



CAPITAL STRUCTURE AND BANK PERFORMANCE: EVIDENCE FROM SELECTED NIGERIAN DEPOSIT MONEY BANKS

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Abstract

This study investigates the impact of capital structure on the financial performance of Nigerian commercial banks between 2014 and 2023. This investigation was prompted by the inconclusive findings regarding the impact of leverage on financial performance in developing economies. A quantitative approach was employed in this study, and panel data were collected from the audited financial records of fifteen sampled deposit money banks in Nigeria. Different tiers of these banks were considered to reflect the diversity in the banking sector. Capital structure was represented through four measures including Debt to Equity Ratio, Total Debt Ratio, Long Term Debt to Capitalization Ratio, and Short-Term Debt to Total Assets Ratio, whereas financial performance was approximated by two indicators, namely Return on Assets (ROA) and Return on Equity (ROE). The findings suggested that capital structure had a significant and ambiguous impact on the performance of the banking industry. Debt ratio was positively and significantly related to ROE, but negatively related to ROA, while short-term debt ratio was positively and significantly related to ROA, showing improved efficiency. Long-term debt ratio and total debt ratio demonstrated an ambiguous and insignificant influence in all the models. Hausman test showed that fixed effects regression model was appropriate. It was established that capital structure had a significant influence on the profitability and risk in Nigerian banks.

Keywords: Capital Structure; Debt to Equity ratio; Return on Asset; Return on Equity; Leverage; Nigerian Deposit Money Banks; Financial Performance; Panel Regression

INTRODUCTION

The structure of the commercial bank's financing mix has traditionally been seen as a prime driver of its operational stability, risk exposure, and long-term profitability (Ezenwakwelu, 2018). This is because banks function in such a highly leveraged environment and financial intermediation, liquidity transformation, and credit creation depend heavily on effective funding strategies, capital structure decisions are even more important for the banking industry. Unlike non-financial firms that rely primarily on equity or retained earnings, commercial banks depend extensively on a mixture of deposits, short-term borrowings, long-term debt, and equity capital to support lending activities and sustain solvency. The choice between short-term liabilities, long-term borrowings, and shareholders' equity determines a bank's resilience to shocks, cost of capital, competitive strategy, and regulatory compliance.

Due to considerable structural, macroeconomic, and regulatory changes in recent years, capital-structure decisions in Nigeria have grown in importance. The Central Bank of Nigeria (CBN) has adopted many reforms aimed at boosting bank capitalization, improving systemic stability, and aligning the industry with global prudential requirements. The 2024 Recapitalization Directive, which requires significant increases in minimum capital requirements for commercial banks, is one of the most revolutionary. It is intended to improve resilience, sustain larger balance sheets, and fortify the system against macro-financial shocks (CBN, 2024). The recapitalization directive launched in 2024 by the Central Bank of Nigeria is part of significant reforms aimed at improving the Nigerian banking system. There were several macroeconomic, financial, and structural factors behind the need for the introduction of such a directive. First, constant macroeconomic instability manifested itself through such elements as high levels of inflation, exchange rate fluctuation, and economic shocks, causing a reduction in the real value of banks' capital and weakening their ability to withstand various kinds of risk (Nigeria's Macro Headwinds Trigger Bank Recapitalisation, 2024).

Secondly, the directive attempts to make the system more stable and resilient by providing for an increased level of capital that can resist various shocks, whether internal or external (Moses-Ashike et al., 2026). Lastly, the directive will allow increasing the borrowing capacity of banks and will be instrumental in the economic development of the country, especially in terms of financing major investments in different areas of the economy (Moses-Ashike et al., 2026). This will be crucial for the development of Nigeria's goal of becoming a trillion-dollar economy. Earlier reforms, including new prudential standards and Basel III-aligned capital and liquidity frameworks enacted between 2018 and 2023, significantly tightened regulatory expectations regarding leverage and capital adequacy (CBN, 2021).

The Nigerian financial system has likewise undergone severe macroeconomic volatility since 2018. Credit quality, earnings stability, and liquidity management were under pressure due to periods of foreign exchange volatility, rising inflation, falling oil revenues, and the economic disruption brought on by the COVID-19 epidemic (IMF, 2021; World Bank, 2022). Although the sector displayed resilience (maintaining regulatory capital ratios across most institutions) key performance measures including Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM) fluctuated substantially over this time (PwC, 2020; IMF, 2023). Understanding how capital structure affects these performance variances has become significant for regulators and bank managers.

The growth of mobile banking, fintech competition, and technological innovation have all contributed to the accelerated digital transformation that has occurred since 2018. These developments have transformed banks' cost structures, income mix, and risk exposures. Increased investment in digital infrastructure requires capital resources, altering banks' leverage strategies and financial flexibility (KPMG, 2022). The connection between digitization and capital-structure behaviour remains relatively underexplored in the Nigerian empirical literature.

Nevertheless, notwithstanding the plethora of research efforts undertaken to establish the link between capital structure and firm performance, recent empirical evidence does not seem to agree with previous findings. Recent academic research continues to exhibit conflicting results depending on how the capital structure and leverage measures are defined. On the one hand, certain research efforts reveal a negative correlation between leverage and financial performance due to the financial risks associated with too much debt and the resultant decline in profitability (Ahmed & Teru, 2020; Erhomosele, 2021). Conversely, recent findings show that well-balanced leverage could improve firm performance through improved shareholder returns and effective capital utilization (Ozundu & Egbunike, 2024; Obalakumo & Odogu, 2024). The majority of existing research from Nigeria tends to rely on data collected before 2016 and fails to consider the impact of post-2018 structural changes such as macroeconomic fluctuations, regulatory reforms, and financial technology developments in the banking industry (International Monetary Fund, 2023; Central Bank of Nigeria, 2021).

This study therefore assesses the impact of capital structure on the performance of ten selected commercial banks in Nigeria between 2014 and 2023, covering pre-pandemic stability, the COVID-19 shock, recovery years, and the build-up to the 2024 recapitalization cycle. By examining multiple performance indicators (ROA, ROE, NIM, and Net Profit Margin) and disaggregated leverage measures such as Debt-Equity Ratio, Total Debt Ratio, Long-Term Debt Ratio, and Short-Term Debt Ratio, the study provides a contemporary and comprehensive understanding of how Nigerian banks optimize their financing structures.

The originality of this research lies in its integration of recent regulatory shifts, macroeconomic regime changes, and digital transformation trends within a unified empirical framework. This study contributes to the ongoing discourse on bank capitalization by providing robust, up-to-date evidence from a decade marked by unprecedented economic and structural change.

The broad objective of this study is to examine the impact of capital structure on the financial performance of selected commercial banks in Nigeria between 2014 and 2023. The specific objectives are to:

- i. determine the effect of capital structure on the profitability of selected commercial banks in Nigeria (using ROA and ROE).
- ii. examine the relationship between leverage levels and the financial performance of commercial banks, with emphasis on Debt-to-Equity Ratio, Total Debt Ratio, Long-Term Debt Ratio, and Short-Term Debt Ratio.
- iii. assess the differential impact of short-term and long-term debt financing on bank operational efficiency and earnings performance.

Hypotheses

To empirically assess the relationship between capital structure and bank performance, the study formulates the following hypotheses in their null and alternative forms:

Hypothesis 1

H₀₁: Capital structure does not exert a significant effect on the profitability of commercial banks in Nigeria.

H₁₁: Capital structure exerts a significant effect on the profitability of commercial banks in Nigeria.

Hypothesis 2

H₀₂: Leverage levels have no significant relationship with the financial performance of commercial banks in Nigeria.

H₁₂: Leverage levels have a significant relationship with the financial performance of commercial banks in Nigeria.

Hypothesis 3

H₀₃: Short-term debt and long-term debt do not differ significantly in their effects on the operational efficiency of commercial banks in Nigeria.

H₁₃: Short-term debt and long-term debt differ significantly in their effects on the operational efficiency of commercial banks in Nigeria.

LITERATURE REVIEW

Conceptual Review

Financial Performance

The ability of an organisation to efficiently use its resources to produce profits and accomplish its goals is referred to as financial performance. It shows the results of a company's operations across time, with a primary emphasis on financial outcomes. Financial performance is defined as profit (the excess of income over expenses during a specific period) which reflects the main objective of any organization (Iyoha et al. 2022). It provides a foundation for analysing the performance of companies in the same industry or sector and acts as a measure of a company's financial stability during that time. Such comparisons enable organizations to analyse their current situations and establish plans to boost performance and achieve their organisational goals.

Key performance measures include return on assets (ROA) and return on equity (ROE), which assess profitability relative to assets and equity. Together, debt ratios and performance metrics help analysts and regulators understand a bank's financial health, risk profile, and overall operational effectiveness.

Return on Asset

Return on assets can be defined as the number of profits made in relation to the amount invested in total assets. A greater ratio indicates that the business is making better use of its assets to produce net income. The higher rate of return will make the company's performance more efficient. This will make the business much more appealing to investors. The company's increased appeal makes it more appealing to investors because it can offer substantial returns. Put differently, ROA will impact stock returns those investors will tolerate.

Return on Equity

Analysts and investors use return on equity (ROE), a financial metric, to evaluate how well a business makes money in relation to the equity invested by its owners. By definition, ROE is the ratio of net income to shareholders' equity, providing a measurable indicator of a company's performance in respect to the capital that its owners have invested (Marcin 2024).

Capital Structure

Due to its essential function in establishing a firm's financing strategy, risk exposure, and total value, capital structure has long been a major topic in financial theory and has drawn

consistent scholarly interest. Researchers have provided a variety of definitions over time, each emphasizing particular aspects of how businesses use debt and equity to fund their operations.

Brealey *et al.*, (2020) describe capital structure as the relative proportion of debt and equity employed by an organisation to finance its activities. Damodaran (2011) also refers to it as the exact combination of long-term borrowing and equity finance that enables a corporation to sustain its operations. Wild *et al.* (2019) further stress that capital structure covers the wide range of funding methods (mainly debt and equity) through which corporations raise funds for ongoing operations and future expansion.

From a broader economic perspective, (Ezenwakwelu, 2018) defined capital structure as the combination of debt and equity used to finance the firm's asset base. Looking at the concept from an investment standpoint, Bodie *et al.*, (2014) noted that capital structure reflects the proportion of a firm's capital financed through debt versus equity, a balance which directly influences the organization's risk profile and return potential.

A core component of the discussion on capital structure is the notion of an optimal or ideal mix of debt and equity. This optimal structure is one that maximizes shareholder wealth while minimizing the firm's Weighted Average Cost of Capital (WACC). Achieving this ideal involves recognizing and balancing real-world market frictions such as agency conflicts, bankruptcy risk, and personal and corporate taxation, factors that significantly shape financing decisions (Watson & Head, 2016). In order to effectively measure capital structure, the current research employs four commonly used proxy variables: Debt/Equity Ratio, Total Debt Ratio, Long Term Debt/Capital Ratio, and Short-Term Debt/Total Asset Ratio.

Debt-to-Equity Ratio (DER)

The Debt-Equity Ratio indicates the percentage of debt in the total capital structure of an organization. This ratio is calculated by dividing the total liabilities by the total stockholders' equity. DER represents the financial leverage of an organization, and a higher DER means that there is a greater financial risk. The higher the ratio, the greater the amount of debts in the business, which implies that there are high risks involved. A higher DER also shows that a company uses its financial resources effectively to achieve maximum benefits, thus making it financially attractive to its stockholders (Brealey *et al.*, 2020; Iyoha *et al.*, 2022).

Total Debt Ratio (TDR)

The Total Debt Ratio is a ratio that shows how much of the total assets of an organization is funded by debts. It is computed using the formula: total debt over total assets. The higher the TDR, the higher the likelihood of external financing and financial distress of the

business entity during economic uncertainty. On the other hand, the lower the TDR, the higher the chances of conservative finance management, implying that the organization uses internal financing to fund its activities (Bodie et al., 2014; International Monetary Fund, 2023).

Long-Term Debt to Capitalization Ratio

The Long-Term Debt to Capitalization Ratio measures the proportion of long-term debt in a firm's total capital structure, typically defined as long-term debt divided by the sum of long-term debt and equity. This ratio focuses on the long-term financing decisions of a firm and reflects its strategic capital structure planning. Higher LTDCR values indicate greater dependence on long-term borrowing, which may provide stability in financing but also increase fixed financial obligations and interest costs over time (Brigham & Ehrhardt, 2010; Watson & Head, 2016). In banking, long-term debt plays a significant role in funding large-scale investments and supporting balance sheet expansion.

Short-Term Debt to Total Assets Ratio

The Short-Term Debt to Total Assets Ratio captures the proportion of a firm's assets financed through short-term liabilities. It is calculated as short-term debt divided by total assets and reflects the firm's reliance on short-term financing for operational activities. A higher STDAR indicates greater dependence on short-term funding, which may enhance liquidity and operational flexibility but also exposes the firm to refinancing risk and interest rate fluctuations (World Bank, 2022; Iyoha et al., 2022). In the context of commercial banks, short-term debt is particularly significant as deposits and other short-term liabilities constitute a major source of funding.

Commercial Banks in Nigeria

The evolution of Nigeria's commercial banking sector mirrors the broader political, social, and economic transformations of the country. The expansion of banking has been central to Nigeria's economic integration, trade facilitation, and overall growth. This development journey spans from the colonial era to the present, marked by regulatory reforms, pivotal turning points, and significant challenges that have shaped the sector's trajectory over the decades.

Commercial banking in Nigeria began during the colonial period, with the African Banking Corporation established in 1892 as the first formal bank. Shortly after, the British Bank of West Africa, now First Bank of Nigeria, was founded in 1894 to support trade between Nigeria and Britain (Oluwole, 2018). These early banks primarily served the interests of British expatriates and colonial administrators, offering only limited services to indigenous Nigerians.

After independence in 1960, efforts to indigenize the banking sector intensified, reinforced by the Banking Decree of 1969, which sought to strengthen regulatory oversight and prevent the frequent bank failures of the 1950s caused by weak capital and poor management practices (Onoh, 2002).

The 1970s and 1980s brought nationalization, indigenization, and diversification in the banking sector. Policies such as the Nigerian Enterprises Promotion Decree of 1972 mandated that Nigerians hold at least 60% of bank equity, leading to the establishment of several local banks and the sector's rapid expansion (Nwankwo, 1980). However, issues like inadequate capitalization, mismanagement, and political interference persisted. The introduction of the Structural Adjustment Program (SAP) in 1986 further transformed the sector by promoting financial liberalization, privatization, and deregulation, while the early 1990s banking crisis exposed the dangers of rapid growth coupled with insufficient regulatory oversight. In response, the CBN and NDIC introduced reforms including prudential guidelines, recapitalization, and enhanced supervision to stabilize the industry (Iheanyi *et al.*, 2016).

From the early 2000s onward, Nigeria's banking sector entered a period of consolidation and modernization. The CBN-led 2004 consolidation initiative raised the minimum capital requirement from N2 billion to N25 billion, prompting mergers and acquisitions that reduced the number of banks to 25 by the end of 2005 (Iheanyi *et al.*, 2016). Recent years have seen a focus on financial inclusion and technological innovation, with digital banking, mobile money, and fintech solutions expanding access to financial services (CBN, 2021). Despite these advancements, the sector continues to face challenges such as regulatory compliance, macroeconomic volatility, and adapting to changing consumer preferences. Nevertheless, opportunities abound in digital finance, fintech collaborations, and regional expansion through the African Continental Free Trade Area (AfCFTA), suggesting a promising future for Nigeria's banking industry (Chigbo, 2017).

Theoretical Review

The theoretical basis of this research includes three main theories of capital structure, including the Modigliani and Miller (MM) Theory, the Trade-Off Theory, and the Pecking Order Theory, which offer an explanation of financing strategies under different economic and institutional environments.

The Modigliani and Miller Theory consists of two propositions put forward by Franco Modigliani and Merton Miller in 1958 and 1963 respectively. The first proposition (Modigliani & Miller I) argues that, in case there is no tax system and transaction costs, and a firm does not face any bankruptcy costs as well as there is no asymmetric information, the value of a

business remains constant regardless of its capital structure. In other words, the decision on whether to use debt or equity financing does not influence firm value in any way. Nevertheless, this proposition is very rigid and unrealistic since it rests on numerous assumptions. The second proposition (Modigliani & Miller II), in turn, partially eliminates these assumptions considering corporate taxation, thus proving that debt financing positively affects firm value.

Taking into account the drawbacks of the MM model, the Trade-Off Theory of capital structure by Kraus & Litzenberger (1973) states that firms maximize their capital structure using a trade-off between the advantages of having debt (especially tax shields) and the costs related to financial distress and bankruptcy. The theory assumes that firms strive to reach an optimal point of debt financing when the marginal benefit of debt becomes equal to the marginal cost. The Pecking Order Theory of Myers & Majluf (1984) assumes that firms do not pursue optimal capital structure but use certain rules to raise funds due to the existence of information asymmetry. Internal financing sources (earnings) come first, then debt financing, while firms seek equity funding only as a last resort.

These theories explain the financing behavior of firms and can be used in further research of the commercial bank capital structure due to taking into account various aspects such as market imperfections, taxation, risks, and asymmetric information.

Empirical Review

Numerous empirical studies have explored the link between capital structure and financial performance across various sectors in Nigeria and other African economies. Okafor and Okoye (2022) examined how capital structure influences financial distress among Nigerian commercial banks. Using logistic regression, the authors assessed whether leverage contributes to the likelihood of financial distress. Their study population comprised all commercial banks in Nigeria, from which a stratified sample was drawn using published financial statements. The findings revealed that higher leverage significantly increases the probability of financial distress. Consequently, the authors advised banks to pursue an optimal capital structure to minimize vulnerabilities associated with excessive debt. In a related study, Nwude and Anyalechi (2018) investigated the effect of capital structure on the performance of commercial banks in Nigeria. Their research assessed how the financing mix, particularly debt-equity ratios, shapes bank performance. Data were analysed using correlation, ordinary least squares (OLS), fixed and random effects panel regression, Granger causality tests, and post-estimation diagnostics such as the restricted F-test and Hausman test. The results showed a negative and significant impact of debt financing on return on assets (ROA), while the debt-equity ratio exhibited a positive and significant effect on return on equity (ROE). These findings

suggest that while excessive debt weakens asset productivity, a well-balanced debt-equity mix may enhance returns attributable to shareholders.

More recently, Serwadda (2019) employed panel regression techniques to examine the impact of capital structure on the performance of banks in Uganda over the period 2006–2015. The findings revealed a significant relationship between banks' profitability and key capital structure components. In particular, long-term debt was found to have a statistically significant association with return on equity, indicating that the structure of long-term financing plays an important role in influencing bank profitability. Duenya and Dugugh (2018) evaluated the impact of capital structure on five Nigerian deposit money banks (DMBs) using a fixed effects regression model. The findings demonstrated that the debt-to-equity ratio improved bank performance, highlighting how significant it is to optimise the debt-to-equity mix in order to increase profitability.

Some of the recent empirical literature that focuses on the relationship between capital structure and financial performance has been published. Peace & Onyenania (2025), for instance, conducted research on the impact of capital structure on the performance of the deposit money banks in Nigeria. Their research showed that leveraging is crucial when it comes to affecting the profitability of such organizations. The researchers observed that while some elements of debt could be beneficial to financial performance, too much debt would put the bank at risk of becoming financially distressed.

Likewise, Obalakumo & Odogu (2024) assessed the importance of managing capital structure in the Nigerian business environment and concluded that combining debt financing with equity finance can lead to improved firm performance.

In addition, Ozondu and Egbunike (2024) studied the effect of capital structure on firm performance, showing that capital structure decisions have considerable implications for profitability ratios. Specifically, their research showed that though debt financing is useful in terms of increasing profits, it should be controlled in order to prevent financial risks and poor performance. Also, Erhomosele (2021) explored how capital structure influences business performance and concluded that debt financing is characterized by positive and negative effects based on its components. Particularly, it was suggested that short-term debt helps to increase efficiency, but long-term debt can reduce profitability because of the high burden of financing.

Ahmed and Teru (2020) conducted research dedicated to the influence of capital structure on business performance and concluded that capital structure has a considerable impact on financial performance. It was shown that optimal debt increases business profitability; however, too much leverage decreases financial stability.

METHODOLOGY

Positivism was the research philosophy used in this study. This philosophy advocates for objectivity, measurement, and the use of quantitative approaches to analyzing the relationship between capital structure and financial performance among Nigerian deposit money banks. A quantitative approach was utilized in this study due to its ability to estimate the influence of the independent variables on the dependent variable using statistical tools. Panel data was used in this study to accommodate cross-sectional and time-series variation in the variables being analyzed. The population of this study consists of all the deposit money banks licensed by the Central Bank of Nigeria (CBN). All these banks operated in Nigeria within the period of the study.

A simple random sampling method was used to select fifteen (15) deposit money banks from the population. These included Access Bank, Fidelity Bank, First City Monument Bank (FCMB), First Bank of Nigeria, Guaranty Trust Bank (GTBank), United Bank for Africa (UBA), Zenith Bank, Citibank Nigeria, Ecobank Nigeria, Stanbic IBTC Bank, Standard Chartered Bank, Union Bank of Nigeria, Unity Bank, Wema Bank, and Sterling Bank. Each selected bank was further classified by industry tier as follows:

Tier 1 - Access Bank, First Bank of Nigeria, Guaranty Trust Bank, United Bank for Africa, Zenith Bank, Citibank Nigeria, and Standard Chartered Bank, which can be regarded as systemically important and large commercial banks.

Tier 2 - Fidelity Bank, First City Monument Bank, Ecobank Nigeria, Stanbic IBTC Bank, and Union Bank of Nigeria, which represent medium-sized commercial banks.

Tier 3 - Unity Bank, Wema Bank, and Sterling Bank, which represent small or not-so-systemically important banks.

Secondary data were the type of data used in the study. These were gathered from the audited annual financial reports of the chosen banks for a ten-year period from 2014 to 2023. Other sources of data included the statistical bulletin from the Nigerian Exchange Group (NGX) and the Central Bank of Nigeria (CBN). Utilization of secondary data guaranteed that the collected information would be reliable and consistent.

Two statistical techniques were adopted in analyzing the collected data in the study. Descriptive statistics were applied in analyzing the data set in order to gain insight into the nature of the data and describe it, whereas correlation analysis was used to analyze whether there existed a relationship between the variables. Finally, panel regression analysis was performed in order to quantify the effect of capital structure on financial performance.

The regression model is specified as:

$$Y_{it} = \alpha_0 + \alpha_1 DER_i + \alpha_2 TDR_i + \alpha_3 LTDCR_i + \alpha_4 STDAR_i + \varepsilon_i$$

$$ROA_{it} = \alpha_0 + \alpha_1 DER_i + \alpha_2 TDR_i + \alpha_3 LTDCR_i + \alpha_4 STDAR_i + \varepsilon_i$$

$$ROE_{it} = \alpha_0 + \alpha_1 DER_i + \alpha_2 TDR_i + \alpha_3 LTDCR_i + \alpha_4 STDAR_i + \varepsilon_i$$

Where, Y_{it} represents the dependent variables (ROA and ROE) at year t ; α_0 is the intercept; $\alpha_1, \alpha_2, \alpha_3$ and α_4 are the coefficients for the independent variables and ε_i is the error term

Table 1: Measurement of variables

Variable Type	Variable	Measurement/Formula	Description	Source
Dependent	Return on Assets (ROA)	$ROA = \frac{\text{Net Income}}{\text{Total Assets}}$	Profitability relative to total assets	(Chigbo, 2017)
Dependent	Return on Equity (ROE)	$ROE = \frac{\text{Net Income}}{\text{Shareholders' Equity}}$	Profitability relative to shareholders' equity	(Marcin 2024)
Independent	Debt-to-Equity Ratio (DER)	$DER = \frac{\text{Total Debt}}{\text{Equity}}$	Measures financial leverage of the bank	(Ozundu & Egbunike, 2024)
Independent	Total Debt Ratio (TDR)	$TDR = \frac{\text{Total Debt}}{\text{Total Assets}}$	Proportion of assets financed by debt	(Ozundu & Egbunike, 2024)
Independent	Long-Term Debt to Capitalization Ratio (LTDCR)	$LTDCR = \frac{\text{Long - Term Debt}}{\text{Long - Term Debt} + \text{Equity}}$	Measures proportion of long-term debt in total capitalization	(Damodaran, 2011)
Independent	Short-Term Debt to Total Assets Ratio (STDAR)	$STDAR = \frac{\text{Short - Term Debt}}{\text{Total Assets}}$	Proportion of short-term debt in total assets	(Azeez et al., 2021)

FINDINGS

The descriptive data demonstrate considerable diversity in both capital structure and financial performance across the sampled Nigerian commercial banks throughout the ten-year period is presented in Table 2. The mean Debt-to-Equity Ratio (DER) of 756.69, with a standard

deviation of 360.85 and a range from -403.56 to 1646.81, indicating large variances in leverage levels, including cases of negative equity.

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
DER	150	756.69	360.85	-403.56	1646.81
TDR	150	96.40	29.73	22.85	254.75
LTDCR	150	48.77	20.50	-24.26	85.17
STDAR	150	81.90	29.17	10.49	240.58
ROA	150	4.52	2.78	1.32	32.70
ROE	150	34.14	15.17	-21.13	65.84

Source: Author's Computation with STATA 14

With significant institutional variance, the average Total Debt Ratio (TDR) and Short-Term Debt to Total Assets Ratio (STDAR) are 96.40 and 81.90, respectively, indicating that the majority of banks rely significantly on debt financing. Long-Term Debt to Capitalization Ratio (LTDCR) averages 48.77, reflecting a balanced use of long-term debt in the capital base, however some negative numbers hint to accounting abnormalities or negative equity. For financial performance, the mean ROA of 4.52% and ROE of 34.14% (with broad ranges and standard deviations) indicate moderate asset profitability but significant volatility in returns to shareholders. Overall, these figures show significant variation in performance and leverage, supporting additional panel regression analysis to look at how capital structure affects bank profitability.

Table 3: Correlation Matrix

	ROA	ROE	DER	TDR	LTDCR	STDAR
ROA	1					
ROE	-0.0188	1				
DER	-0.3361	0.6247	1			
TDR	0.3773	-0.4663	-0.1451	1		
LTDCR	-0.3979	0.4492	0.7417	-0.3490	1	
STDAR	0.433	-0.4398	-0.2225	0.9573	-0.5391	1

Source: Author's Computation with STATA 14

The correlation matrix in Table 3 demonstrates the links between capital structure characteristics and financial performance metrics for the sampled institutions. Return on Assets

(ROA) shows a negative correlation with Debt-to-Equity Ratio (DER, -0.336) and Long-Term Debt to Capitalization Ratio (LTDCR, -0.398), but a positive association with Total Debt Ratio (TDR, 0.377) and Short-Term Debt to Total Assets Ratio (STDAR, 0.433), suggesting that higher leverage, particularly long-term debt, may reduce asset profitability, whereas short-term borrowing appears to support it. Return on Equity (ROE) shows negative correlations with TDR (-0.466) and STDAR (-0.440) and strong positive correlations with DER (0.625) and LTDCR (0.449), suggesting that a greater reliance on equity and long-term debt increases shareholder returns. Excessive total and short-term debt may reduce shareholder profitability.

Table 4: Panel Regression (ROA)

Variable	Random Effect			Fixed Effect		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
DER	-0.001	-1.411	0.161	-2.580	-1.608	0.111
TDR	-0.080	-1.725	0.087	0.000	0.071	0.944
LTDCR	0.048	1.564	0.120	-0.091	-1.939	0.055
STDAR	0.130	2.398	0.018	0.074	2.288	0.024
C	0.386	0.264	0.792	0.149	2.708	0.008
R-squared		0.353			0.539	
Adjusted R-squared		0.264			0.437	
S.E. of regression		2.316			2.085	
F-statistic		3.970			5.275	
Prob(F-statistic)		0.000			0.000	

Source: Author's Computation with STATA 14

From the panel regression analysis of the Return on Assets (ROA) using the Random Effects and Fixed Effects Models, the capital structure ratio showed varying influences on the profitability of commercial banks in Nigeria. Using the Fixed Effects Model, DER had a negative yet statistically insignificant effect on ROA (Coefficient = -2.580; t-value = -1.608; Probability value = 0.111), showing that leverage reduces profit generation from the assets held by the banks, despite being insignificant. TDR showed insignificance in the Fixed Effects Model (Probability Value = 0.944); however, using the Random Effects Model, TDR had a statistically insignificant effect on ROA (probability value = 0.087). LTDCR showed insignificance when tested using the Random Effects Model (Probability value = 0.120) but was found to be

statistically significant at the 10% level using the Fixed Effects Model (Coefficient = -0.091; t-value = -1.939; Probability value = 0.055).

Short-Term Debt to Total Assets Ratio (STD TAR) positively influenced ROA in both models (Random Effects: coefficient = 0.130, $t = 2.398$, $p = 0.018$; Fixed Effects: coefficient = 0.074, $t = 2.288$, $p = 0.024$), which indicates an improvement in efficiency of operations due to short term borrowing. Additionally, the models showed that there was a moderate strength of determination and fixed effects model explained more variance than random effects model ($R^2 = 0.539$; Adjusted $R^2 = 0.437$ vs $R^2 = 0.353$; Adjusted $R^2 = 0.264$). The F-values for both models were found to be statistically significant ($p < 0.001$). Therefore, it can be concluded that ROA is highly influenced by short term debt financing whereas the influence of the other parts of capital structure is not consistent at all.

Table 5: Panel Regression (ROE)

Variable	Random Effect			Fixed Effect		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
C	40.445	9.248	0.000	37.147	8.281	0.000
DER	0.037	11.801	0.000	0.039	12.057	0.000
TDR	-0.141	-1.078	0.283	-0.146	-1.119	0.265
LTDCR	-0.152	-1.706	0.090	-0.124	-1.376	0.171
STD TAR	-0.162	-1.062	0.290	-0.147	-0.961	0.339
R-squared	0.849			0.879		
Adjusted R-squared	0.829			0.852		
S.E. of regression	6.117			5.828		
F-statistic	41.060			32.863		
Prob(F-statistic)	0.000			0.000		

Source: Author's Computation with STATA 14

The results from the panel regression for Return on Equity (ROE) from both the Random Effects and Fixed Effects regressions suggested that the variables measuring capital structures have inconsistent impacts on the profitability of Nigerian commercial banks. Debt/Equity Ratio (DER) was found to exhibit consistent statistically significant positive relationship with ROE regardless of whether the Random Effects model was used or not (Random Effects: coefficient = 0.037, $t = 11.801$, $p < 0.001$); (Fixed Effects: coefficient = 0.039, $t = 12.057$, $p < 0.001$). Higher

ratios mean better returns on the stock. On the other hand, Total Debt Ratio (TDR), Long Term Debt to Capitalization Ratio (LTDCR), and Short Term Debt to Total Assets Ratio (STDTAR) failed to be statistically significant in predicting ROE at the 5% level in both the regression models.

The results shows that both models (Random and Fixed effect) had great explanatory power, with the Fixed Effects model exhibiting more power ($R^2 = 0.879$; Adjusted $R^2 = 0.852$) than the Random Effects model ($R^2 = 0.849$; Adjusted $R^2 = 0.829$). The results mean that a considerable amount of variation in ROE can be attributed to the set of variables and bank-specific factors included in the regressions. At the same time, the F-statistics were significant ($p < 0.001$) for both models. The findings indicate that the major factor affecting the profitability measured through ROE was equity leverage (DER). Other debt ratios showed their insignificance in this regard.

Post Estimation Test

H_0 : The difference in coefficients of that Panel Regression is not systematic

H_1 : The difference in coefficients of that Panel Regression is systematic

Table 6: Hausman Test

Model	Test Summary	Chi-Sq.		
		Statistic	Chi-Sq. d.f.	Prob.
ROA	Period random	34.698	4	0.000
ROE	Period random	17.332	4	0.002

Source: Author's Computation with STATA 14

The Hausman post-estimation test was performed to identify which estimator (Random Effect or Fixed Effect) was more suitable for the panel regression analyses of ROA and ROE. Null Hypothesis suggested that the differences in coefficients between the two models were not systematic, indicating that the Random Effect Model was adequate, while Alternative Hypothesis suggested that the differences were systematic, thus the Fixed Effect Model would be more suitable.

In case of ROA, the Hausman test generated a Chi-Square value of 34.698 with 4 Degrees of Freedom and probability of 0.000. Likewise, in case of ROE, the Chi-Square value was 17.332, again with 4 Degrees of Freedom but probability of 0.002. In both cases, since the probability was lesser than the significant level of 5%, null hypothesis was rejected. This implies

that the differences in coefficients were indeed systematic, and hence, the Fixed Effect Models were more appropriate for interpreting ROA and ROE respectively.

Table 7: Effect of Capital structure on Nigerian commercial banks' profitability

	Return on Assets (ROA)			Return on Equity (ROE)		
	Coef.	t	P>t	Coef.	t	P>t
DER	0.00	-2.52	0.01	0.03	6.13	0.00
TDR	-0.05	-1.40	0.16	-0.51	-3.15	0.00
LTDCR	0.03	0.99	0.32	-0.02	-0.18	0.86
STDAR	0.10	2.13	0.04	0.34	1.77	0.08
Constant	2.38	1.90	0.06	36.44	7.01	0.00
	F (4,15)		12.6100	F (4,15)		48.6000
	Prob > F		0.0000	Prob > F		0.0000
	R-Squared		0.2581	R-Squared		0.5728
	Adjusted R-Squared		0.2377	Adjusted R-Squared		0.5610

Source: Author's Computation with STATA 14

The OLS regression results in Table 7 show that capital structure variables have varying effects on the financial performance of Nigerian commercial banks. For Return on Assets (ROA), the Debt-to-Equity Ratio (DER) has a negative and statistically significant effect ($t = -2.52$, $p = 0.01$), indicating that higher leverage reduces profitability relative to total assets. The Short-Term Debt to Total Assets Ratio (STDAR) positively influences ROA ($t = 2.13$, $p = 0.04$), suggesting that short-term borrowing supports operational efficiency. Total Debt Ratio (TDR) and Long-Term Debt to Capitalization Ratio (LTDCR) do not have statistically significant effects on ROA (implying that overall and long-term debt do not strongly impact asset-based profitability). The model explains approximately 25.8% of the variation in ROA ($R^2 = 0.2581$), with an F-statistic of 12.61 ($p < 0.001$), indicating overall model significance).

For Return on Equity (ROE), DER has a strong positive and significant effect ($t = 6.13$, $p < 0.001$), suggesting that appropriate leverage enhances shareholder returns. TDR negatively affects ROE ($t = -3.15$, $p = 0.00$), indicating that excessive debt may reduce equity profitability. LTDCR and STDAR are not significant for ROE ($p > 0.05$), highlighting those long-term and short-term debt ratios have limited influence on shareholder returns. The model accounts for 57.3% of the variation in ROE ($R^2 = 0.5728$), and the F-statistic ($F = 48.60$, $p < 0.001$) confirms the model's overall explanatory power. These findings suggest that the type and level of debt

play significant roles in determining bank performance, with short-term debt benefiting operational efficiency and leverage affecting returns to equity differently.

In relation to Hypothesis 1, the null hypothesis (H_{01}) was rejected due to the significant joint impact of the capital structure on the profitability of the commercial banks, as seen from the overall significance of the regression model for ROA ($F = 12.61$, $p < 0.001$). Furthermore, the null hypothesis (H_{02}) was rejected in terms of the second hypothesis since the leverage ratios were found to be significantly related to the indicators of financial performance (ROA and ROE), hence establishing that leverage does indeed have an impact on the performance of banks. In regard to the third hypothesis, the null hypothesis (H_{03}) was partly accepted since although the short-term debt (STDAR) had a significant influence on ROA, the long-term debt ratio (LTDCR) was not found to have a statistically significant impact on both ROA and ROE.

DISCUSSION ON FINDINGS

The findings of this research revealed that capital structure had both positive and negative effects on the financial performances of commercial banks in Nigeria. According to the results obtained from both the ordinary least squares and panel regression analyses, the leverage ratio of Debt-Equity Ratio (DER) exhibited dual impacts in which it had a negative impact on ROA but was positively associated with ROE. It means that while increased leverage ratio might reduce the effective use of assets, it improves the returns to the bank's stockholders. This finding agrees with the observation by (Peace & Onyenania, 2025) in their assertion that the capital structure has complicated yet significant implications for profitability ratios like ROA and ROE since proper use of leverage ratio would enhance financial performance.

From the findings of the study, it is evident that short-term debt has a significant impact on ROA, which was positive. Long-term and total debt ratios were insignificant in their effects on the performance of the banks. In other words, Nigerian banks appear to utilize short-term debt in an effective way in enhancing operational efficiency in their business. On the other hand, long-term debts may prove to be harmful or may fail to make any positive contributions to profitability. This conclusion is supported by (Obalakumo & Odogu, 2024). The authors state that the ratio of short-term debt and long-term debt to capital structure is significant for banks, and thus should be well-managed to enhance performance. Likewise, according to (Azeez et al., 2021), equity finance has more positive implications for financial performance than debt finance.

The results also showed that capital structure variables jointly explained a moderate proportion of variations in ROA and a higher proportion in ROE, indicating that capital structure has a stronger explanatory power for shareholder returns than for asset efficiency. This is

consistent with (Erhomosele, 2021), who reported a non-monotonic relationship between leverage and bank performance, suggesting that the impact of capital structure is not linear but varies depending on the level and composition of debt. The stronger effect observed on ROE in this study further supports the agency cost theory, which explains that debt can discipline management and improve shareholder value when properly structured.

The findings are also consistent with (Ozundu & Egbunike, 2024), who concluded that both equity and debt capital significantly influence the financial performance of Nigerian banks, and recommended optimal blending of financing sources. The results of this study similarly highlight that while leverage can enhance profitability, especially ROE, excessive or poorly structured debt may reduce asset efficiency and increase financial risk. Therefore, the study confirms the broader theoretical expectation that capital structure plays a pivotal but context-dependent role in determining bank performance, and it reinforces the need for optimal capital mix decisions in line with agency theory and trade-off theory perspectives.

CONCLUSION

From this study, it can be concluded that the capital structure had significant impacts on the performance of commercial banks in Nigeria between 2014 and 2023. However, there were variations on the impact based on the types of debts utilized. It was noted that short-term debt improved the efficiency of the commercial banks in terms of ROA. On the other hand, DER increased ROE, suggesting that debt can generate higher returns for shareholders, despite reducing profits based on assets. The impacts of total debt and long-term debt on efficiency and profitability were not consistently positive; rather, they could have a negative impact on bank performance. In the above scenario, the term "risk" pertains to financial risk, which refers to the probability of being unable to meet debt obligations and hence, having high liquidity risks and low financial flexibility due to heavy borrowing. Therefore, banks should strive for the right combination of short-term and long-term financing to optimize bank performance.

This study is, however, subject to a few limitations. First, the sample was restricted to fifteen deposit money banks selected through simple random sampling, which, although reflective of the three industry tiers, may not fully capture the behaviour of banks excluded from the sample. Second, the analysis relied solely on secondary data drawn from audited annual reports, and capital structure was measured using only four leverage proxies (DER, TDR, LTDCR, and STDAR), without controlling for bank-specific factors such as size, age, or ownership structure, or for macroeconomic variables such as inflation and exchange rate movements, which could also influence performance. Third, the ten-year study period (2014–2023), while capturing important regulatory and macroeconomic shifts, precedes the full

implementation of the 2024 Recapitalization Directive, so the findings may not yet reflect its eventual effects on bank capital structure and performance. Future research could address these limitations by extending the sample size and period, incorporating macroeconomic and bank-specific control variables, and revisiting the analysis once the recapitalization reforms have been fully implemented.

RECOMMENDATIONS

Based on the findings, it is recommended that Nigerian commercial banks adopt a balanced approach to debt financing. Banks should carefully manage their short-term debt to optimize operational efficiency while avoiding excessive total debt that may compromise shareholder returns. Strategic use of long-term debt should be encouraged to support growth without increasing risk unnecessarily. Regulators and bank management should provide guidance on optimal leverage ratios to ensure sustainable profitability and financial stability. Additionally, banks should regularly review their capital structure in line with changing economic conditions, interest rate fluctuations, and regulatory policies to enhance overall performance and risk management.

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