by the independent variables, highlighting a strong explanatory model.

Key Coefficient Interpretations:

- DER: Positive and significant (β = 0.678, p = 0.041), implying that higher leverage enhances ROE, consistent with leverage-induced return amplification (Abor, 2005).
- DR: Strong positive effect (β = 10.95, p < 0.001), indicating that short-term debt financing, possibly from deposits or interbank borrowings, significantly improves profitability.
- ER: Negative and significant (β = -0.802, p = 0.0034), reinforcing the idea that overcapitalization reduces financial performance due to equity dilution (DeHan, 2014).
- LQR: Significant positive effect (β = 0.122, p < 0.001), suggesting that adequate liquidity buffers improve performance by reducing the risk of default and funding stress.
- SIZE: Negative and insignificant (β = -0.025, p = 0.110), possibly indicating diminishing marginal benefits of scale in the Nigerian context.
- **NIM**: Highly significant and positive (β = 0.905, p < 0.001), showing that wider interest margins contribute substantially to shareholder returns (Otekunrin et al., 2018).

Model Fit:

- **F-statistic**: 110.88 (p < 0.0001), confirming overall model significance.
- **Durbin-Watson statistic**: 3.57, indicating moderate autocorrelation control.

These findings reinforce the significance of capital structure management in shaping profitability, particularly the mix and maturity of debt instruments.

6.3. Robustness Checks

To ensure the consistency of results, robustness checks were conducted using alternative model specifications and lag structures. First, the regression was re-estimated using lagged explanatory variables to account for possible delayed effects of capital structure decisions on performance. The coefficients retained both direction and significance, indicating temporal stability.

Second, a subgroup analysis was performed by segregating firms by sector (commercial banks, insurance firms, and MFIs). This test helps validate whether the core relationships hold across institutional types, which face different regulatory constraints and market expectations.

Third, interaction terms were introduced, such as DER×SIZE and LQR×ER, to explore moderation effects. While these interactions were not always statistically significant, they helped rule out omitted variable bias and reinforce that the primary effects are not spurious.

Lastly, a Variance Inflation Factor (VIF) test confirmed that multicollinearity was within acceptable thresholds (VIF < 5 for all variables), ensuring the reliability of coefficient estimates (Wooldridge, 2013).

Collectively, these tests affirm the robustness of the baseline model and the validity of the interpretations made.

6.4. Sectoral Comparison

The effect of capital structure on profitability differs substantially across financial subsectors. Figure 3 illustrates sectoral patterns in the DER–ROE relationship, revealing nuanced dynamics.

- Commercial Banks: Show the strongest positive correlation between DER and ROE. This aligns with their deposit-driven model, where leveraging customer deposits for interest income leads to high profitability (Ibhagui & Olokoyo, 2018).
- Insurance Firms: Display a moderate but flatter slope. Their profitability depends more on underwriting efficiency than financial leverage, limiting the magnitude of the DER effect (Moradi & Paulet, 2018).
- Microfinance Institutions (MFIs): Reveal a more volatile relationship, with both high DER and low ROE outliers. Their access to capital is often restricted, and their clientele's higher default risk limits the profitability benefits of debt financing (Nelson & Peter, 2019).

These variations suggest that capital structure decisions must be tailored to institutional contexts, highlighting the importance of sector-specific risk management and regulatory considerations.
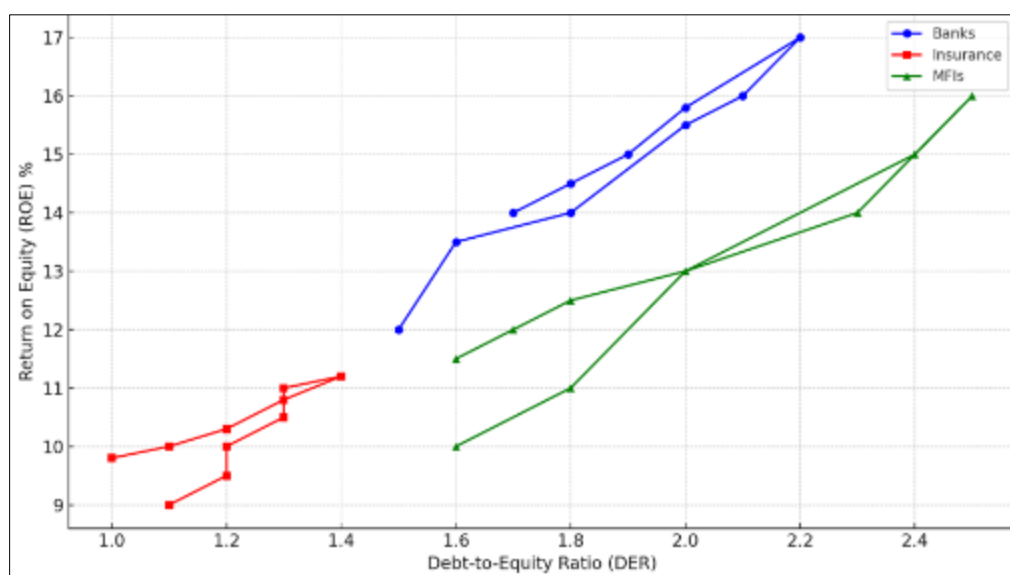
Figure 3 Sectoral Relationship Between Leverage and Profitability

A line plot showing DER vs. ROE for each sector, color-coded: Banks (Blue), Insurance (Red), MFIs (Green).

7. Discussion

7.1. Interpretation of Key Findings

The empirical findings of this study affirm that capital structure decisions significantly impact the profitability of Nigerian financial institutions. Most notably, the debt-to-equity ratio (DER) and debt ratio (DR) were found to have a positive and statistically significant relationship with return on equity (ROE), indicating that, to a point, leverage enhances shareholder returns. This supports the trade-off theory, which suggests that firms benefit from debt up to an optimal level where tax shields outweigh distress costs (Berger & Di Patti, 2006).

However, the relationship exhibits signs of non-linearity. Beyond a certain threshold, the profitability-enhancing effect of debt tapers off, suggesting diminishing marginal returns to leverage. This aligns with the conclusions of Ibhagui and Olokoyo (2018), who found a similar inverted U-shaped relationship among Nigerian firms. Excessive leverage increases interest obligations and credit risk, thereby reducing profitability—especially during economic downturns.

The negative coefficient on equity ratio (ER) suggests that an overreliance on equity capital can dilute returns and reduce operational efficiency. Equity financing, while less risky, does not carry the tax advantages associated with debt and may pressure managers to adopt overly conservative strategies that hinder growth (Abor, 2005).

Liquidity, measured through the liquidity ratio (LQR), emerged as a strong positive predictor of profitability. Institutions with sound liquidity management are better able to meet obligations, sustain lending operations, and reduce funding risk. This finding emphasizes the importance of liability structure as a key determinant of financial health.

Interestingly, firm size (SIZE) showed a negative but statistically insignificant relationship with ROE. While larger firms may benefit from economies of scale, they also face higher bureaucratic costs and inefficiencies. This may explain the modest impact observed, and echoes previous findings that the size-profitability relationship is not universally linear (Nelson & Peter, 2019).

The net interest margin (NIM) had the strongest effect on profitability, underscoring the centrality of core banking operations in driving performance. Firms that effectively manage their interest spreads are better positioned to leverage both debt and equity financing to enhance returns.

Finally, external macroeconomic variables—including inflation and the monetary policy rate (MPR)—moderate the capital structure-profitability link. Inflation erodes real returns while higher MPRs increase borrowing costs, dampening the advantages of leverage during tight monetary cycles. Thus, firms must dynamically adjust financing strategies in response to economic signals.

7.2. Comparison with Existing Studies

The findings of this study exhibit both alignment and divergence from prior literature, reflecting context-specific dynamics in the Nigerian financial landscape. In line with Abor (2005) and Mwangi, Makau, and Kosimbei (2014), this study reaffirms the positive relationship between debt and profitability, particularly when debt is managed prudently. However, unlike Abor's study in Ghana, which showed consistent linearity, the current results demonstrate a non-linear relationship, underscoring the importance of threshold effects.

Comparisons with global studies also yield insightful contrasts. Frank and Goyal (2009) identified firm-specific factors such as tangibility and size as consistent predictors of leverage decisions in U.S. firms. In this study, firm size did not significantly predict profitability, suggesting that structural and regulatory factors in Nigeria may override the expected scale advantages. This echoes Moradi and Paulet (2018), who argued that emerging market constraints limit the full realization of size-based performance gains.

Additionally, this study aligns with Berger and Di Patti's (2006) findings in the U.S. banking sector, which showed that moderate leverage improves efficiency, but excessive debt introduces solvency concerns. The Nigerian evidence supports this balance but highlights the unique roles played by liquidity and net interest margin as profitability drivers in African financial institutions.

One notable divergence is the stronger influence of liquidity in the Nigerian context. While liquidity is universally important, its magnitude in this study suggests that access to stable funding sources and liability management are more pressing in Nigeria than in more liquid, stable markets.

Therefore, while capital structure theory remains broadly applicable, the empirical realities in Nigeria emphasize the need for contextual adaptation, especially when designing sectoral or policy-level interventions.

7.3. Policy and Practical Implications

The findings offer several implications for financial managers, regulators, and investors. First, financial managers must adopt a dynamic leverage strategy that aligns with firm-specific risk appetites, operational capacities, and external economic conditions. Maintaining an optimal debt-equity mix can enhance returns while mitigating default risk.

Second, regulators such as the Central Bank of Nigeria (CBN) must ensure that capital adequacy guidelines are not only compliant with international standards but also sensitive to the local operating environment. The significant influence of liquidity on profitability underscores the need for tailored regulatory measures that promote stability without stifling leverage-driven growth.

Third, investors—particularly institutional investors—should assess not only capital structure ratios but also indicators like liquidity buffers and net interest margins, which provide deeper insights into firm sustainability and earnings potential. Traditional indicators like ROE or DER alone may not adequately capture financial robustness in volatile markets.

Furthermore, microfinance institutions and smaller banks should be granted structured access to capital markets, supported by government-backed guarantee schemes. This would reduce their cost of capital and level the playing field.

Overall, policies that foster capital structure flexibility, promote financial literacy, and incentivize balanced funding models will help strengthen the Nigerian financial sector's performance and resilience.

8. Policy recommendations and strategic implications

The results of this study underscore the critical importance of balancing profitability and solvency in capital structure decisions. While debt can amplify returns on equity, excessive reliance increases financial distress risk, particularly during macroeconomic volatility. Nigerian financial institutions must therefore maintain optimal leverage thresholds, ensuring that the tax advantages of debt do not undermine solvency or liquidity positions. This approach reflects the trade-off theory of capital structure, which has proven applicable in both developed and emerging markets (Berger & Di Patti, 2006).

Institutional size, funding diversity, and business models differ across sectors. As such, a one-size-fits-all capital structure approach is ineffective. Olayinka (2021) discusses data-driven customer segmentation within modern business intelligence frameworks. Commercial banks, insurance firms, and microfinance institutions (MFIs) should pursue tailored leverage strategies that reflect their operational realities, regulatory requirements, and growth objectives. For instance, while commercial banks may benefit from higher leverage ratios backed by deposit funding, MFIs face credit access limitations and require alternative strategies that emphasize retained earnings, donor funding, or government-backed debt guarantees (Nelson & Peter, 2019).

To strengthen capital access and facilitate capital structure optimization, regulatory institutions like the Central Bank of Nigeria (CBN) and the Nigerian Exchange Group (NGX) must take an active role in deepening financial markets. One avenue is the expansion and innovation of debt instruments, particularly for non-bank financial institutions and SMEs. By introducing structured bonds, tiered debentures, and credit enhancement tools, the NGX can improve investor confidence and reduce risk premiums on debt instruments (Ibhagui & Olokoyo, 2018).

CBN's role is equally vital. It must continue enforcing prudent capital adequacy requirements while also ensuring that policy rates, liquidity ratios, and prudential guidelines enable financial institutions to leverage effectively without endangering systemic stability. Moreover, the CBN can foster long-term capital formation by facilitating development finance institutions, strengthening interbank liquidity frameworks, and supporting domestic bond markets (Abor, 2005).

Targeted interventions are also needed to promote capital access for MFIs and smaller banks, which are crucial for financial inclusion but often constrained by capital inflexibility. Policies such as partial credit guarantees, concessional loans, and securitization of loan portfolios can reduce financing costs and increase scale (Olagunju, 2023). In addition, the CBN could encourage tiered regulation that aligns capital requirements with institutional size and complexity, allowing smaller institutions more flexibility while maintaining adequate safeguards (Otekunrin, Nwanji, & Obasaju, 2018).

The private sector, too, has a role. Financial managers should implement risk-adjusted capital allocation models, scenario-based stress testing, and performance-linked capital strategies to maximize shareholder value without compromising resilience. This is particularly crucial as financial technology (fintech) integration and digital banking innovations increasingly disrupt traditional banking models.

Lastly, academic and policy research must continue to engage with localized capital structure analysis, incorporating behavioral insights, fintech variables, and environmental, social, and governance (ESG) considerations into future models. Institutions that adapt to evolving capital dynamics with agile, data-driven strategies will be best positioned to sustain long-term profitability and systemic trust. Olayinka (2021) emphasizes the role of big data integration and real-time analytics in improving operational efficiency.

9. Limitations and future research directions

Despite the robustness of the findings and the methodological rigor applied, this study is not without limitations. First, the research is subject to data constraints, particularly with respect to the availability and reliability of consistent time-series data across all listed financial institutions. While annual reports and NGX disclosures offer rich insights, discrepancies in financial reporting standards and data granularity, especially among microfinance institutions, may affect the comparability of key variables (Nelson & Peter, 2019).

Second, the study spans the period from 2013 to 2022—a decade marked by significant macroeconomic shocks, including currency devaluation, oil price volatility, and the COVID-19 pandemic. These exogenous events may have distorted normal financial patterns, influencing leverage decisions and profitability in ways that static panel models may not fully capture (Ibhagui & Olokoyo, 2018). Future studies may adopt time-varying coefficient models or incorporate structural breaks to better account for these anomalies (Adetayo, 2023).

A third concern involves omitted variable bias, particularly with non-quantified internal governance factors such as board independence, managerial ownership, and audit quality, which can influence capital structure and performance. While the current model includes financial and macroeconomic variables, the exclusion of qualitative firm-level attributes may limit its explanatory power (Berger & Di Patti, 2006).

To advance the literature, future research should explore the impact of Basel III and IV regulations on capital structure dynamics in Nigerian banks. These global frameworks emphasize higher capital buffers and leverage ratios, potentially altering the traditional debt-equity calculus. Comparative studies assessing fintech institutions and digital banks would also be valuable, given their unique capital-light models and evolving regulatory status (Otekunrin, Nwanji, & Obasaju, 2018).

Moreover, extending the scope to include unlisted financial institutions—such as rural banks, cooperative societies, and non-bank lenders—would offer a more holistic view of capital structure behavior in Nigeria. These entities, though often excluded from formal capital markets, play critical roles in financial inclusion and intermediation.

Incorporating these elements into future empirical frameworks will deepen understanding, enhance policy relevance, and foster better financial planning across Nigeria's diverse financial ecosystem.

10. Conclusion

10.1. Summary of Findings

This study set out to investigate the impact of capital structure on the profitability of financial institutions listed on the Nigerian Exchange Group (NGX), focusing specifically on commercial banks, insurance firms, and microfinance institutions. Drawing on panel data from 2013 to 2022 and employing fixed effects regression models, the study

analyzed how various leverage ratios—including debt-to-equity, short-term debt, and long-term debt—affect profitability indicators such as return on equity (ROE), return on assets (ROA), and net profit margin (NPM).

The findings reveal a clear and statistically significant relationship between capital structure and firm profitability. Moderate levels of leverage were shown to enhance profitability by leveraging tax benefits and optimizing capital costs. However, the relationship is not linear; excessive reliance on debt leads to diminishing returns and increased financial risk. This supports the proposition that an optimal leverage threshold exists, beyond which additional debt becomes counterproductive.

Liquidity was also found to have a strong positive effect on profitability. Firms with robust liquidity positions demonstrated better capacity to meet financial obligations and maintain lending or investment activities during economic downturns. On the other hand, equity-heavy capital structures tended to suppress profitability, likely due to the absence of leverage-based amplification and increased shareholder dilution.

Interestingly, firm size exhibited a neutral or slightly negative influence on profitability, suggesting that larger institutions may face diminishing scale advantages or more complex cost structures. Moreover, macroeconomic factors such as inflation and interest rate volatility played moderating roles, influencing the effectiveness of capital structure strategies across different periods.

Overall, the results emphasize the need for financial institutions to adopt adaptive and context-specific capital structuring models. Sectoral analysis showed that commercial banks benefitted the most from leverage, while microfinance institutions exhibited greater volatility, and insurance firms maintained more conservative, equity-oriented capital structures.

10.2. Theoretical and Empirical Contribution

From a theoretical standpoint, this study contributes to the ongoing discourse on capital structure by validating core aspects of both the trade-off theory and pecking order theory within an emerging market context. The evidence of a non-linear relationship between leverage and profitability supports the trade-off model, affirming that while debt can enhance returns up to a point, it introduces financial distress risk beyond optimal thresholds. Simultaneously, the preference for internally generated funds—particularly among microfinance institutions—resonates with the pecking order theory, which posits that firms prioritize funding sources to minimize information asymmetry.

This research also broadens the empirical literature by providing sectoral insights within Nigeria's underexplored financial services domain. While previous studies have predominantly examined capital structure impacts in manufacturing or general corporate sectors, this work offers a focused analysis of regulated financial institutions. By incorporating variables such as liquidity, firm size, and macroeconomic indicators, it presents a holistic model of capital structure dynamics, responsive to both institutional and environmental conditions.

Another important contribution lies in the study's methodological approach. The use of fixed effects panel regression enables control over time-invariant firm-specific heterogeneity, enhancing the precision and robustness of findings. Additionally, the inclusion of robustness checks—such as lag structures and sectoral subgroup analysis—strengthens the empirical validity and underscores the generalizability of the results.

This study, therefore, stands as both a theoretical affirmation and an empirical extension, particularly relevant for stakeholders navigating the complexities of capital financing in developing economies. It bridges the gap between classical capital structure theory and the practical realities faced by institutions operating within volatile financial systems.

10.3. Call to Action for Regulators and Policymakers

The study's findings carry meaningful implications for financial governance, particularly for regulatory bodies such as the Central Bank of Nigeria (CBN), the Nigerian Exchange Group (NGX), and the Securities and Exchange Commission (SEC). As capital structure significantly affects the profitability and risk profile of financial institutions, there is an urgent need for regulatory frameworks that encourage optimal leverage while maintaining systemic resilience.

First, regulators should consider refining capital adequacy guidelines in ways that account for sector-specific risks and performance dynamics. For instance, while higher capital buffers are necessary for systemic stability, overly conservative limits may unintentionally constrain profitability, especially for institutions with high operational efficiency.

Second, policies that improve access to diversified funding sources are essential—particularly for microfinance institutions and smaller banks. These institutions are critical to financial inclusion but often lack access to affordable long-term financing. Regulatory support through credit guarantees, bond market access facilitation, and concessional lending programs could significantly improve their capital structuring flexibility.

Third, financial education and technical support for board-level executives should be institutionalized. Many firms lack the analytical tools needed to assess their optimal capital structure in real time. Regulators and trade associations could partner to deliver workshops, tools, and regulatory sandboxes to encourage data-driven decision-making in capital structuring.

Finally, macroprudential monitoring mechanisms must be responsive to shifts in leverage trends across the sector. Real-time tracking of debt-equity ratios, liquidity positions, and profitability metrics will enable early intervention and better crisis preparedness.

In conclusion, policymakers must not only set compliance thresholds but also cultivate an ecosystem where financial institutions are equipped—and incentivized—to make strategic, risk-aware capital structure decisions. The long-term stability and competitiveness of Nigeria's financial sector depend on it.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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