



NON-PERFORMING LOANS AND FINANCIAL PERFORMANCE OF LISTED DEPOSIT MONEY BANKS IN NIGERIA

*Badaki, T. Janet¹, Professor Gugong, Benjamin Kumai², Ayuba, A. (PhD)³,
Isuwa Dauda (PhD)⁴*

¹*Bank of Agriculture, Kaduna,*

^{2,3,4}*Department of Accounting, Kaduna State University*

Corresponding Author(s)' Email/Mobile: +2348034306881¹

Abstract

This study examines the impact of credit risk on financial performance of listed Deposit Money Banks (DMBs) in Nigeria. The motivation for the study arises from persistent concerns over declining profitability, rising non-performing loans, and the overall stability of the Nigerian banking sector. Specifically, the study investigates the effect of Non-Performing Loan Ratio (NPLR), Loan Loss Provision Ratio (LLPR), and Non-Performing Loan Coverage Ratio (NPCR) on Return on Assets (ROA). A correlational research design was adopted, utilizing secondary data extracted from the audited annual reports of 13 listed Nigerian DMBs over the period 2015–2024. Panel Corrected Standard Errors (PCSE) regression technique was employed to analyze the data. The findings reveal that LLPR has a negative and statistically significant effect on ROA, indicating that increased provisioning reduces profitability. NPCR was found to have a positive and significant impact on ROA, suggesting that adequate loan coverage enhances financial performance. However, NPLR exhibited a negative but insignificant relationship with ROA. Firm size showed a positive but insignificant direct effect on financial performance, though it marginally moderated the relationship between LLPR and ROA. The study concludes that effective credit risk management, particularly optimal provisioning and adequate coverage ratios, is crucial for sustaining profitability in Nigerian DMBs. The study recommends strengthened credit monitoring systems, balanced provisioning strategies, and regulatory emphasis on maintaining adequate coverage ratios in order to enhance bank financial stability.

Keywords: non-performing loans, financial performance, deposit money banks, Nigeria

1. Introduction

Financial performance is a fundamental indicator of an organization's economic health and long-term sustainability. It reflects the extent to which an entity utilizes its resources efficiently to generate returns for stakeholders, sustain operations, and achieve strategic objectives (Ross et al. 2022). Strong financial performance underpins growth, employment, and investment, thereby influencing the welfare of employees, customers, suppliers, and the broader society. For policymakers, understanding financial performance is critical for formulating effective economic policies and regulatory frameworks that

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ensure market stability, protect investors, and promote sustainable development. Conversely, poor financial performance erodes stakeholder confidence, triggers layoffs, reduces tax revenues, constrains credit availability, and ultimately undermines social welfare and economic progress.

Globally, financial performance has gained heightened importance within an increasingly integrated financial system, where institutions are assessed not solely on profitability but also on their capacity to withstand economic shocks, exemplified by the 2008 global financial crisis and the COVID-19 pandemic. International banking regulators, including the Basel Committee on Banking Supervision, emphasize performance metrics such as Return on Assets (ROA) and Return on Equity (ROE) as critical measures of banks' capacity to withstand risk, grow capital, and support economic activity (Basel Committee for Banking Supervision [BCBS], 2017). Poor financial performance, particularly in the banking sector, can propagate systemic risk, reduce credit flows, and trigger contagion effects across borders, highlighting the necessity for robust risk management frameworks.

Within the African context, financial performance takes on heightened significance given the continent's distinct macroeconomic volatility and structural constraints that often amplify banking sector risks and performance pressures (Ola & Okorie, 2023). Over the past two decades, African banks have experienced rapid growth, driven by financial liberalization, technology adoption, and increasing integration with global markets. However, these institutions often operate in volatile environments characterized by political uncertainty, foreign exchange fluctuations, and macroeconomic instability (Abiola & Okodudo, 2020). Such conditions expose banks to elevated credit risk and operational challenges, which, if unmanaged, can significantly undermine profitability. For policymakers and regulators, sustaining strong financial performance is essential to mobilize domestic savings, finance development initiatives, and reduce dependence on external borrowing.

Focusing specifically on Nigeria, deposit money banks (DMBs) constitute the backbone of the country's financial system. They play a pivotal role in mobilizing savings, providing credit, facilitating payment systems, and supporting trade and investment both domestically and internationally (Central Bank of Nigeria, 2023). Financial performance in Nigerian banks is therefore not merely a corporate objective but a matter of public policy. Weak performance in this sector can lead to credit contraction, higher borrowing costs, diminished investor confidence, and even institutional failures, with far-reaching implications for economic stability. The regulatory environment has also evolved significantly during the period of this study, marked by the enactment of the Banks and Other Financial Institutions Act (BOFIA) 2020 and increasing emphasis on corporate governance and asset quality, underscoring the need for empirical investigation into the determinants of bank profitability.

One critical determinant of bank performance is Non-Performing Loan Ratio (NPLR), which measures the proportion of loans that have become impaired due to borrower default. Elevated NPL ratios indicate weak credit management and higher exposure to credit risk, thereby reducing interest income and increasing provisioning costs. Empirical studies have consistently shown that high NPL levels negatively affect profitability metrics such as ROA and ROE, both globally and in emerging markets (Khalid & Ishfaq, 2022; Iqbal & Taufiq, 2024). In Nigeria, persistent NPLs have attracted

regulatory scrutiny because they erode banks' asset bases and constrain their ability to extend credit to productive sectors, ultimately threatening financial system stability.

Closely linked to the NPL ratio is the Loan Loss Provision Ratio (LLPR), representing the portion of the loan portfolio set aside to cover potential credit losses. While provisions reduce current period earnings, they serve as a buffer against future defaults, enhancing institutional resilience. High LLPRs reflect prudent risk management and a forward-looking approach to expected losses. Empirical evidence suggests that although provisioning may suppress short-term profitability, it strengthens long-term stability by mitigating unexpected credit shocks (Ojo & Olokoyo, 2023; Sulaiman & Adewale, 2024). In Nigeria, where macroeconomic volatility often affects borrowers' repayment capacity, appropriate loan loss provisioning is crucial for sustaining profitability and protecting capital.

The NPL Coverage Ratio (NPCR), calculated as provisions relative to NPLs, further complements credit risk assessment by indicating the adequacy of provisioning against impaired assets. A strong coverage ratio demonstrates prudent risk management and reassures stakeholders that the bank can absorb potential losses without severely impacting profitability. Empirical research indicates that banks with higher coverage ratios tend to be more resilient and maintain stronger financial performance, even during periods of stress (Bamidele & Adeyemi, 2024; Tella & Atake, 2022). In Nigeria, the NPL Coverage Ratio is particularly relevant given the regulatory emphasis on asset quality and capital adequacy.

Listed deposit money banks in Nigeria serve as the formal financial backbone of the economy, playing a critical role in mobilizing funds, allocating credit, facilitating financial services for individuals and institutions, and providing publicly accessible financial information through audited annual reports. This makes them an appropriate and accessible population for assessing the dynamics of credit risk and profitability in the Nigerian banking sector.

Despite the pivotal role Deposit Money Banks (DMBs) play in mobilizing savings, allocating credit, facilitating payments, and supporting economic activities in Nigeria, the sector has faced persistent challenges in sustaining robust financial performance. Weak financial performance erodes stakeholder confidence, reduces credit creation capacity, and undermines economic growth. Between 2015 and 2024, several financial services firms, including mortgage finance and savings institutions, were delisted from the Nigerian Exchange (NGX) Limited due to poor financial performance and non-compliance with regulatory and listing requirements.

Starting with the most recent, Saminu and Muhammed (2024) narrated that the Central Bank of Nigeria (CBN) on the 6th August, 2024 announced it had granted approval for a pivotal financial takeover of Unity Bank Plc by Providus Bank Limited with an asset ownership 80-20 percent (80 percent Providus, 20 percent Unity Bank). This was as a result of the signs of financial distress as its total liabilities exceeded total assets in its half-year results, raising concern that it may default on its obligations to creditors and be headed for bankruptcy. The bank's unaudited financial statements for the six months ended June 30, 2023, showed that total liabilities at N688.826 billion exceeded total assets at N509.998 billion.

In the year 2022, the auditor of Unity Bank Plc (Akinyemi Ashade, KPMG) raised concerns over the financial health of the bank after total liabilities exceeded its assets for

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two consecutive financial years. Additionally, unity bank did not meet the required minimum capital adequacy ratio (CAR) of 10% and the minimum capital base of N25 billion as required by the CBN (Okere et al. 2024). Pointing to material uncertainty that might cast significant doubt on the bank's ability to continue as a going concern, this is a clear indication of poor financial performance.

Olufemi *et al.* (2023) narrated that union bank plc was reported taken over by Titan Trust Bank. Titan Trust Bank acquisition of 93.41% controlling interest in Union Bank on June 1, 2022, led to the dissolution of the former board and the reconstitution of a new board with new leadership. This development led to bring the percentage float of Union Bank shares to less than 20%. Additionally, Central Bank of Nigeria (CBN) has dissolved the board and management of Union Bank, Keystone Bank, and Polaris Bank Plc. This action became necessary due to the non-compliance of these banks and their respective boards with the provisions of Section 12(c), (f), (g), (h) of Banks and Other Financial Institutions Act, 2020 (Saminu & Muhammed, 2024). The bank's infractions vary from regulatory non-compliance, corporate governance failure, disregarding the conditions under which their licenses were granted, and involvement in activities that pose a threat to financial stability, among others which are likely to lead the respective banks into financial distress (PremiumTime, 2024a).

In another development, Heritage banks' troubles which began in 2019 when it faced severe financial distress and appeared on the verge of collapse. However, under Godwin Emefiele (Governor of Central Bank of Nigeria), the CBN pursued a policy of not allowing banks to fail, supporting Heritage Bank through various measures. According to information contained in the 2021 audited financial statement of the bank at a negative reserve of N230.8 billion as of December 2021. The bank had a share capital of just N53.9 billion and accumulated losses of N459.3 billion making it technically insolvent. As of 2021, Heritage Bank reported it had a balance of N247 billion as balances due to banks in Nigeria. The bank also cited First Bank as the only bank owed the amount at the time. It is likely that the N456 billion paid to First Bank includes accumulated interests. CBN revoked the banking licenses of heritage bank due to failure to adhere to Section 12 (1) of Banks and other financial institutions act (BOFIA), (2020), which necessitated regulatory intervention PremiumTime, 2024).

On the same vein, the corporate governance issues that led to heritage bank failure were; First, the bank's capital has been persistently below the CBN minimum threshold. Second, the bank had not produced its financial statements for years and over the years there had been various investors that had tried to acquire the bank but once they did their due diligence they backed out. Third, situations have been so bad that they don't have senior staff for certain pertinent positions such as Chief Risk Officer and Treasurer (PremiumTime, 2024b).

In addition, it is of utmost importance to reveal the financial failure that took place within the period of the study in the Nigerian financial arena. Diamond bank in 2018 failed as a result of the following factors; bad leadership, ineffective risk management, lack of independence and high turnover in the board (Abdulwahab *et al.* 2023). While, Skye bank problems started after it used short-term funds to buy local lender Mainstreet bank in 2014 but failed to raise fresh cash. It had been in talks with shareholders and investors to raise capital but suspended plans after weak oil prices hit the capital markets and drove foreign investors away (Yahaya *et al.*, 2022).

**BADAKI, T. JANET¹, PROFESSOR GUGONG, BENJAMIN KUMAI²,
AYUBA, A. (PHD)³, ISUWA DAUDA (PHD)⁴**

Empirical research has often focused narrowly on the relationship between a single non-performing loan measure typically the Non-Performing Loan (NPL) ratio and profitability, leaving gaps in understanding how combinations of multiple risk proxies jointly affect financial performance (Ademola & Adegoke, 2025; Collaku & Aliu, 2021). Prior studies in Nigeria have largely ignored the inclusion of loan loss provision ratio (LLPR), and NPL coverage ratio (NPCR), which collectively provide a more comprehensive assessment of credit risk management effectiveness (Ughulu & Odion, 2023).

Furthermore, most existing research does not adequately account for changes over a critical recent decade characterized by regulatory shifts, post-COVID financial forbearance withdrawal, and new prudential guidelines, highlighting a period gap in the literature. In view of the foregoing, current study examines the impact of non-performing loans on financial performance of listed deposit money banks in Nigeria with the moderating role of firm size for the period of 2015 to 2024 financial years.

The study identified the following research questions to include: 1] Does NPL ratio influence financial performance of listed deposit money banks in Nigeria? 2] Does loan loss provision ratio affect financial performance of listed deposit money banks in Nigeria? 3] Does non-performing loan coverage ratio affect financial performance of listed deposit money banks in Nigeria?

In line with the research questions, this study examines the impact of non-performing loans on financial performance (ROA) of listed deposit money banks in Nigeria for the period of 2015 and 2024. Thus, the specific objectives of the study are to: i] assess the effect of the NPL ratio on financial performance of listed deposit money banks in Nigeria; ii] determine the influence of the loan loss provision ratio on financial performance of listed deposit money banks in Nigeria; iii] examine the impact of non-performing loan coverage ratio on financial performance of listed deposit money banks in Nigeria.

The study formulated hypotheses in null form to include:

H₀₁: Non-performing loan ratio has no significant effect on financial performance of listed deposit money banks in Nigeria;

H₀₂: Loan loss provision ratio has no significant effect on financial performance listed deposit money banks in Nigeria;

H₀₃: Non-performing loan coverage ratio has no significant effect on financial performance listed deposit money banks in Nigeria.

This study is particularly relevant to investors, both institutional and individual, as it provides empirical insights into how non-performing loans (NPLs) influence the financial performance (ROA) of listed deposit money banks in Nigeria. Since investors rely heavily on credible financial performance indicators for decision-making, understanding the extent to which credit risk affects profitability and how larger banks may mitigate these effects enhances investor confidence in financial reports and strategic banking decisions.

For bank management and executive leadership, this study defines the scope of internal financial and risk management practices necessary to achieve sustainable performance. By examining the individual and combined effects of various NPL proxies NPL ratio, loan loss provision ratio, and NPL coverage ratio, the research helps managers

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understand how to structure credit risk policies, optimize loan monitoring, and strengthen internal controls more effectively.

The study also addresses the broader stakeholder community, including regulators, auditors, employees, depositors, and the general public, by emphasizing the critical role of credit risk management and bank size in ensuring financial stability and accountability. Regulators such as the Central Bank of Nigeria (CBN) and the Financial Reporting Council of Nigeria (FRCN) may find the outcomes useful in evaluating or updating banking supervision guidelines, risk management frameworks, and capital adequacy requirements.

The study spans a ten-year period from 2015 to 2024, carefully selected to reflect significant developments in the Nigerian banking sector, including heightened regulatory oversight, reforms in credit risk management, and the adoption of enhanced financial reporting standards. This timeframe coincides with key regulatory initiatives such as the Banks and Other Financial Institutions Act (BOFIA, 2020), the implementation of Central Bank of Nigeria (CBN) risk management directives, and increasing emphasis on corporate governance and transparency in financial disclosures. Additionally, the period captures rapid digital transformation, the growth of fintech innovations, and structural changes in the banking industry, making it ideal for assessing the long-term impact of non-performing loans and firm characteristics on financial performance.

2. Literature Review

Previous studies have collected and analyzed data on this subject. In the context of the present study, empirical reviews involve examining prior studies on non-performing loans (NPL ratio, loan loss provisions, and NPL coverage ratio), on financial performance across the globe.

Non-Performing Loan Ratio and Financial Performance

Sari and Fauzan (2025) examined how Non-Performing Loan (NPL) Ratio and other financial ratios affect the Return on Assets (ROA) of banks listed on the Indonesia Stock Exchange (IDX) for 2021–2023. Using a quantitative paradigm and multiple regression analysis on secondary data from annual reports of purposively sampled banks, the study aimed to assess determinants of profitability, including NPL. The results showed that NPL had a significant negative effect on ROA, indicating that rising credit risk erodes profitability in Indonesian banks. Control variables such as NIM increased ROA, while LDR and CAR had no significant effects. Although the short period may limit long-term inference, the findings consistently support the expectation that worsening asset quality weakens bank profitability.

Kalkan (2025) investigated the impact of the NPL Ratio on ROA among 15 Turkish deposit banks from 2003 to 2020 using robust least squares regression. Grounded in credit risk management theory, it found that higher NPL ratios were significantly associated with lower ROA, affirming that poor loan quality undermines profitability. The study controlled for bank size, deposit ratios, CPI, and GDP growth using panel data, which strengthens its internal validity. However, its long span (17 years) may mask recent structural changes in Turkish banking practices, and the model lacks direct behavioral theory supporting causal pathways.

Kusuma and co-researchers (2025) conducted a study on bank profitability drivers, including NPL ratios, using machine learning models on Indonesian bank data from 2012–2023. The study found NPL negatively affected ROA, with operational efficiency and bank

size also significant. The use of Random Forest and XGBoost enhances robustness beyond traditional regression, providing insight into variable importance. Although the advanced technique improves prediction, interpretability of machine learning models may be lower than conventional econometric methods for causal inference.

Loan Loss Provision Ratio and Financial Performance

Sultana and Jalloh (2025) investigated “Loan Loss Provisioning and Profitability of the Private Commercial Banks of Bangladesh” covering twenty private commercial banks in Bangladesh for roughly ten years up to 2025. Grounded in banking risk and regulatory compliance theory, the study followed a quantitative panel data design using secondary annual report data. Its objective was to determine how LLP ratios influence profitability measured by ROA and ROE, while including bank size, loan ratios, and inflation as controls. The analysis revealed that loan loss provisioning significantly affects profitability, typically exhibiting a negative impact since provisions are recognized as expense items that directly reduce bank income. While the study reflects current banking realities under Basel and IFRS frameworks, the reliance on reported data may understate discretionary provisioning behavior by management.

Majani (2022) examined credit risk management impacts on the financial performance of commercial banks listed on the Nairobi Securities Exchange, Kenya (2016–2019), incorporating both NPL and loan loss provision ratios into a quantitative regression analysis framework. The objective was to assess how credit risk measures relate to ROE. Results indicated an insignificant relationship between LLPR and ROE, suggesting that LLP did not meaningfully influence the selected profitability measure. While the study’s design was appropriate for panel data analysis, its focus on ROE rather than ROA and limited geographical scope reduce generalizability to broader banking contexts.

Tomomewo et al. (2023) examined credit risk management determinants, including Loan Loss Provision Ratio, on non-performing loans in Nigerian deposit money banks over 2013–2022 using panel data regression (OLS, fixed and random effects). While the primary outcome was NPL, LLP was found to be positively but insignificantly associated with NPL levels. Although this study’s main focus was not banking profitability, it contributes indirectly by highlighting how LLP practices interact with credit risk, which in turn affects financial performance. The population was all 14 listed banks in Nigeria.

Batekele and Maseka (2025) explored how credit risk indicators including Loan Loss Provision Ratio affect financial performance (ROA and ROE) in commercial banks in the Democratic Republic of Congo (DRC). The study employed a quantitative design with multiple regression on secondary bank financial data and controlled for other credit risk measures. Results indicated that although non-performing loan ratios and other risk proxies strongly influenced performance, the specific impact of LLP Ratio varied, reflecting complex interactions in high-risk markets. The study used a modest sample of major banks but contributes context for emerging market banks.

Non-Performing Loan Coverage Ratio

Alqahtani and Mayes (2024) investigated the influence of credit risk measures including NPL Coverage Ratios on financial performance indicators such as ROA and ROE for commercial banks across Gulf Cooperation Council (GCC) countries from 2012 to 2022. The objective was to determine how provisioning behaviour and coverage levels affect profitability across oil-dependent economies. Through a quantitative panel

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regression design, secondary bank financial data were sourced from national bank disclosures and Fitch Connect databases. A fixed-effects model revealed that higher NPL Coverage Ratios were associated with smaller negative impacts of credit risk on ROA, suggesting that strong provisioning helps cushion profitability against loan losses. This finding aligns with credit risk buffering theory, which posits that adequate coverage enhances bank resilience. The study's broad regional scope strengthens generalizability, but the unique economic structure of GCC economies limits direct applicability to other regions such as Sub-Saharan Africa. (Alqahtani & Mayes, 2024).

Ndung'u and Muga (2025) examined how NPL Coverage Ratios and other risk indicators influence bank financial performance in Kenya's commercial banking sector from 2014–2023. The study aimed to quantify the effects of coverage practices on profitability (measured by ROA) while also controlling for capital adequacy, liquidity, and macroeconomic variables. Using a quantitative panel regression framework on secondary data collected from the Central Bank of Kenya and individual bank financial statements, the results showed that NPL Coverage Ratios had a positive and statistically significant effect on ROA, indicating that banks with higher provisioning relative to impaired loans maintained better profitability. The use of fixed-effects models helped control for unobserved heterogeneity, increasing confidence in the estimates. A noted limitation was that the model did not explicitly test causality beyond association, suggesting room for dynamic modelling in future research.

European Central Bank (2022) empirically evaluated how macroprudential expectations for loan loss coverage, including NPL Coverage Ratios, affect bank profitability and stability for euro-area banks post-Global Financial Crisis (roughly 2011–2020). The objective was to assess whether regulatory and provisioning expectations influence profitability outcomes such as income stability and ROA. Using a quantitative semi-structural modelling approach with stress testing data and cross-sectional bank results, the study showed that higher required coverage levels initially suppress reported profitability due to increased provisioning expenses, but over the medium-term support income stability and reduce volatility a finding consistent with the idea that adequate provisioning cushions banks against credit shocks. The design used secondary supervisory datasets and stress regime simulations rather than simple panel regression, but the empirical policy insights support the performance relevance of coverage ratios. A critique is that the modelling is specific to euro-area regulatory frameworks and may not generalize to all banking systems, especially those with different provisioning rules.

Theoretical Review

In the context of this study, credit risk theory and agency theory are used to support this study. Credit Risk Theory has evolved into a foundational framework in banking and finance, guiding how financial institutions measure, manage, and mitigate credit risk, particularly through indicators such as non-performing loans (NPLs), loan loss provisions (LLPs), and NPL coverage ratios. At the core of Credit Risk Theory are four critical concepts: Probability of Default (PD), Loss Given Default (LGD), Exposure at Default (EAD), and Expected Loss (EL).

The Probability of Default reflects the likelihood that a borrower will fail to meet contractual obligations. Loss Given Default represents the proportion of the loan likely to be lost if a default occurs, while Exposure at Default captures the total value at risk. These elements combine mathematically to calculate the expected loss, guiding banks in

determining the appropriate level of provisions and coverage ratios (Basel Committee on Banking Supervision [BCBS], 2017). In practice, these measures directly influence loan loss provision ratios and NPL coverage ratios, which act as buffers against the negative effects of loan defaults on bank profitability.

The theory provides a clear explanation on the impact of NPL ratios on ROA. Credit Risk Theory posits that as the proportion of non-performing loans rises, the expected losses increase, thereby reducing a bank's profitability (Altman & Saunders, 1998). Banks with higher NPL ratios face greater income erosion and operational strain, making ROA more vulnerable to credit risk shocks. This theoretical lens underscores the importance of monitoring and managing NPLs to protect financial performance, particularly in emerging economies such as Nigeria, where macroeconomic volatility and regulatory challenges exacerbate credit risk (Uche, 2021).

Loan Loss Provision Ratios (LLP) and ROA are also grounded in Credit Risk Theory. LLP ratios reflect the extent to which banks allocate resources to cover potential loan losses. According to the theory, adequate provisioning mitigates the negative effects of loan defaults on profitability, because provisions absorb potential losses before they impact earnings. Banks that maintain conservative LLP ratios can protect their ROA from sudden shocks in credit quality, whereas insufficient provisioning exposes the bank to significant profit volatility (Saunders & Allen, 2020; Altman & Saunders, 1998). This linkage justifies the inclusion of LLP as a key independent variable in your study, as it mediates the impact of NPLs on financial performance.

Agency Theory is particularly relevant in explaining the moderating role of firm size in the relationship between Non-Performing Loan Coverage Ratios (NPLCR) and ROA. According to the theory, larger banks typically have more complex organizational structures with multiple layers of management. While this can increase monitoring costs, it also allows for more formalized governance, risk management systems, and internal control mechanisms. These structures help ensure that managers implement adequate NPL coverage policies to protect profitability.

In contrast, smaller banks may have less formal monitoring and weaker control over managerial decisions, making their NPL coverage practices less effective in safeguarding ROA. Thus, firm size moderates the effectiveness of coverage ratios, aligning with the theoretical assertion that better-aligned agent-principal relationships reduce agency costs and improve financial outcomes (Jensen & Meckling, 1976; Eisenhardt, 1989).

The theory also provides insights into how loan loss provisioning and coverage decisions may be influenced by managerial incentives. Managers in larger banks may be incentivized to maintain higher coverage ratios to demonstrate prudence to regulators and shareholders, thereby mitigating potential losses from non-performing loans. Smaller banks, due to resource constraints, might adopt lower coverage levels or take on higher credit risk, exposing profitability to greater volatility. Agency Theory explains why these structural and managerial differences matter. The alignment between management actions (agent) and shareholder objectives (principal) directly affects how effectively NPL coverage translates into ROA (Daily et al. 2003).

3. Methodology

This aspect comprises the design and data sources used in the study. This study employed correlational research design within the framework of the positivist research

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paradigm, that emphasizes objectivity, quantification, and empirical validation. The correlational design is appropriate because the study will investigate cause-and-effect relationships. The positivist paradigm aligns with the study's reliance on measurable variables, statistical analysis, and hypothesis testing to draw generalizable conclusions about the impact of non-performing loans on financial performance of listed deposit money banks in Nigeria.

The population of this study comprises all listed Deposit Money Banks (DMBs) in Nigeria as of December 31, 2024 (Table 1). As of the study period, there are 14 listed DMBs on the Nigerian Exchange Group (NGX), which constitute the target population. Out of these banks, Jaiz Bank was filtered out as data for year 2015 and 2016 were not available resulted to incomplete financial statement. The selection of entire thirteen banks is also justified based on the consistent availability of financial data across the study period (2015–2024).

This study relied exclusively on secondary data collected from publicly available sources. The data were extracted from the annual reports and audited financial statements of the 13 listed Deposit Money Banks (DMBs) in Nigeria for the period 2015 to 2024. These documents were sourced from the Nigerian Exchange Group (NGX) portal.

Table 1

Listed Deposit Money Banks in Nigeria

S/N	Name of Bank	Date of Listing	Remarks
1.	Access Holdings Plc	1998	Selected
2.	Fidelity Bank Plc	2005	Selected
3.	First Bank of Nigeria Holdings Plc	1971	Selected
4.	Guaranty Trust Holding Company Plc (GTCO)	2007	Selected
5.	Sterling Financial Holdings Company Plc	1992	Selected
6.	Union Bank of Nigeria Plc	1917	Selected
7.	United Bank for Africa Plc (UBA)	1970	Selected
8.	Zenith Bank Plc	2004	Selected
9.	Wema Bank Plc	1990	Selected
10.	Eco Bank	1986	Selected
11.	Unity Bank Plc	2006	Selected
12.	FCMB Group Plc	2004	Selected
13.	Stanbic IBTC Holdings Plc	2005	Selected

Source: Website of the Nigerian Exchange Group (NXG) 2024

Variable Measurement and Sources

Table 2

Measurement and Definition of Variables

Variable	Type	Measurement	Source
Financial Performance (ROA)	Dependent Variable	Ratio of net income to total assets / 100	Iqbal and Taufiq (2024)
NPL Ratio (NPLR)	Independent Variable	Non-Performing Loans / Total Loans and Advances	Al-Khourri (2023)
Loan Loss Provision Ratio (LLPR)	Independent Variable	Loan Loss Provisions / Gross Loans	Sulaiman and Adewale (2024)
NPL Coverage Ratio (NPCR)	Independent Variable	Provisions / Non-Performing Loans	Bamidele and Adeyemi (2024)
Firm Size (FISI)	Control Variable	Natural log of Total Assets	Mensah and Sarpong (2024)
Leverage (LEVE)	Control Variable	Proportion of debt to equity	Mensah and Sarpong (2024)

Source: Compiled by the Researcher, 2026

To empirically examine the relationship between non-performing loans and financial performance, the study adopts a panel regression model. The general form of the model is expressed as follows:

$$ROA_{it} = \beta_0 + \beta_1 NPLR_{it} + \beta_2 LLPR_{it} + \beta_3 NPCR_{it} + \beta_4 FISI_{it} + \beta_5 LEVE_{it} + \epsilon_{it} \dots \dots \dots (i)$$

Where: ROA = Return on Assets, NPLR = NPL Ratio, LLPR = Loan Loss Provision ratio, NPCR = NPL Coverage Ratio, FISI = Firm Size, LEVE = Leverage, $\beta_1 - \beta_5$ = Coefficients of the explanatory and interaction variables, ϵ = Error term, it = time and firms.

4. Results and Discussion

Descriptive Statistics

This section presents and describes the nature of the study's variables using descriptive statistics. The descriptive statistics (which is balanced panel) is presented in Table 3 displaying the observation, minimum, maximum, mean as well as the standard deviation of the data in respect of all the study's variables.

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Table 3
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	130	0.519	0.307	-0.045	0.895
NPLR	130	26.054	16.155	-18.453	44.412
LLPR	130	3.351	1.996	-0.859	5.254
NPCR	130	1.773	0.169	0.252	2.023
FISI	130	2.807	2.986	1.254	10.933
LEVE	130	0.217	0.240	0.108	0.950

Source: Extracted from STATA 17 Output, 2026

ROA has a mean value of 0.5193 with a standard deviation of 0.3065, indicating moderate variability in profitability across banks and years. The minimum value of -0.045 suggests that some banks recorded losses during certain periods, while the maximum value of 0.895 reflects relatively strong profitability in some bank-year observations. The dispersion implies heterogeneity in operational efficiency and earnings performance among listed banks. The presence of negative ROA values confirms that profitability was not uniform throughout the study period, possibly due to macroeconomic shocks, credit risk exposure, or regulatory adjustments. The relatively wide range suggests that profitability performance differs significantly across banks, justifying further regression analysis to determine the drivers of such variations.

The mean NPLR is 26.05, with a high standard deviation of 16.15, indicating substantial dispersion in credit risk exposure across banks. The minimum value of -18.453 and maximum of 44.412 show extreme variability. The negative minimum may reflect data scaling adjustments or recovery/write-back effects. The high average and large dispersion suggest that credit risk management differs considerably among listed deposit money banks. Elevated NPL levels can significantly erode earnings due to reduced interest income and increased provisioning requirements. The large variation also signals potential instability in asset quality, strengthening the need to empirically test the impact of NPLR on ROA.

LLPR has a mean of 3.351, with a standard deviation of 1.996, indicating moderate variation in provisioning practices. The minimum value of -0.859 may indicate loan recoveries or accounting adjustments, while the maximum value of 5.254 suggests aggressive provisioning in certain years. Provisioning policies vary across banks, reflecting differences in risk appetite, regulatory compliance, and management prudence. Higher provisioning may reduce short-term profitability but strengthen long-term resilience. The variability supports examining LLPR's direct and interactive effects on financial performance.

NPCR records a mean of 1.773, suggesting that, on average, banks held provisions approximately 177% of their non-performing loans. The relatively small standard deviation of 0.169 indicates consistency in coverage practices across banks. The range (0.252 to 2.023) shows that some banks were under-provisioned, while others maintained strong buffers. The high average coverage ratio suggests regulatory compliance and prudent risk management among listed banks. However, the lower bound indicates that some

institutions may have been exposed to residual credit risk. This variable may positively influence ROA if strong provisioning enhances investor confidence and financial stability.

Normality Test

Normal distribution is a vital condition in regression analysis. According to Wooldridge (2013) it is vital to note that the OLS estimator is reliable and asymptotically normal whether or not the normality assumption is achieved. The kernel density estimate (KDE) of the fitted values provides a non-parametric approximation of their underlying probability density function without imposing a normality assumption. Kernel density estimation smooths observed data points using a weighting function in this case, the Epanechnikov kernel with a specified bandwidth of 0.0500, which determines the degree of smoothness in the distribution (Silverman, 1986; Epanechnikov, 1969). The chosen bandwidth appears to provide moderate smoothing, as the curve is continuous and stable without excessive jaggedness, suggesting that random noise has been minimized while preserving the essential structure of the data.

The distribution of the fitted values appears bimodal, with two distinct peaks around the mid-range of the predicted values. Bimodality in a kernel density plot statistically indicates the presence of subpopulations or structural heterogeneity within the data (Wand & Jones, 1995). In this context, the two peaks suggest that the model predicts financial performance at two dominant levels, implying differences in predicted outcomes across bank-year observations. This pattern reflects variability in how the explanatory variables jointly influence the dependent variable.

Furthermore, the density curve exhibits slight positive skewness, as evidenced by a longer right tail extending toward higher fitted values. Positive skewness implies that while most predicted values cluster around moderate levels, a smaller number of observations display relatively higher predicted performance (DeCarlo, 1997). The absence of extreme spikes or irregular fluctuations suggests that the fitted values are not heavily influenced by outliers, indicating stability in model predictions.

Overall, the kernel density plot reveals a moderately dispersed, bimodal, and mildly right-skewed distribution, suggesting heterogeneity in predicted financial performance while maintaining statistical smoothness and consistency in the estimated density.

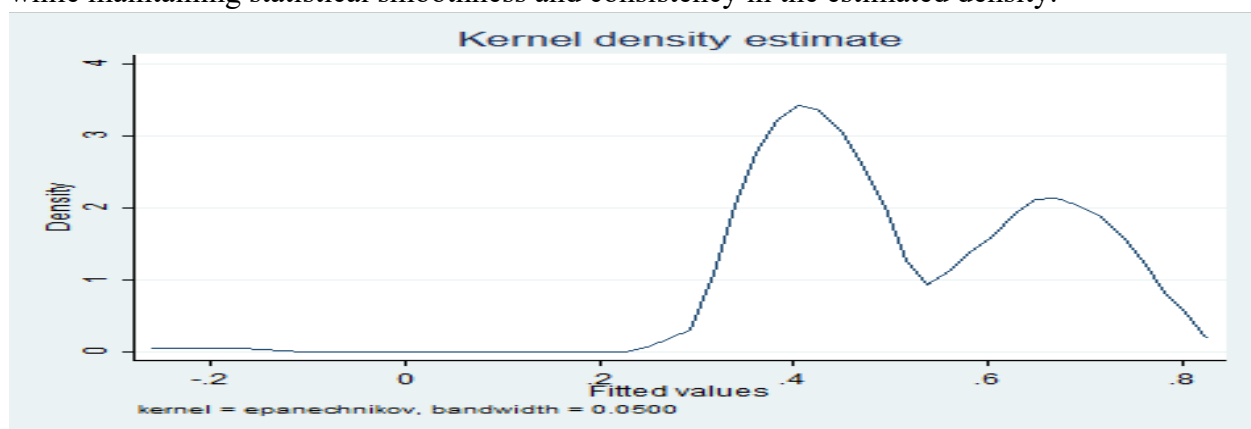


Figure 1: Residual Distribution

Source: Author's Compilation, 2026

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Correlation Matrix

Table 4 presents correlation matrix of the study where the degree of association between the dependent variable and independent variables is determined as well as the association among the repressors themselves.

Table 4

Correlation Matrix

Variable	ROA	NPLR	LLPR	NPCR	FISI	LEVE
ROA	1.000					
NPLR	-0.260	1.000				
LLPR	-0.294	0.806	1.000			
NPCR	0.244	0.230	0.256	1.000		
FISI	0.258	-0.242	-0.342	0.070	1.000	
LEVE	0.082	-0.530	-0.444	-0.203	0.236	1.000

Source: Extracted from STATA 17 Output, 2026

The correlation results for financial performance indicate a combination of weak, moderate, and strong relationships, interpreted using established statistical thresholds where r values below ± 0.10 indicate very weak relationships, ± 0.10 to ± 0.29 indicate weak relationships, ± 0.30 to ± 0.49 indicate moderate relationships, and ± 0.50 and above indicate strong relationships (Cohen, 1988; Evans, 1996).

The correlation results indicate the degree and direction of association between Return on Assets (ROA) and the explanatory variables across 130 observations. ROA exhibits a negative correlation with NPLR ($r = -0.260$) and LLPR ($r = -0.294$), suggesting that increases in non-performing loans and loan loss provisions are associated with declines in bank profitability. These relationships are moderate in magnitude and consistent with financial intermediation theory, which posits that poor asset quality reduces earnings through higher credit risk exposure and provisioning costs.

ROA shows a positive correlation with NPCR ($r = 0.244$) and FISI ($r = 0.258$). The positive relationship with NPCR suggests that certain credit risk dynamics may be associated with improved returns, possibly reflecting risk–return trade-offs in lending activities. However, this correlation matrix will not serve as a basis for generalization on the actual relationship between non-performing loans and financial performance as correlation matrix only gives a mere degree of association between the dependent variable and the independent variables themselves. Thus, regression shows causation.

It can be observed that the relationship between the independent variables themselves is not significant, an indication of absence of multicollinearity. This can be clearly observed from the two indicators (i.e. tolerance value and variance inflation factor VIF) which are within less than 1 and less than 10 respectively.

Model Specification Test (Ramsey RESET)

Table 5

Ramsey RESET Test

Test	F-value	df (numerator, denominator)	p-value
RESET	2.060	3, 121	0.110

Source: Extracted from STATA 17 Output, 2026

To assess the adequacy of the model specification, the Ramsey Regression Equation Specification Error Test (RESET) was conducted using powers of the fitted values of financial performance (ROA). The null hypothesis of the test states that the model has no omitted variables and is correctly specified (Ramsey, 1969).

The test produced an F-statistic of 2.06 with a corresponding probability value of 0.110. Since the p-value is greater than the 5% significance level, the null hypothesis cannot be rejected. This result implies that there is no statistical evidence of omitted variable bias or functional form misspecification in the model. Therefore, the model is considered to be correctly specified, and subsequent inferences drawn from it are likely to be reliable.

Multicollinearity Test

This section presents and discusses the diagnostic test conducted so as to determine by comparison to the gold standard (that is the best alternative) for reliability and validity of the inferential statistics from the regression model. The test consists of Multicollinearity test (that is tolerance value and variance inflation factor VIF).

Table 6

Multicollinearity Test

Variable	VIF	1/VIF
NPLR	3.230	0.310
LLPR	3.140	0.318
LEVE	1.430	0.697
FISI	1.200	0.836
NPCR	1.120	0.893
Mean VIF	2.020	

Source: Extracted from STATA 17 Output, 2026

The Variance Inflation Factor (VIF) is used to detect multicollinearity among predictor variables in a regression model (Hair et al., 2019; O'Brien, 2007). High multicollinearity inflates standard errors and may distort the significance of coefficients, making inference unreliable. From the results, NPLR has a VIF of 3.230 and $1/VIF = 0.310$, and LLPR has a VIF of 3.140 with $1/VIF = 0.318$. These values are below the commonly cited threshold of 10 (or the stricter threshold of 5), indicating no severe multicollinearity (Hair et al., 2019).

LEVE (VIF = 1.430), FISI (VIF = 1.200), and NPCR (VIF = 1.120) also fall well below critical levels, suggesting that these variables are not linearly dependent on other predictors. The mean VIF = 2.020, which further confirms that the model does not suffer from problematic multicollinearity. Statistically, this indicates that the independent variables (credit risk proxies, firm size, and leverage) provide unique explanatory

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information in predicting ROA, and regression coefficients are likely stable and reliable for inference (O'Brien, 2007).

Heteroskedasticity

Table 7

Heteroskedasticity

Test	χ^2	df	p-value
Breusch-Pagan / Cook-Weisberg	5.01	1	0.025

Source: Extracted from STATA 17 Output, 2026

The Breusch–Pagan/Cook–Weisberg test for heteroskedasticity produced a chi-square statistic of 5.010 with a p-value of 0.025, leading to rejection of the null hypothesis of constant error variance. This result indicates the presence of heteroskedasticity in the regression residuals, implying that the variance of the error terms is not constant across observations. Although heteroskedasticity does not bias coefficient estimates, it renders conventional standard errors inconsistent and statistical tests unreliable (Breusch & Pagan, 1979; Greene, 2018).

Consequently, standard errors estimation is required to obtain valid inference. In the context of this panel study, panel corrected standard errors at the firm level were adopted to correct for heteroskedasticity and potential within-panel serial correlation, thereby ensuring consistent and reliable statistical inference (Arellano, 1987).

Serial Correlation

Table 8

Serial Correlation

Test	F-value	df (num, denom)	p-value
Wooldridge	13.028	1, 12	0.004

Source: Extracted from STATA 17 Output, 2026

The Wooldridge test for autocorrelation in panel data yielded an F-statistic of 13.028 with a p-value of 0.004, leading to rejection of the null hypothesis of no first-order autocorrelation. This result indicates the presence of serial correlation in the regression residuals across time within panel units. Serial correlation violates the classical assumption of independently distributed error terms and, if uncorrected, leads to underestimated standard errors and overstated statistical significance of regression coefficients (Wooldridge, 2010).

Consequently, appropriate corrective measures are required to ensure valid inference. In this study, panel corrected standard errors at the panel-unit level were employed to adjust for within-panel serial correlation alongside heteroskedasticity, thereby producing consistent and reliable statistical estimates (Arellano, 1987).

Regression Results

Table 9

Summary of Regression Result Panel Corrected Standard Errors

Predictor	Coefficient (β)	p-value
NPLR	−0.003	0.171
LLPR	−0.039	0.010
NPCR	0.574	0.000
FISI	0.014	0.040
LEVE	0.087	0.063
R ² =		0.215
Wald $\chi^2(8)$		69.69
Prob.		0.000

Source: Extracted from STATA 17 Output, 2026

Analyses of the Model

The panel-corrected standard errors (PCSE) regression was conducted to examine the impact of NPLR, LLPR, and NPCR on financial performance of listed deposit money banks in Nigeria. PCSE is appropriate for panel data with potential contemporaneous correlation and heteroskedasticity across groups (Beck & Katz, 1995; Wooldridge, 2010).

The regression results show an overall model Wald chi-square = 69.69 with $p < .000$, indicating that the set of predictors jointly explains a significant portion of variation in ROA. The $R^2 = 0.215$, implying that approximately 22% of the variation in bank profitability is explained by the independent variables, which is reasonable in financial panel data given inherent market variability.

Non-Performing Loans Ratio and Financial Performance

The coefficient for NPLR is negative and not statistically significant (Coef. = −0.003, $p = 0.171$), suggesting that higher non-performing loan ratios are associated with slightly lower financial performance, but the effect is weak and inconclusive. Theoretically, higher NPLs reduce profitability because they indicate poor asset quality and higher credit risk. However, in practice, banks may manage NPLs effectively through provisioning or recovery strategies, weakening the direct effect.

Bank management should continue to monitor and manage NPLs through efficient recovery strategies and early identification of default risk, as NPLs alone may not immediately reduce profitability but could threaten long-term financial stability. The researcher expected a negative relationship, consistent with Credit Risk Theory, which predicts that high NPLs increase potential losses and reduce ROA. Supporting studies: Al Khouri (2023), Girish & Sivakumar (2023), Sulaiman & Adewale (2024). Contrasting studies: Mensah & Sarpong (2024) report weak or insignificant effects when other risk measures are included.

Loan Loss Provision Ratio and Financial Performance

The coefficient for LLPR is negative and statistically significant (Coef. = −0.039, $p = 0.010$), indicating that higher loan loss provisions reduce bank profitability. While provisioning protects banks against future losses, it directly reduces net income, lowering

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ROA. Bank management must carefully balance provisioning to ensure regulatory compliance while minimizing adverse effects on short-term profitability.

Strategic risk management and accurate forecasting of expected losses are critical. A priori expectation: Negative relationship expected, consistent with Credit Risk Theory. Supporting studies: Iqbal & Taufiq (2024), Al Khouri (2023), Bamidele & Adeyemi (2024). Contrasting studies: Girish & Sivakumar (2023) suggest well-capitalized banks may absorb provisions without large profitability impacts.

NPL Coverage Ratio and Financial Performance

The coefficient for NPCR is positive and statistically significant (Coef. = 0.574, $p < 0.000$), suggesting that higher coverage ratios are associated with higher ROA. Meaning: Banks that adequately cover NPLs are more resilient and financially stable, mitigating potential losses. Bank management should maintain high coverage ratios as a strategy to safeguard profitability, enhancing resilience against defaults and reinforcing investor confidence.

A priori expectation: Positive relationship expected. Supporting studies: Bamidele & Adeyemi (2024), Sulaiman & Adewale (2024), Girish & Sivakumar (2023). Contrasting studies: Al Khouri (2023) reports smaller effects in banks with already low NPLs.

5. Conclusion and Recommendations

This paper examined the effect of credit risk indicators and financial structure variables on the dependent variable. The results show that the overall model is statistically significant, though it explains a moderate proportion of the variation in the outcome variable. Loan Loss Provision Ratio (LLPR) has a significant negative effect, indicating that higher provisioning for potential loan losses reduces performance.

In contrast, Net Profit to Capital Ratio (NPCR) and Financial Sector Size Index (FISI) exert significant positive effects, suggesting that improved profitability and financial sector development enhance performance. Non-Performing Loan Ratio (NPLR) and Leverage (LEVE) were not statistically significant at the 5% level, although leverage showed a marginal positive influence.

Based on these findings, financial institutions should strengthen credit risk management practices to reduce excessive loan loss provisions and improve asset quality. Management should also implement strategies aimed at enhancing profitability relative to capital, as this has the strongest positive impact on performance.

Additionally, policymakers should continue to promote financial sector development to create a supportive environment for institutional growth. Finally, banks should maintain prudent leverage levels to balance return optimization with financial stability.

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**BADAKI, T. JANET¹, PROFESSOR GUGONG, BENJAMIN KUMAI²,
AYUBA, A. (PHD)³, ISUWA DAUDA (PHD)⁴**

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