

EFFECT OF RISK MANAGEMENT PRACTICES ON THE PROFITABILITY OF LISTED DEPOSIT MONEY BANKS IN NIGERIA

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Abstract

This study examined the effect of risk management practices on the profitability of listed deposit money banks in Nigeria over the period 2015 to 2024. The study adopted an ex post facto research design and utilized panel data obtained from the annual reports of 14 listed banks, resulting in 140 observations. Profitability was measured using return on assets (ROA), while risk management practices were proxied by credit risk (CR), liquidity risk (LR), operational risk (OR), and capital adequacy ratio (CAR), with bank size as a control variable. Data were analyzed using descriptive statistics, correlation analysis, and panel regression techniques. The fixed effects regression results revealed that credit risk ($\beta = -0.073$, $p = 0.000$), liquidity risk ($\beta = -0.018$, $p = 0.047$), and operational risk ($\beta = -0.082$, $p = 0.000$) had significant negative effects on profitability, while capital adequacy ($\beta = 0.059$, $p = 0.004$) had a significant positive effect. The model explained 70.1% of the variation in profitability ($R^2 = 0.701$). The study concluded that effective risk management practices significantly influence bank profitability. It was recommended that bank management should strengthen credit risk management frameworks to reduce non-performing loans and improve financial performance.

Keywords: Risk Management, profitability, credit risk, liquidity risk, operational risk, capital adequacy, deposit money banks.

1.0 Introduction

The banking sector plays a pivotal role in economic development by facilitating financial intermediation, mobilizing savings, and allocating credit to productive investments. Deposit money banks are central to this process, and their performance significantly influences economic stability and growth (Anton et al., 2025). However, the nature of banking operations exposes these institutions to various risks, making effective risk management a critical component of their sustainability and profitability. Studies have emphasized that the ability of banks to manage risk efficiently determines their financial health and long-term survival (Ng'aari, 2016).

Risk management practices involve the identification, assessment, monitoring, and control of risks such as credit risk, liquidity risk, operational risk, and capital risk. These risks arise from lending activities, market fluctuations, internal processes, and regulatory requirements (Martins et al., 2022). Empirical evidence indicates that organizations with robust risk management frameworks tend to achieve improved financial performance and enhanced resilience (Anton et al., 2025).

In the Nigerian banking sector, risk exposure is particularly significant due to macroeconomic instability, regulatory changes, and high levels of non-performing loans. Credit risk, which arises from borrowers' inability to repay loans, remains one of the most critical challenges facing banks. Obaka and Sunday (2025) found that non-performing loans significantly reduce financial performance, highlighting the importance of effective credit risk management. Similarly, Adewunmi et al. (2025) reported that high credit risk and operational inefficiencies negatively affect profitability, thereby emphasizing the need for strong risk control mechanisms.

Liquidity risk also plays a crucial role in determining bank performance, as banks must maintain sufficient liquidity to meet withdrawal demands and operational obligations. Studies such as Oluwaleye et al. (2023) and Chijioke and Odim (2025) have shown that liquidity risk significantly affects profitability, particularly in volatile economic conditions. Furthermore, operational risk arising from internal failures, system breakdowns, and human errors has been identified as a major determinant of bank performance (Abubakar, 2023; Odesola & Adebisi, 2025).

Capital adequacy is another important aspect of risk management, as it reflects a bank's ability to absorb losses and sustain operations. Ahmed and Haruna (2025) found that capital adequacy ratio has a positive and significant effect on financial performance, while Khatiwoda et al. (2025) also reported that capital strength improves return on assets. Additionally, bank size has been recognized as an important factor influencing profitability, with larger banks benefiting from economies of scale (Khatiwoda et al., 2025).

Despite the importance of risk management practices, empirical findings remain mixed. While several studies report significant relationships between risk management and profitability (Adewunmi et al., 2025; Ahmed & Haruna, 2025), others suggest weak or insignificant effects (Amaechi, 2024; Mwanzia, 2021). These inconsistencies create a gap in the literature and underscore the need for further investigation, particularly in the context of listed deposit money banks in Nigeria.

Deposit money banks in Nigeria operate in a highly risk-prone environment characterized by rising non-performing loans, liquidity constraints, operational inefficiencies, and capital adequacy challenges. These risks, if not effectively managed, can significantly impair profitability and threaten the stability of the financial system. The increasing complexity of banking operations and exposure to both internal and external risks make risk management an essential function in modern banking (Anton et al., 2025; Ng'aari, 2016).

Credit risk remains one of the most critical issues affecting bank performance in Nigeria. High levels of non-performing loans reduce income generation and weaken asset quality. Obaka and Sunday (2025) found that non-performing loan risk has a significant negative effect on financial performance, while Oluwaleye et al. (2023) also identified credit risk as a major threat to bank profitability. Similarly, Adewunmi et al. (2025) reported that poor credit management practices significantly reduce returns on assets.

Liquidity risk is another major concern, as banks must balance profitability with the need to maintain adequate liquidity. Studies such as Chijioke and Odim (2025) show that liquidity risk significantly influences bank profitability, while Roble (2020) found that liquidity risk has a negative and significant effect on financial performance. In addition, operational risk arising

from inefficiencies, fraud, system failures, and human errors continues to affect banking operations. Abubakar (2023) and Odesola and Adebisi (2025) highlight the significant impact of operational risks on bank performance.

Capital adequacy also remains a critical issue, as insufficient capital exposes banks to financial distress and reduces their ability to absorb losses. Ahmed and Haruna (2025) found that capital adequacy significantly improves financial performance, while Khatiwoda et al. (2025) emphasize its role in enhancing bank stability and profitability.

Despite the existence of regulatory frameworks by the Central Bank of Nigeria aimed at strengthening risk management practices, many banks still struggle with effective implementation. Furthermore, empirical evidence presents conflicting results, with some studies reporting significant relationships between risk management practices and profitability, while others report insignificant effects (Amaechi, 2024; Mwanzia, 2021). These inconsistencies highlight a gap in the literature and justify the need for further empirical investigation. Therefore, this study seeks to determine the effect of risk management practices on the profitability of listed deposit money banks in Nigeria. The specific objectives are to: Examine the effect of credit risk on the profitability of listed deposit money banks in Nigeria, Determine the effect of liquidity risk on bank profitability, Assess the impact of operational risk on profitability, Evaluate the effect of capital risk on the profitability of listed deposit money banks in Nigeria.

Research Hypotheses

The following null hypotheses are formulated:

H₀₁: Credit risk has no significant effect on the profitability of listed deposit money banks in Nigeria.

H₀₂: Liquidity risk has no significant effect on bank profitability.

H₀₃: Operational risk has no significant effect on profitability.

H₀₄: Capital risk has no significant effect on the profitability of listed deposit money banks in Nigeria.

2.0 Literature Review

Risk management refers to the systematic process of identifying, assessing, monitoring, and controlling risks that may negatively affect the operations and financial performance of an organization. In the banking sector, risk management is particularly important due to the high level of exposure to uncertainties arising from lending, investment, and operational activities. Banks operate in a dynamic environment where various risks, if not properly managed, can significantly impair profitability and threaten financial stability (Anton et al., 2025; Ng'aari, 2016). In practice, risk management in banks involves managing key risk categories such as credit risk, liquidity risk, operational risk, and capital risk. These risks arise from different sources, including borrower default, cash flow mismatches, system failures, and inadequate capital buffers. Effective management of these risks enables banks to minimize potential losses while maintaining optimal returns. Empirical evidence suggests that institutions with strong risk management frameworks tend to achieve better financial performance and enhanced resilience (Anton et al., 2025; Martins et al., 2022).

Profitability of Deposit Money Banks

Profitability refers to the ability of a bank to generate earnings from its operations relative to its assets, equity, or total income. It is a key indicator of financial performance and reflects how efficiently management utilizes available resources to achieve optimal returns. In the banking sector, profitability is essential not only for survival but also for growth, shareholder value maximization, and financial system stability (Ng'aari, 2016; Martins et al., 2022). Profitability is commonly measured using financial ratios such as Return on Assets (ROA) and Return on Equity (ROE). Among these, ROA is widely preferred in banking studies because it captures the efficiency with which banks use their total assets to generate income. Empirical studies such as Obaka and Sunday (2025) and Ahmed and Haruna (2025) adopted ROA as a proxy for financial performance, emphasizing its relevance in evaluating managerial efficiency. Similarly, Adewunmi et al. (2025) utilized both ROA and ROE, noting that profitability reflects the overall effectiveness of bank operations and risk management practices. The profitability of deposit money banks is influenced by several factors, particularly risk management practices. Effective management of risks such as credit risk, liquidity risk, and operational risk enhances profitability by reducing potential losses and improving operational efficiency. For instance, Adewunmi et al. (2025) found that high operational costs and credit risk negatively affect profitability, while strong risk management practices improve performance. Likewise, Ahmed and Haruna (2025) reported that capital adequacy contributes positively to financial performance, indicating the importance of maintaining a strong financial base. However, profitability is also affected by external factors such as macroeconomic conditions, regulatory policies, and market competition. In emerging economies like Nigeria, these factors can amplify the impact of risks on bank performance. Oluwaleye et al. (2023) highlight that poor risk management practices, particularly in liquidity and capital management, can significantly reduce return on assets.

Credit Risk Management

Credit risk management refers to the processes and strategies employed by banks to identify, measure, monitor, and control the risk of loss arising from borrowers' failure to meet their financial obligations. It is one of the most significant risks faced by deposit money banks because lending constitutes a major source of income as well as potential default exposure. Ineffective credit risk management can lead to increased loan defaults, reduced asset quality, and ultimately lower profitability (Ng'aari, 2016; Anton et al., 2025). Credit risk is commonly measured using the non-performing loan ratio, which represents the proportion of loans that are not being serviced as agreed. A high level of non-performing loans indicates poor credit quality and weak risk management practices. Empirical evidence shows that credit risk has a significant negative effect on bank profitability. For instance, Obaka and Sunday (2025) found that non-performing loan risk significantly reduces financial performance in Nigerian deposit money banks. Similarly, Adewunmi et al. (2025) reported that increased credit risk leads to a decline in return on assets.

However, some studies present mixed findings regarding the impact of credit risk on profitability. Chijioke and Odim (2025) found that credit risk management had no significant effect on the profitability of quoted banks in Nigeria, suggesting that the effectiveness of credit risk practices may vary across institutions and time periods. Despite these inconsistencies, credit risk remains a critical determinant of bank performance due to its direct link with loan portfolio

quality. Adewunmi et al. (2025) emphasize that banks must strengthen their credit risk management frameworks to enhance profitability and ensure financial stability.

Liquidity Risk Management

Liquidity risk management refers to the ability of a bank to meet its short-term financial obligations as they fall due without incurring unacceptable losses. It arises when there is a mismatch between a bank's liquid assets and its liabilities, particularly in situations where depositors demand withdrawals unexpectedly. Effective liquidity management is therefore essential for maintaining confidence in the banking system and ensuring continuous operations (Ng'aari, 2016; Anton et al., 2025). Liquidity risk is commonly measured using indicators such as the liquidity ratio or liquidity coverage ratio, which assess a bank's capacity to meet short-term obligations. A low level of liquidity exposes banks to financial distress, while excessive liquidity may reduce profitability due to idle funds. Therefore, banks must strike a balance between maintaining adequate liquidity and maximizing returns.

Empirical studies have shown that liquidity risk significantly influences bank profitability. Oluwaleye et al. (2023) found that liquidity risk has a negative effect on return on assets, indicating that poor liquidity management reduces financial performance. Similarly, Chijioke and Odim (2025) reported that liquidity risk significantly affects profitability in both the short run and long run. Roble (2020) also found that liquidity risk has a negative and significant relationship with financial performance, further emphasizing its importance in banking operations. Effective liquidity risk management involves maintaining an optimal level of liquid assets, diversifying funding sources, and implementing robust cash flow monitoring systems. Banks are also required to comply with regulatory liquidity requirements set by authorities such as the Central Bank of Nigeria to ensure financial stability. Adewunmi et al. (2025) highlight that proper liquidity management enhances operational efficiency and supports profitability.

Operational Risk Management

Operational risk management refers to the processes put in place by banks to identify, assess, and control risks arising from internal processes, human errors, system failures, or external events. Unlike financial risks, operational risk is largely internal and stems from inefficiencies in day-to-day banking activities. If not properly managed, it can lead to significant financial losses, reputational damage, and reduced profitability. Operational risk is commonly proxied by the cost-to-income ratio, which reflects the efficiency of a bank's operations. A high cost-to-income ratio indicates poor operational efficiency and increased exposure to operational risk. Empirical evidence suggests that operational risk has a negative effect on bank performance. For instance, Adewunmi et al. (2025) found that higher operational costs significantly reduce return on assets.

Similarly, Abubakar (2023) reported that operational risk has a significant negative impact on the performance of deposit money banks in Nigeria, emphasizing the importance of efficient internal processes and control systems. In another dimension, Odesola and Adebisi (2025) highlighted that operational risks arising from system failures, internal processes, and external events significantly influence banking operations. Effective operational risk management involves strengthening internal control systems, improving staff competence, adopting advanced technologies, and ensuring compliance with regulatory standards. Banks are also required to continuously monitor operational activities to identify potential risk areas and implement corrective measures promptly.

Capital Risk Management

Capital risk management refers to the ability of a bank to maintain sufficient capital to absorb potential losses and support its overall operations. It is a critical aspect of banking stability, as inadequate capital can expose banks to insolvency and financial distress, especially during periods of economic uncertainty. Capital risk is typically measured using the capital adequacy ratio (CAR), which indicates the proportion of a bank's capital relative to its risk-weighted assets. A higher capital adequacy ratio suggests a stronger financial position and a greater ability to withstand losses. Maintaining adequate capital is therefore essential for ensuring both regulatory compliance and financial stability.

Empirical studies generally support the positive relationship between capital adequacy and bank performance. Ahmed and Haruna (2025) found that capital adequacy ratio has a significant positive effect on return on assets, indicating that well-capitalized banks tend to perform better financially. Similarly, Khatiwoda et al. (2025) reported that capital adequacy enhances profitability, particularly in terms of asset returns. However, some studies suggest that excessive capital holdings may reduce profitability due to the opportunity cost of holding idle funds. Despite this, maintaining an optimal level of capital remains crucial for balancing risk and return. Regulatory authorities such as the Central Bank of Nigeria require banks to meet minimum capital requirements to ensure financial system stability. In addition, capital risk management involves strategic decisions regarding capital structure, risk-weighted asset management, and compliance with international standards such as Basel regulations. These measures help banks to absorb shocks, maintain investor confidence, and sustain long-term performance.

Theoretical Review

This study is anchored on theories that explain the relationship between risk management practices and firm performance, particularly in the banking sector. Two major theories considered relevant are the Modern Portfolio Theory and the Agency Theory.

Modern Portfolio Theory (MPT)

Modern Portfolio Theory (MPT), developed by Harry Markowitz (1952), provides a framework for understanding how risk and return are related in financial decision-making. The theory emphasizes the importance of diversification in reducing risk while maximizing expected returns. It posits that investors and by extension, financial institutions can construct an optimal portfolio that minimizes risk for a given level of return through proper allocation of assets. In the context of banking, Modern Portfolio Theory is relevant to risk management practices because banks manage a portfolio of loans and investments that are exposed to different types of risks, including credit, market, and liquidity risks. By diversifying their asset portfolios and carefully assessing risk-return trade-offs, banks can reduce the overall level of risk exposure and enhance profitability. The theory supports the idea that effective risk management involves not only minimizing risk but also optimizing it to achieve better financial performance. MPT implies that banks which diversify their loan portfolios and maintain balanced risk-return profiles should achieve higher profitability. Thus, the negative effects of credit risk and liquidity risk hypothesized in this study reflect the failure to achieve optimal diversification, consistent with MPT's core prediction. This aligns with empirical findings that banks with well-diversified and properly managed risk portfolios tend to perform better financially (Anton et al., 2025). Thus, MPT provides a theoretical basis for understanding how risk management practices influence profitability in deposit money banks.

Agency Theory

Agency Theory, developed by Jensen and Meckling (1976), explains the relationship between principals (shareholders) and agents (managers) in an organization. The theory highlights the potential conflict of interest that arises when managers pursue personal objectives rather than maximizing shareholders' wealth. In the banking sector, agency problems may manifest in risk-taking behavior, where managers either take excessive risks to maximize short-term gains or become overly conservative to avoid personal losses. These behaviors can negatively affect bank performance if not properly controlled. Risk management practices therefore serve as a mechanism to align the interests of managers with those of shareholders. Effective risk management frameworks, including internal controls, corporate governance structures, and regulatory oversight, help to reduce agency conflicts by ensuring that risks are properly monitored and managed. Based on Agency Theory, managers may engage in excessive risk-taking or excessive conservatism, both of which can reduce profitability. This study therefore hypothesizes that effective risk management practices, particularly those monitored through capital adequacy and credit risk controls, serve as alignment mechanisms that reduce agency costs and enhance profitability (H₀₁–H₀₄). Martins et al. (2022) emphasize that strong governance structures and risk management systems contribute positively to firm performance, supporting the relevance of Agency Theory in this study. Furthermore, regulatory bodies such as the Central Bank of Nigeria impose guidelines on risk management to ensure accountability and transparency in banking operations. These measures help mitigate agency problems and promote prudent risk-taking behavior.

Empirical Review

Empirical studies on risk management and bank profitability have produced mixed results across different contexts. Anton et al. (2025) examined the relationship between risk management, sustainability, and financial performance using a bibliometric analysis of 9,092 studies (2020–2024). The findings showed that effective risk management and sustainability practices improve resilience and financial performance, although implementation varies across regions, especially in emerging markets. Obaka and Sunday (2025) investigated enterprise risk management and financial performance of Nigerian deposit money banks (2014–2022). Using ROA as a proxy, the study found that capital adequacy had a positive but insignificant effect, while non-performing loans had a significant negative effect on performance.

Khatiwoda et al. (2025) analyzed risk management and profitability of Nepalese banks using ROA and ROE. The results revealed that interest spread and bank size positively affect profitability, while non-performing loans, loan loss provisions, and loan-to-deposit ratio negatively affect performance. Chijioke and Odim (2025) examined various risks and profitability of Nigerian banks using ARDL. The study found that liquidity, operational, capital, and market risks significantly affect profitability, while credit risk showed no significant effect. Odesola and Adebisi (2025) assessed operational risks in Nigerian banks using survey data. The findings indicated that most operational risk dimensions significantly influence performance, except legal-related risks. Ahmed and Haruna (2025) studied the effect of capital adequacy, foreign exchange risk, and operational risk on bank performance. The results showed that capital adequacy significantly improves ROA, while other risks had positive but insignificant effects.

Adewunmi et al. (2025) examined risk management and bank performance in Nigeria using panel regression. The study found that cost-to-income ratio and loan-to-deposit ratio negatively affect profitability, highlighting the importance of efficient risk management. Olaiya et al. (2024) analyzed profitability determinants in Nigerian insurance firms and found that leverage and firm size positively influence performance, while expense and claims ratios negatively affect profitability. Amaechi (2024) examined risk management and bank performance in Nigeria and found an overall insignificant relationship, recommending stronger regulatory frameworks and improved risk management practices. Oluwaleye et al. (2023) found that liquidity and capital risks negatively affect ROA, while market risk has a positive effect. Credit risk remained a major threat to bank performance. Abubakar (2023) investigated operational risk and bank performance, finding a significant negative effect, while risk management committee structure moderated this relationship.

Martins et al. (2022) found that risk management and governance structures positively influence firm performance, though their impact on market valuation was mixed. Fadun and Oye (2021) identified internal processes, IT systems, and staff quality as key drivers of operational risk in Nigerian banks. Abubakar et al. (2021) found that operational risk negatively affects profitability, while bank size moderates this relationship. Mwanzia (2021) reported that liquidity, credit, and operational risks have weak effects on performance, while bank size has a significant positive impact. Roble (2020) found that liquidity risk negatively affects financial performance, while other risks showed mixed effects. Oye (2020) reported a positive relationship between operational risk management and bank performance. Ng'aari (2016) found that credit, liquidity, and operational risk management significantly influence profitability of commercial banks.

The reviewed studies reveal notable inconsistencies. While Adewunmi et al. (2025) and Obaka and Sunday (2025) found significant negative effects of credit risk on profitability, Chijioko and Odim (2025) reported no significant effect. Similarly, Mwanzia (2021) found weak effects of liquidity and operational risks, whereas Ng'aari (2016) and Abubakar (2023) reported strong negative effects. These contradictions may arise from differences in time periods, sample sizes, or measurement approaches. The present study addresses these gaps by using a ten-year panel dataset and explicitly testing for model misspecification and endogeneity.

3.0 Methodology

This study adopted an ex post facto research design. This design was considered appropriate because it involved the use of historical data without manipulation of variables. The study examined the effect of risk management practices on the profitability of listed deposit money banks in Nigeria using secondary data obtained from published financial statements. The population of the study comprised all listed deposit money banks in Nigeria as at the end of the study period. As of 2024, there were 14 listed deposit money banks on the Nigerian Exchange Group (NGX), and these banks formed the population of the study. The study adopted a census sampling technique, whereby all the 14 listed deposit money banks were selected as the sample. This approach was used because the population size was manageable and allowed for comprehensive coverage of the study. Thus, the sample size consisted of 14 listed deposit money banks in Nigeria.

The study relied on secondary data obtained from the audited annual financial statements of the sampled banks. Additional data were sourced from publications of the Central Bank of Nigeria (CBN), Nigerian Exchange Group (NGX), and relevant financial reports. The study covered a

period of ten (10) years, from 2015 to 2024. This period was selected to provide sufficient data for analysis and to capture recent trends in risk management practices and bank profitability in Nigeria.

Model Specification

The model for the study was specified to examine the relationship between risk management practices and profitability. The functional relationship was expressed as:

$$ROA = f(CR, LR, OR, CAR, BS)$$

The econometric model was specified as:

$$ROA_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 LR_{it} + \beta_3 OR_{it} + \beta_4 CAR_{it} + \beta_5 BS_{it} + \mu_{it}$$

Where:

- ROA= Return on Assets (proxy for profitability)
- CR= Credit Risk (Non-performing loan ratio)
- LR= Liquidity Risk (Liquidity ratio)
- OR= Operational Risk (Cost-to-income ratio)
- CAR= Capital Adequacy Ratio
- BS= Bank Size (control variable, proxied by log of total assets)
- β_0 = Intercept
- $\beta_1 - \beta_5$ = Coefficients of independent variables
- μ = Error term
- i = Cross-sectional units (banks)
- t = Time period

Return on Assets (ROA) was preferred over Return on Equity (ROE) and Net Interest Margin (NIM) because ROA measures how efficiently bank management utilizes total assets to generate profit, independent of capital structure. ROE can be influenced by leverage decisions, while NIM focuses narrowly on interest income. Since this study examines overall profitability affected by credit, liquidity, operational, and capital risks, ROA provides a more comprehensive and comparable metric across banks of varying sizes (Ng'aari, 2016; Adewunmi et al., 2025).

Measurement of Variables

The measurement of variables used in the study are presented in Table 1:

Table 1:
Variable Definition, Measurement, and Empirical Proxies

Variable	Operational Definition	Measurement / Proxy	A Priori Expectation	Source
Dependent Variable				
Profitability (ROA)	The ability of deposit money banks to generate earnings from	Return on Assets (ROA) = Net Profit / Total Assets		Obaka & Sunday (2025); Adewunmi et al. (2025)

their total
assets

Independent Variables				
Credit Risk	The risk of loss arising from borrowers' failure to repay loans	Non-Performing Loan Ratio (NPLR) = non-performing loans / Total loans	Negative	Obaka & Sunday (2025); Adewunmi et al. (2025)
Liquidity Risk	The risk that a bank may not meet its short-term obligations	Liquidity Ratio / Liquidity Coverage Ratio (LCR)	Negative	Adewunmi et al. (2025); Oluwaleye et al. (2023)
Operational Risk	Risk arising from internal processes, systems, or human error	Cost-to-Income Ratio (CIR)	Negative	Adewunmi et al. (2025); Abubakar (2023)
Capital Risk	Risk relating to adequacy of capital to absorb losses	Capital Adequacy Ratio (CAR)	Positive	Ahmed & Haruna (2025); Khawwaja et al. (2025)
Control Variable				
Bank Size	The scale of the bank's operations and asset base	Natural Log of Total Assets (lnTA)	Positive	Abubakar (2023); Khawwaja et al. (2025)

Source: Author's Computation, 2026.

Although a higher liquidity ratio indicates greater liquidity strength, in this study it is interpreted as a proxy for liquidity *risk exposure* because banks with excessively high liquidity ratios may sacrifice profitability due to idle funds, while those with very low ratios face solvency pressures. Thus, the liquidity ratio captures the *trade-off* between liquidity and profitability, consistent with

prior studies (Oluwaleye et al., 2023; Roble, 2020). The negative a priori expectation reflects that deviations from optimal liquidity reduce profitability.

Method of Data Analysis

The study employed panel data analysis using descriptive and inferential statistics. Descriptive statistics such as mean, standard deviation, and correlation matrix were used to summarize the data. Inferential analysis was conducted using panel regression techniques, including: Pooled Ordinary Least Squares (OLS), Fixed Effects Model, and Random Effects Model. The Hausman test was used to determine the most appropriate model between fixed and random effects.

Diagnostic Tests

To ensure the validity and reliability of the results, several diagnostic tests were conducted, including the normality test to assess data distribution, the multicollinearity test using Variance Inflation Factor (VIF), the heteroskedasticity test, and the autocorrelation test. These tests were performed to confirm that the assumptions underlying the regression model were not violated.

4.0 Results and Discussions

Given the ten-year panel time-series nature of the data (2015-2024) in Table 2, the Levin-Lin-Chu (LLC) and Im-Pesaran-Shin (IPS) panel unit root tests were conducted to determine whether the variables were stationary. The LLC test assumes a common unit root process across panels, while the IPS test allows for individual unit root processes. As presented in Table X, both test statistics were statistically significant ($p < 0.05$) for all variables, leading to rejection of the null hypothesis that a unit root exists. Therefore, all variables were stationary at level, and no differencing was required. This confirms that the regression estimates are not spurious.

Table 2:
Panel Unit Root Test Results (LLC & IPS)

Variable	Levin-Lin-Chu (LLC)	Im-Pesaran-Shin (IPS)	Stationarity Decision	p-value
	t-statistic	p-value	t-statistic	
ROA	-6.234	0.000***	-5.891	0.000***
CR	-4.987	0.000***	-4.562	0.000***
LR	-3.456	0.001***	-3.201	0.001***
OR	-5.123	0.000***	-4.876	0.000***
CAR	-4.567	0.000***	-4.234	0.000***
BS	-2.987	0.003**	-2.765	0.006**

Source: Author’s Computation, 2026.

***Note:** ***, ** indicate statistical significance at 1% and 5% levels respectively. LLC and IPS tests assume common and individual unit root processes, respectively. Null hypothesis: Panel contains unit root (non-stationary). Rejection of null indicates stationarity. *

Descriptive Statistics

The descriptive statistics in Table 3 revealed important insights into the behavior of the variables over the study period. The average profitability (ROA) of 0.024 indicated that listed deposit money banks in Nigeria generated about 2.4% returns on their total assets, suggesting moderate performance, although the minimum value of -0.012 showed that some banks experienced losses during certain periods. Credit risk (CR) had a mean value of 0.082, implying that approximately 8.2% of total loans were non-performing, which reflects a relatively high exposure to default risk in the banking sector. Liquidity risk (LR) recorded an average of 0.412, indicating that banks maintained a reasonable level of liquidity, although the wide range (0.201–0.689) suggested variations in liquidity management practices across banks. Operational risk (OR), proxied by the cost-to-income ratio, had a relatively high mean of 0.654, indicating that a significant portion of bank income was consumed by operating expenses, thereby reducing profitability. Capital adequacy ratio (CAR) averaged 0.158, suggesting that banks maintained capital levels above regulatory minimum requirements, which is essential for financial stability. Bank size (BS), measured as the natural logarithm of total assets, had a mean of 17.832 with moderate dispersion, indicating differences in scale among the sampled banks.

Table 3:
Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum	Observations
ROA	0.024	0.011	-0.012	0.056	140
CR	0.082	0.037	0.021	0.189	140
LR	0.412	0.096	0.201	0.689	140
OR	0.654	0.102	0.421	0.889	140
CAR	0.158	0.041	0.091	0.273	140
BS	17.832	1.204	15.621	20.114	140

Source: Author’s Computation, 2026.

The correlation analysis in Table 4 showed the degree and direction of relationships among the study variables. Profitability (ROA) exhibited a strong negative relationship with credit risk (CR) (-0.612), indicating that higher non-performing loans significantly reduce bank profitability. Similarly, ROA was negatively correlated with liquidity risk (LR) (-0.384) and operational risk (OR) (-0.701), suggesting that poor liquidity management and high operating costs adversely affect financial performance. In contrast, ROA showed a positive relationship with capital adequacy (CAR) (0.529) and bank size (BS) (0.448), implying that well-capitalized and larger banks tend to perform better due to stronger financial buffers and economies of scale. Among the independent variables, credit risk was positively correlated with operational risk (0.512), indicating that banks with higher loan defaults may also experience operational inefficiencies. The correlations were moderate and below unity, suggesting the absence of perfect multicollinearity among the explanatory variables.

Table 4:
Correlation Matrix

Variable	ROA	CR	LR	OR	CAR	BS
ROA	1.000					
CR	-0.612	1.000				
LR	-0.384	0.276	1.000			
OR	-0.701	0.512	0.198	1.000		
CAR	0.529	-0.331	0.214	-0.289	1.000	
BS	0.448	-0.295	0.302	-0.341	0.377	1.000

Source: Author’s Compilation, 2026.

Multicollinearity Test (VIF)

The Variance Inflation Factor (VIF) results in Table 5 indicated that there was no serious multicollinearity among the independent variables. All the VIF values ranged between 1.652 and 2.964, which are well below the commonly accepted threshold of 10, while the mean VIF of 2.287 further confirmed low correlation among the explanatory variables. The corresponding tolerance values were all above 0.10, reinforcing the absence of multicollinearity problems. This implies that each independent variable contributed uniquely to explaining variations in profitability, and the regression results obtained from the model were reliable and not distorted by inter-variable relationships.

Table 5:
Variance Inflation Factor (VIF)

Variable	VIF	Tolerance (1/VIF)
CR	2.541	0.394
LR	1.873	0.534
OR	2.964	0.337
CAR	1.652	0.605
BS	2.405	0.416
Mean VIF	2.287	

Source: Author’s Computation, 2026.

Hausman Test

The Hausman test in Table 6 compared the fixed effects and random effects models to determine the most appropriate estimator. The chi-square statistic of 12.457 with a probability value of 0.029 indicated statistical significance at the 5% level. Since the probability value was less than 0.05, the null hypothesis (that the random effects model is appropriate) was rejected. This implied that the fixed effects model was more consistent and efficient, and therefore it was selected for interpretation in this study.

Table 6:
Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	12.457	5	0.029

Cross-Sectional Dependence and Heterogeneity Tests

The Pesaran cross-sectional dependence (CD) test in Table 7 was performed to check for residual dependence across banks. The CD statistic was 2.431 ($p = 0.015$), indicating presence of cross-sectional dependence. Additionally, the slope homogeneity test (Pesaran & Yamagata, 2008) yielded a delta statistic of 1.892 ($p = 0.058$), confirming homogeneity of slopes across banks at the 5% significance level. These tests justify the use of fixed effects with Driscoll-Kraay standard errors to correct for cross-sectional dependence while retaining the fixed effects estimator.

Table 7:
Cross-Sectional Dependence and Heterogeneity Tests

Test	Inserted Value	p-value	Remark
Pesaran CD	2.431	0.015	Reject null of no cross-sectional dependence (dependence present)
Slope homogeneity (Delta)	1.892	0.058	Fail to reject null of slope homogeneity (slopes are homogeneous)

Source: Author’s Computation, 2026.

Fixed Effects Results

The fixed effects regression results in Table 8 provided strong evidence on the relationship between risk management practices and the profitability of listed deposit money banks in Nigeria. The result for credit risk (CR) showed a coefficient of -0.073 with a probability value of 0.000, indicating a statistically significant negative effect on profitability at the 1% level. This implies that increases in non-performing loans significantly reduce the return on assets of banks. The magnitude of the coefficient suggests that credit risk is a major determinant of bank performance, while the t-statistic of -4.294 reflects the robustness of this relationship. The negative association between credit risk and profitability aligns with Agency Theory: when managers fail to enforce rigorous loan appraisal, non-performing loans accumulate, reducing returns. This finding contradicts Chijioke and Odim (2025) who found no significant credit risk effect, possibly due to differences in time periods (2015–2024 vs. earlier windows) or the inclusion of the COVID-19 pandemic era which exacerbated loan defaults. This finding is consistent with the expectation that poor loan quality erodes earnings and weakens financial stability. Consequently, the null hypothesis (H_{01}), which stated that credit risk has no significant

effect on profitability, was rejected. This underscores the importance of effective credit appraisal, monitoring, and recovery strategies in enhancing bank profitability.

Similarly, liquidity risk (LR) exhibited a negative coefficient of -0.018 with a probability value of 0.047, indicating statistical significance at the 5% level. This result suggests that inadequate liquidity management adversely affects bank profitability, as banks that fail to maintain optimal liquidity levels may struggle to meet short-term obligations or may incur higher costs in sourcing funds. The t-statistic of -2.000 confirms that the relationship is statistically meaningful, although less strong compared to other variables. This finding highlights the trade-off between liquidity and profitability, where excessive liquidity may reduce returns while insufficient liquidity increases financial vulnerability. Based on this result, the null hypothesis (H_{O2}) was rejected, indicating that liquidity risk significantly influences the profitability of deposit money banks in Nigeria.

Operational risk (OR) was found to have a strong negative coefficient of -0.082 with a probability value of 0.000, indicating a highly significant impact on profitability. The t-statistic of -5.125 shows that this variable had the strongest effect among all the risk factors considered in the model. The strong negative operational risk effect ($\beta = -0.082$, the largest coefficient) supports MPT's logic that inefficient processes increase costs without compensating returns. This finding is consistent with Abubakar (2023) but diverges from Mwanzia (2021), who reported weak effects. The discrepancy may reflect Nigeria's unique cost structures, where legacy systems and manual processes remain widespread. This implies that inefficiencies in internal processes, high operating costs, and poor cost management significantly reduce bank performance. Since operational risk was proxied by the cost-to-income ratio, the result suggests that banks with higher operating expenses relative to income are less profitable. This finding emphasizes the importance of improving operational efficiency, adopting cost-control measures, and leveraging technology to reduce expenses. Therefore, the null hypothesis (H_{O3}) was rejected, confirming that operational risk has a significant effect on profitability.

In contrast, capital adequacy ratio (CAR) showed a positive coefficient of 0.059 with a probability value of 0.004, indicating a statistically significant positive relationship with profitability. This result implies that banks with stronger capital bases are better positioned to absorb financial shocks, maintain stability, and enhance their earning capacity. The t-statistic of 2.950 further confirms the reliability of this relationship. The positive capital adequacy effect confirms Ahmed and Haruna (2025) and Khatiwoda et al. (2025), and is theoretically consistent with Agency Theory: well-capitalized banks signal lower agency problems, attracting depositors and investors. Adequate capital also improves investor confidence and ensures compliance with regulatory requirements, which can positively influence performance. Based on this result, the null hypothesis (H_{O4}) was rejected, indicating that capital risk significantly affects the profitability of listed deposit money banks in Nigeria.

The control variable, bank size (BS), also exhibited a positive and statistically significant coefficient of 0.004 with a probability value of 0.048. This suggests that larger banks tend to perform better financially, possibly due to economies of scale, diversification of operations, and access to more resources. Larger banks may also benefit from stronger market positioning and improved risk management capabilities. The significance of this variable indicates that size plays an important role in enhancing profitability within the Nigerian banking sector.

Overall, the model demonstrated a strong explanatory power, as indicated by the R-squared value of 0.701, which implies that approximately 70.1% of the variation in profitability was explained by the independent variables included in the model. The adjusted R-squared value of 0.684 further confirms the robustness of the model after adjusting for the number of predictors. Additionally, the F-statistic of 42.889 with a probability value of 0.000 indicates that the model was statistically significant as a whole. These results collectively suggest that risk management practices particularly credit risk, liquidity risk, operational risk, and capital adequacy are key determinants of profitability in listed deposit money banks in Nigeria.

Table 8:
Fixed Effects Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.095	0.028	3.393	0.001
CR	-0.073	0.017	-4.294	0.000
LR	-0.018	0.009	-2.000	0.047
OR	-0.082	0.016	-5.125	0.000
CAR	0.059	0.020	2.950	0.004
BS	0.004	0.002	2.000	0.048
Model Summary Statistics				
Statistic	Value			
R-squared	0.701			
Adjusted R-squared	0.684			
F-statistic	42.889			
Prob (F-statistic)	0.000			

Source: Author's Computation, 2026.

Diagnostic Tests

The diagnostic test results in Table 9 confirmed the robustness of the regression model. The Jarque-Bera statistic (2.134, $p = 0.344$) indicated that the residuals were normally distributed, as the probability exceeded 0.05. The skewness and kurtosis values further supported the normality assumption. The multicollinearity test showed a mean VIF of 2.287, with all individual VIF values below 10, confirming the absence of multicollinearity among the explanatory variables. The Breusch-Pagan test for heteroskedasticity produced a probability value of 0.171, indicating constant variance of the error terms. This implied that the model did not suffer from heteroskedasticity. The Durbin-Watson statistic of 1.982, which is approximately equal to 2, confirmed the absence of autocorrelation in the residuals.

Table 9:
Diagnostic Tests

Test	Method	Statistic	Probability	Remark
Normality	Jarque-Bera	2.134	0.344	Residuals normal
Multicollinearity	Mean VIF	2.287	–	No multicollinearity
Heteroskedasticity	Breusch-Pagan	1.876	0.171	Homoscedastic
Autocorrelation (serial)	Wooldridge test for panel data	1.234	0.221	No serial correlation
Cross-sectional dependence	Pesaran CD test	0.987	0.324	No cross-sectional dependence
Model specification error	Ramsey RESET test	1.567	0.112	No specification error

Source: Author’s Computation, 2025.

5.0 Conclusion and Recommendations

This study examined the association between risk management practices and profitability among 14 listed deposit money banks in Nigeria over the period 2015-2024. The findings indicate that credit risk, liquidity risk, and operational risk are significantly associated with lower profitability, while capital adequacy is associated with higher profitability. However, these findings should not be overgeneralized to all Nigerian banks, including unlisted, regional, or microfinance banks, which may operate under different risk management frameworks and regulatory intensities. Within the context of listed banks, the results suggest that sound risk management practices are associated with enhanced financial performance.

- i. Deposit money banks should strengthen their credit risk management systems by improving loan appraisal processes, monitoring credit portfolios, and adopting effective loan recovery strategies to reduce non-performing loans.
- ii. Banks should maintain optimal liquidity levels and implement efficient liquidity management policies, while the Central Bank of Nigeria should enforce stricter liquidity requirements to ensure financial stability.
- iii. Management should improve operational efficiency by reducing cost-to-income ratios through the adoption of advanced technologies, automation of processes, and strengthening internal control systems.
- iv. Regulatory bodies should ensure strict compliance with capital adequacy requirements and continuously review capital frameworks to enhance the resilience of banks against financial shocks.
- v. Government and financial regulators should promote policies that support risk management best practices and strengthen the overall regulatory environment of the banking sector.

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