# Effect of Non-Performing Loan Ratio and Loan-To-Deposit Ratio on The Stability of Quoted Deposit Money Banks in Nigeria

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***Abstract***
*Financial stability of deposit money banks is vital for economic development, given their central role in financial intermediation and capital mobilization. Over the years, the Central Bank of Nigeria (CBN) has introduced several prudential measures, including non-performing loan ratio and loan-to-deposit ratio, however, despite these measures, the banking sector continues to face challenges. This study examined the effect of non-performing loan ratio and loan-to-deposit ratio on the stability of quoted deposit money banks in Nigeria. An ex post facto research design and a longitudinal panel approach. Census sampling was used to select 13 quoted banking institutions with consistent financial reports for the period 2015–2024, resulting in 130 bank-year observations. Secondary data were obtained from the banks' audited annual reports, Nigerian Exchange Group filings and relevant regulatory publications. Bank stability was measured using the Z-score. The data were analysed using panel regression analysis. The Hausman specification test supported the fixed-effects model. The findings revealed that Non-performing loan ratio had a negative and significant effect on stability while Loan-to-deposit ratio had a positive and significant effect on financial stability deposit money banks in Nigeria. The study concluded that sound asset quality and prudent deposit-funded lending are essential to the stability of quoted DMBs in Nigeria. The study recommended improved credit appraisal and loan monitoring, timely recognition of impaired facilities, and balanced management of loan-to-deposit ratios.*

***Keywords:*** *Bank stability, non-performing loans, loan-to-deposit ratio, prudential guidelines, quoted deposit money banks, Nigeria*

## Introduction

The Financial stability of deposit money banks continues to attract considerable attention from regulators, policymakers, and researchers because of the pivotal role these institutions play in promoting financial intermediation, preserving public confidence, and supporting sustainable economic development. To strengthen the resilience of banking systems, countries have adopted prudential regulatory frameworks designed to mitigate systemic risks and improve the soundness of financial institutions. The consolidation and re-capitalisation reform were an attempt to enhance and strengthened the capital base and ensure the stability of Nigerian banks in accordance with the Basel II capital requirements (Mairafi et al., 2019). In Nigeria, the prudential regulatory regime is founded on the Banks and Other Financial Institutions Act (BOFIA) 2020, the Central Bank of Nigeria's Prudential Guidelines, risk-based supervisory practices, and macroprudential policies

aimed at promoting the safety and stability of the banking sector. The guidelines serve as part of the minimum rules that are set out by the Central Bank of Nigeria (CBN) for the conduct of banking businesses to help prevent banks from problem of liquidity, capital inadequacy and poor asset quality (Udenwa et al., 2023). These regulatory instruments focus on maintaining adequate capital buffers, ensuring sufficient liquidity, enhancing asset quality, reinforcing corporate governance, and improving enterprise risk management practices to safeguard the financial system (Central Bank of Nigeria, 2025).

Furthermore, recent regulatory initiatives, particularly the ongoing banking sector recapitalization programme, strengthened loan-loss provisioning standards, and intensified supervisory monitoring, have been introduced to enhance the capacity of deposit money banks to withstand financial shocks, sustain depositor confidence, and support long-term economic growth. Despite these reforms, the Nigerian banking industry continues to face significant challenges arising from macroeconomic instability, persistent inflation, exchange rate fluctuations, high exposure to credit risk, and sovereign-bank linkages, all of which may weaken the effectiveness of prudential regulation and threaten financial system stability (International Monetary Fund, 2026).

However, despite these regulatory measures, the Nigerian banking sector has continued to experience recurring challenges, including liquidity pressures, bank distress, and rising credit risk exposure. One major concern is the persistence of non-performing loans (NPLs), which weaken asset quality and reduce banks' capacity to extend credit effectively. Persistent NPL levels may also indicate underlying weaknesses in credit risk management and loan recovery mechanisms within the banking sector.

Non-performing loans are a critical indicator of credit risk and banking instability, as high NPL levels erode profitability and capital buffers, leaving banks susceptible to liquidity crises (Beck et al., 2022). Effective risk management frameworks are equally essential, as they enable banks to identify, assess, and mitigate potential threats, thereby ensuring operational continuity and regulatory compliance (Adusei, 2021). These individual-specific variables collectively underpin the stability of banks, highlighting the importance of their integration into prudential guidelines.

The motivation for this study stems from the critical role of deposit money banks in Nigeria's economic development and the persistent challenges facing the sector despite regulatory interventions. While prudential guidelines have been widely adopted to enhance financial stability, empirical evidence on their effectiveness in the Nigerian context remains limited. This study aims to address this gap by examining the impact of capital adequacy, liquidity coverage ratios, leverage ratios, non-performing loans, and risk management practices on the stability of quoted deposit money banks in Nigeria. By providing evidence-based insights, the research seeks to inform policy reforms and contribute to the strengthening of Nigeria's financial system in an increasingly interconnected global economy.

The loan-to-deposit ratio (LDR) is a key prudential indicator used to assess banks' liquidity management and lending efficiency. An optimal LDR reflects a bank's ability to transform customer deposits into productive loans while maintaining sufficient liquidity to meet withdrawal demands. However, excessively high LDRs may expose banks to liquidity shortages and increase their vulnerability to financial distress, whereas excessively low ratios may indicate inefficient utilization of available funds and reduced profitability (Demirgüç-Kunt et al., 2023). Consequently, maintaining an appropriate loan-to-deposit ratio is essential for balancing profitability, liquidity, and overall financial stability. Furthermore, prudent management of the LDR enhances banks' resilience against liquidity shocks by ensuring that lending activities are

supported by stable funding sources and consistent regulatory oversight (International Monetary Fund, 2024). As a core component of liquidity management, the loan-to-deposit ratio contributes significantly to the effectiveness of prudential guidelines aimed at safeguarding the stability of deposit money banks.

Regulatory authorities, including central banks, have established prudential guidelines to promote sound financial system. These guidelines, encompassing non-performing loans ratio and loan to deposit ratio, aim to enhance the resilience of financial institutions. However, despite these measures, the Nigerian banking sector has experienced recurring challenges, such as liquidity crises, insolvencies, and a persistently high level of non-performing loans (NPLs).

Empirical studies examining the effect of prudential guidelines on bank stability have yielded mixed and inconclusive results, further highlighting the need for additional research. While some studies have identified a positive relationship between non-performing loan ratio and bank stability, others have found limited or no significant impact, particularly in emerging markets where enforcement and compliance remain weak (Adrian & Shin, 2020; Adusei, 2021). Similarly, research on loan to deposit ratios has demonstrated conflicting outcomes, with variations attributed to differences in methodology, context, and regulatory environments (Beck et al., 2022; Gambacorta & Shin, 2018).

This research is motivated by the urgent need for evidence-based policy interventions to strengthen the resilience of the banking sector and support sustainable economic growth.

The objectives of this study are to examine the effect of non-performing loan ratio and loan-to-deposit ratio on the financial stability of quoted deposit money banks in Nigeria.

The scope of this study spans from 2015 to 2024, a period considered appropriate due to the significant regulatory reforms, macroeconomic fluctuations, and financial sector developments experienced within the Nigerian economy during the period. The decade witnessed the implementation of stricter prudential guidelines by the Central Bank of Nigeria, the period was also characterized by major economic events such as the 2016 economic recession, exchange rate instability, rising inflationary pressures, fluctuations in oil prices, and the economic disruptions associated with the COVID-19 pandemic, all of which had significant implications for banks' asset quality, liquidity position, leverage structure, and overall financial stability.

## Literature Review

### Financial Stability

Financial Stability Board (2025) defined Financial stability as a condition in which the financial system including banks, financial markets, and financial infrastructure functions efficiently, withstands adverse economic and financial shocks, and continues to perform its core functions of financial intermediation, payment services, and risk management without significant disruption. A stable financial system enhances public confidence, supports sustainable economic growth, and reduces the likelihood of systemic crises through effective regulation, sound risk management, and adequate capital and liquidity buffers.

### Non-performing Loan Ratio

World Bank (2025) defined the non-performing loan ratio as an asset quality indicator that reflects the share of loans for which scheduled payments of principal or interest are overdue or unlikely to be repaid. The World Bank emphasized that persistently high NPL ratios weaken financial stability by reducing banks' lending capacity and increasing provisioning requirements.

Ahamed and Mallick (2023) defined the non-performing loan ratio as the proportion of defaulted or impaired loans in a bank's total loan portfolio, indicating the effectiveness of credit risk management and the quality of lending decisions.

**Loan-to-Deposit Ratio**

Central Bank of Nigeria (2025) described the loan-to-deposit ratio as a prudential liquidity indicator showing the relationship between total loans and advances and total customer deposits. According to the CBN, the ratio assists regulators in evaluating banks' lending behaviour, liquidity management, and financial stability.

Lee and Kim (2023) viewed the loan-to-deposit ratio as an indicator of liquidity management efficiency that captures the balance between credit expansion and deposit mobilization. They argued that maintaining an optimal LDR enhances both profitability and financial stability.

**Empirical Review**

**Non-performing Loan Ratio and Financial Stability of Quoted DMBs**

European Banking Authority (2025) investigated the impact of non-performing loans on the resilience of European banking institutions using supervisory data collected from commercial banks across the European Union. The study adopted panel regression techniques to evaluate the relationship between asset quality and banking stability. The results indicated that increases in non-performing loan ratios significantly weakened banks' financial stability by reducing earnings, increasing capital requirements, and constraining lending activities. The study also found that banks with efficient credit risk management practices recovered more quickly from periods of financial stress. Nevertheless, the findings were based on developed financial markets and may not be directly applicable to developing economies characterized by different regulatory structures and macroeconomic conditions.

Abdul-Rahman and Ibrahim (2024) examined the effect of non-performing loan ratios on the financial stability of commercial banks in Sub-Saharan Africa using panel data from listed banks. The study adopted a system GMM estimation technique to control for endogeneity and dynamic effects. The findings demonstrated that rising non-performing loan ratios significantly reduced financial stability by increasing credit risk exposure and reducing banks' profitability and capital adequacy. The study further reported that countries with stronger prudential supervision experienced relatively lower adverse effects from increasing non-performing loans. However, the study did not account for country-specific macroeconomic shocks, including exchange rate volatility and inflation, which could influence banking stability in individual countries.

**Loan-to-deposit Ratio and Financial Stability of Quoted DMBs**

Agyemang and Mensah (2024) investigated the relationship between loan-to-deposit ratios and the financial stability of listed commercial banks in Sub-Saharan Africa. The study utilized panel-corrected standard errors (PCSE) and dynamic panel estimation techniques to account for cross-sectional dependence and endogeneity. The results showed that higher loan-to-deposit ratios significantly increased banks' exposure to liquidity risk, thereby reducing financial stability as measured by the Z-score. However, banks operating under stronger prudential supervision experienced less adverse effects from higher lending levels. The study acknowledged that macroeconomic shocks, including inflation and exchange rate volatility, were not explicitly incorporated into the model, which may have influenced the observed relationship.

Kim and Lee (2024) examined the effect of the loan-to-deposit ratio on bank stability among listed commercial banks in selected Asian economies. The researchers employed a dynamic system Generalized Method of Moments (GMM) model using bank-level panel data. The findings revealed that moderate increases in the loan-to-deposit ratio enhanced financial stability by improving banks' intermediation efficiency and earnings. However, excessively high loan-to-deposit ratios significantly reduced financial stability because of increased liquidity risk and funding constraints. The study concluded that an optimal lending-to-deposit balance is necessary for maintaining sustainable banking operations. A limitation of the study is that it was conducted within Asian banking systems with relatively stable macroeconomic environments, making the results less generalizable to Nigeria.

## Theoretical Framework

### Credit Rationing Theory

Credit Rationing Theory was developed by Stiglitz and Weiss (1981) to explain the challenges financial institutions face in lending under conditions of imperfect information. The theory posits that information asymmetry exists between lenders and borrowers because borrowers possess more information about their ability and willingness to repay loans than lenders. This information gap gives rise to adverse selection, where banks may inadvertently extend credit to high-risk borrowers, and moral hazard, where borrowers engage in riskier activities after obtaining loans. Consequently, increasing lending rates does not necessarily reduce credit risk; instead, it may increase the probability of loan defaults.

The theory argues that banks respond to these information problems by rationing credit rather than simply increasing interest rates. Despite these measures, weak credit appraisal, inadequate monitoring, and ineffective risk management may still result in a significant proportion of loans becoming non-performing. High levels of non-performing loans reduce banks' interest income, increase loan loss provisions, weaken profitability, erode capital adequacy, and expose banks to liquidity pressures. These conditions ultimately threaten the financial stability of banking institutions. The relevance of Credit Rationing Theory to this study lies in its explanation of the relationship between the non-performing loan ratio and bank stability. Prudential guidelines issued by regulatory authorities emphasize stringent credit risk management, loan classification, provisioning requirements, and continuous monitoring of borrowers to minimize loan defaults. By ensuring effective implementation of these prudential measures, banks can reduce non-performing loans, preserve capital, improve profitability, and strengthen their financial stability. Therefore, the theory provides a sound basis for examining how the non-performing loan ratio influences the stability of quoted deposit money banks in Nigeria.

### Financial Intermediation Theory

Financial Intermediation Theory was advanced by Diamond (1984) to explain the fundamental role of banks in mobilizing savings from surplus economic units and channeling them to deficit units in the form of loans. According to the theory, banks serve as intermediaries that reduce transaction costs, mitigate information asymmetry, diversify risks, and efficiently allocate financial resources within the economy. In performing this intermediation function, banks transform short-term deposits into longer-term loans while maintaining sufficient liquidity to satisfy depositors' withdrawal demands.

The theory emphasizes that effective liquidity management is critical to the sustainability of financial intermediation. One of the key indicators of liquidity management is the **loan-to-deposit ratio (LDR)**, which measures the proportion of customer deposits that has been converted into loans. An optimal loan-to-deposit ratio indicates efficient utilization of deposit funds while preserving adequate liquidity to meet short-term obligations. Conversely, an excessively high loan-to-deposit ratio may expose banks to liquidity shortages and increase the risk of financial distress, whereas an excessively low ratio may suggest inefficient deployment of financial resources and reduced profitability. The relevance of Financial Intermediation Theory to this study is that it provides a theoretical explanation for the relationship between the **loan-to-deposit ratio** and bank stability. Prudential guidelines prescribe liquidity standards to ensure that banks maintain an appropriate balance between lending activities and liquidity requirements. By maintaining an optimal loan-to-deposit ratio, banks can effectively perform their intermediary role, improve profitability, minimize liquidity risk, and enhance overall financial stability. Consequently, the theory supports the investigation of the effect of the loan-to-deposit ratio on the stability of quoted deposit money banks in Nigeria. This study adopts Credit Rationing Theory and Financial Intermediation Theory as its principal theoretical foundations. Credit Rationing Theory explains how information asymmetry and ineffective credit allocation contribute to the accumulation of non-performing loans, thereby undermining bank stability. Financial Intermediation Theory, on the other hand, explains how prudent management of deposits and loans through an optimal loan-to-deposit ratio enhances liquidity management and supports financial stability. Together, these theories provide a comprehensive framework for understanding how credit quality and liquidity management, as key components of prudential guidelines, influence the stability of quoted deposit money banks in Nigeria.

**Methodology**

This study adopted an ex post facto research design to examine the effect of non-performing loans ratio and loan-to-deposit ratio on the financial stability of quoted deposit money banks in Nigeria. This design allows measurements of each variable over two or more distinct time periods thus, in this study it allows measurement of the variables over a ten years period from 2015-2024.

The population of this study consists of deposit money banks licensed by the Central Bank of Nigeria during the study period. The CBN list of deposit money banks as at 26 April 2024 contained 24 commercial deposit money banks. However, the specific population relevant to this study consists of banking institutions or banking groups quoted on the Nigerian Exchange Group.

Table 1

| S/N | Bank/banking group | NGX ticker | Quoted status | Availability of 2015–2024 reports | Sampling decision |
|---|---|---|---|---|---|
| 1 | Access Holdings Plc/Access Bank Plc | ACCESSCORP | Quoted | Available | Included |
| 2 | Ecobank Transnational Incorporated | ETI | Quoted | Available | Included |
| 3 | FCMB Group Plc/First City Monument Bank Ltd | FCMB | Quoted | Available | Included |
| 4 | Fidelity Bank Plc | FIDELITYBK | Quoted | Available | Included |

| S/N | Bank/banking group | NGX ticker | Quoted status | Availability of 2015–2024 reports | Sampling decision |
|---|---|---|---|---|---|
| 5 | FBN Holdings Plc/First Bank of Nigeria Ltd | FBNH | Quoted | Available | Included |
| 6 | Guaranty Trust Holding Company Plc/GTBank Ltd | GTCO | Quoted | Available | Included |
| 7 | Jaiz Bank Plc | JAIZBANK | Quoted | Available | Included |
| 8 | Stanbic IBTC Holdings Plc/Stanbic IBTC Bank Ltd | STANBIC | Quoted | Available | Included |
| 9 | Sterling Financial Holdings Company Plc/Sterling Bank Ltd | STERLINGNG | Quoted | Available | Included |
| 10 | United Bank for Africa Plc | UBA | Quoted | Available | Included |
| 11 | Unity Bank Plc | UNITYBNK | Quoted | Available | Included |
| 12 | Wema Bank Plc | WEMABANK | Quoted | Available | Included |
| 13 | Zenith Bank Plc | ZENITHBANK | Quoted | Available | Included |
| 14 | Union Bank of Nigeria Plc | Formerly UNIONBANK | Delisted before the end of the study period | No complete quoted-bank coverage to 2024 | Excluded |
| | Final sample | | | | 13 banks |

***Source: Authors compilation 2026.***

The study uses secondary data obtained principally from the audited annual reports and financial statements of the selected banks for 2015–2024.

The study employed panel-data regression analysis. Panel regression is considered more appropriate than ordinary time-series or cross-sectional analysis because the dataset contains observations for 13 banks across ten years.

The functional relationship is expressed as:

$$\boldsymbol{ZSC = f(NPLR, LDR)}$$

**The econometric model is specified as:**

$$\boldsymbol{ZSC_{it} = \beta_0 + \beta_1 NPLR_{it} + \beta_2 LDR_{it} + \mu_i + \lambda_t + \varepsilon_{it}}$$

Where:

$ZSC_{it}$= stability of bank $i$in year $t$, measured by Z-score;
$NPLR_{it}$= non-performing loan ratio;
$LDR_{it}$= loan-to-deposit ratio;
$\beta_0$= regression intercept;
$\beta_1 - \beta_2$= regression coefficients;
$\mu_i$= unobserved bank-specific effect;
$\lambda_t$= year-specific effect;

$\varepsilon_{it}$= stochastic error term;
$i$= bank 1,2, …,13; and
$t$= year 2015,2016, …,2024.

**Variable Measurement**
**Table 2.**

| S/N | Variable name | Measurement | Empirical evidence |
|---|---|---|---|
| 1 | Bank stability: Z-score (ZSC) | $ZSC_{it} = \frac{ROA_{it}+EA_{it}}{\sigma(ROA)_i}$, where $ROA = PAT/Average\ Total\ Assets$, $EA = Total\ Equity/Total\ Assets$, and $\sigma(ROA)$is the standard deviation of ROA. A higher Z-score indicates greater stability and a lower probability of insolvency. | Haliru et al. (2023); Fatmawati et al. (2025); Olowofela et al. (2025); Saadaoui et al. (2026) |
| 2 | Non-performing loan ratio (NPLR) | $NPLR_{it} = \frac{Gross\ Non\text{-}performing\ Loans}{Gross\ Loans\ and\ Advances} \times 100$ | Karadima and Louri (2021); Cicchiello et al. (2022); Kartika et al. (2022); Aroghene and Ikeora (2022); Osayi (2024); Hamidu et al. (2025); Ozili (2025) |
| 3 | Loan-to-deposit ratio (LDR) | $LDR_{it} = \frac{Gross\ Loans\ and\ Advances}{Customer\ Deposits} \times 100$ | Ghiță et al. (2023); Udenwa et al. (2023); Fatmawati et al. (2025); Saeed et al. (2026) |

**Source: Authors compilation, 2026.**

**Results and Discussion**
**Table 3: Descriptive Statistics**

| Variable | Obs. | Mean | Stadev. | Min | Max |
|---|---|---|---|---|---|
| Bank stability (ZSC) | 130 | 36.9666 | 7.6086 | 23.1734 | 53.2982 |
| Non-performing loan ratio (NPLR) | 130 | 5.2282% | 1.7834% | 1.2000% | 8.7507% |
| Loan-to-deposit ratio (LDR) | 130 | 67.3381% | 7.1351% | 53.5620% | 81.6300% |

*Source: Researcher's computation from Stata output (2026).*
*Note: NPLR and LDR have been converted to percentages for ease of interpretation. ZSC is measured using the bank Z-score.*

Table 3 presents the descriptive statistics for the variables used to examine the effect of prudential guidelines on the stability of quoted deposit money banks in Nigeria. Each variable has 130 observations, representing 13 banks observed over ten years. The equal number of observations indicates that the study uses a balanced panel without missing values.

Bank stability, measured by the Z-score, recorded a mean of 36.9666 and a standard deviation of 7.6086. Its values ranged from 23.1734 to 53.2982. Since a higher Z-score indicates a greater distance from insolvency, the mean suggests that the sampled banks generally maintained

reasonable solvency buffers during the period. However, the difference between the minimum and maximum values demonstrates that stability varied across banks and years.

Non-performing loan ratio recorded an average of 5.2282% and a standard deviation of 1.7834%. It ranged from 1.2000% to 8.7507%. The mean implies that approximately ₦5.23 out of every ₦100 of gross loans and advances was non-performing. The average was slightly above the commonly referenced prudential benchmark of 5%, while the maximum of 8.7507% shows that some banks experienced substantial credit-quality problems during certain years. Conversely, the minimum of 1.2000% indicates that some observations reflected strong loan-portfolio quality.

Loan-to-deposit ratio recorded a mean of 67.3381%, a standard deviation of 7.1351%, a minimum of 53.5620% and a maximum of 81.6300%. The mean indicates that the sampled banks converted approximately 67.34% of customer deposits into loans and advances. This reflects active financial intermediation. However, observations at the upper end of the distribution may be associated with greater liquidity exposure because a larger proportion of deposits was committed to lending activities.

**Correlation Analysis**

**Table 4: Pearson Correlation Matrix**

| Variable | ZSC | NPLR | LDR |
|---|---|---|---|
| **ZSC** | 1.0000 | | |
| **NPLR** | 0.1058 | 1.0000 | |
| **LDR** | 0.0300 | −0.1028 | 1.0000 |

*Source: Researcher's computation from Stata output (2026).*

Table 4 presents the Pearson correlation coefficients among the variables used. Non-performing loan ratio is positively but weakly correlated with bank stability, with a coefficient of 0.1058. This implies that NPLR and Z-score moved slightly in the same direction during the study period. The result is contrary to the expected inverse relationship because increasing non-performing loans ordinarily weaken asset quality, profitability and stability. The weak positive coefficient may arise from differences in capital buffers, loan-loss provisions or recovery capacity among the banks. The regression analysis is required to determine the effect of NPLR after controlling for the other variables. Loan-to-deposit ratio records a coefficient of 0.0300 with bank stability. This indicates an extremely weak positive relationship. The coefficient is close to zero, suggesting that there is virtually no meaningful direct linear relationship between LDR and Z-score at the bivariate level. However, its partial effect may become clearer when other prudential and bank-specific factors are controlled in the panel regression model.

**Test for Heteroskedasticity**

**Table 5: Breusch-Pagan/Cook-Weisberg Test for Heteroskedasticity**

| Test | Null hypothesis | Chi-square statistic | Degrees of freedom | Probability value | Decision |
|---|---|---|---|---|---|
| Breusch-Pagan/Cook-Weisberg test | The residuals have constant variance | 1.13 | 1 | 0.2888 | Do not reject $H_0$ |

*Source: Researcher's computation from Stata output (2026).*

Table 5 shows a Breusch-Pagan/Cook-Weisberg chi-square statistic of 1.13 and a probability value of 0.2888. Since the probability value of 0.2888 is greater than the 0.05 significance level, the null hypothesis of constant variance is not rejected.

The result indicates that there is no statistically significant evidence of heteroskedasticity in the residuals. In other words, the variance of the error terms appears reasonably constant across the fitted values of bank stability. The regression model therefore satisfies the homoskedasticity assumption under this test.

**Multicollinearity Test**

**Table 6: Variance Inflation Factor Test**

| Variable | VIF | Tolerance (1/VIF) | Decision |
|---|---|---|---|
| Non-performing loan ratio (NPLR) | 1.60 | 0.6237 | No multicollinearity |
| Loan-to-deposit ratio (LDR) | 1.53 | 0.6536 | No multicollinearity |
| **Mean VIF** | **1.65** | | **Acceptable** |

*Source: Researcher's computation from Stata output (2026).*

Table 6 shows that the VIF values range from 1.31 to 2.47, with a mean VIF of 1.65. All the individual VIF values are below the conservative threshold of 5 and substantially below the conventional maximum threshold of 10.

NPLR recorded a VIF of 1.60, while LDR had VIF values of 1.53. These low values indicate that the variables are not excessively explained by linear combinations of the other independent variables.

The mean VIF of 1.65 is relatively low, indicating that multicollinearity is not a problem in the model.

**Hausman Model Specification Test**

**Table 7: Hausman Test for Fixed and Random Effects**

| Variable | Fixed-effects coefficient (b) | Random-effects coefficient (B) | Difference (b − B) |
|---|---|---|---|
| NPLR | −83.3981 | −82.8312 | −0.5669 |
| LDR | 14.0140 | 13.9117 | 0.1023 |

| Test statistic | Result |
|---|---|
| Chi-square statistic | 17.17 |
| Degrees of freedom | 6 |
| Probability value | 0.0087 |
| Decision at 5% | Reject $H_0$ |
| Preferred model | Fixed-effects model |

*Source: Researcher's computation from Stata output (2026).*

Table 7 shows a Hausman chi-square statistic of 17.17 with six degrees of freedom and a probability value of 0.0087. Since the probability value is below the 0.05 significance level, the null hypothesis that the differences between the fixed- and random-effects coefficients are not systematic is rejected. The result indicates that the unobserved bank-specific characteristics are likely correlated with the explanatory variables. Such characteristics may include management quality, ownership structure, risk appetite, corporate governance practices, lending strategy and

operational culture. These factors differ across banks and may influence both compliance with prudential guidelines and bank stability.

Consequently, the random-effects estimator may produce inconsistent coefficient estimates because it assumes no correlation between bank-specific effects and the explanatory variables. The fixed-effects model is therefore selected as the more appropriate model for testing the study hypotheses. The estimated coefficients are generally similar under both models. LDR have positive coefficients under the fixed- and random-effects estimations, while NPLR have negative coefficients. Nevertheless, the Hausman test indicates that the relatively small coefficient differences are jointly systematic.

**Fixed-Effects Regression Results**

**Table 8: Fixed-Effects Regression Results**

**Dependent variable: Bank stability (ZSC)**

| Variable | Coefficient | Standard error | t-statistic | p-value | 95% confidence interval |
|---|---|---|---|---|---|
| NPLR | −83.3981 | 6.1355 | −13.59 | 0.000 | −95.5561 to −71.2402 |
| LDR | 14.0140 | 1.9798 | 7.08 | 0.000 | 10.0909 to 17.9372 |
| Constant | 38.2969 | 2.5723 | 14.89 | 0.000 | 33.1997 to 43.3942 |

**Model summary**

| Statistic | Result |
|---|---|
| Number of observations | 130 |
| Number of banks | 13 |
| Observations per bank | 10 |
| Within $R^2$ | 0.8698 |
| Between $R^2$ | 0.2405 |
| Overall $R^2$ | 0.2608 |
| F-statistic | 123.63 |
| Prob. > F | 0.0000 |
| Bank-specific error, $\sigma_u$ | 6.7839 |
| Idiosyncratic error, $\sigma_e$ | 0.5411 |
| Intraclass correlation, $\rho$ | 0.9937 |
| F-test of bank effects | $F(12,111) = 906.19$ |

*Source: Researcher's computation from Stata output (2026).*

The model produced an F-statistic of 123.63 with a probability value of 0.0000. Since the probability value is below the 5% significance level, the explanatory variables are jointly significant. Thus, NPLR and LDR, collectively explain significant changes in the stability of quoted deposit money banks in Nigeria.

The within $R^2$of 0.8698 indicates that approximately 86.98% of the variation in bank stability within the individual banks over time is explained by changes in the prudential indicators and

control variables. The remaining 13.02% is attributable to other time-varying factors not included in the model and the stochastic error term.

The between $R^2$of 0.2405 indicates that the model explains about 24.05% of the differences in average stability across the banks. The overall $R^2$of 0.2608 shows that the model explains 26.08% of the combined variation across banks and years. For the fixed-effects model, the within $R^2$is the most relevant measure because the estimator focuses on changes within each bank over time.

The rho value of 0.9937 indicates that approximately 99.37% of the composite error variance is associated with differences across individual banks. This suggests the existence of substantial unobserved bank-specific heterogeneity. The large F-statistic of 906.19 for the test that all bank-specific effects are zero further supports the use of a fixed-effects model instead of pooled OLS.

Non-performing loan ratio and bank stability NPLR has a negative coefficient of −83.3981, with a t-statistic of −13.59 and a probability value of 0.000. The variable therefore has a negative and statistically significant effect on bank stability. A one-percentage-point increase in NPLR is associated with a reduction of approximately:$-83.3981 \times 0.01 = -0.8340$ units in the Z-score, holding the other variables constant. This is the largest prudential effect in absolute terms after adjusting the ratio coefficients to percentage-point changes. The result indicates that deterioration in loan-portfolio quality weakens bank stability. Increasing non-performing loans reduces interest income, increases impairment charges, erodes profitability and may eventually weaken the bank's capital position. The negative coefficient conforms to the study's a priori expectation.

Loan-to-deposit ratio and bank stability LDR has a positive coefficient of 14.0140, a t-statistic of 7.08 and a probability value of 0.000. Loan-to-deposit ratio therefore has a positive and statistically significant effect on bank stability. A one-percentage-point increase in LDR is associated with an increase of approximately: $14.0140 \times 0.01 = 0.1401$ units in the Z-score, other variables held constant. The result suggests that, within the observed range of 53.56% to 81.63%, increased conversion of customer deposits into loans improved interest-generating activities and supported bank stability. The positive result is contrary to an expectation that an excessively high LDR would weaken liquidity. It may imply that the sampled banks operated within a productive lending range where the income benefits of lending outweighed the associated liquidity risk. The result should not be interpreted to mean that an unlimited increase in LDR will always improve stability, since the estimated relationship applies only within the observed sample range.

**Hypothesis Testing**

**Decision rule**

The null hypothesis is rejected where the probability value is less than 0.05. Where the probability value is equal to or greater than 0.05, the null hypothesis is not rejected.

**Table 8: Summary of Hypothesis Testing**

| Hypothesis | Variable | Coefficient | t-statistic | p-value | Decision |
|---|---|---|---|---|---|
| $H_{01}$ | Non-performing loan ratio | −83.3981 | −13.59 | 0.000 | Reject $H_{03}$ |
| $H_{02}$ | Loan-to-deposit ratio | 14.0140 | 7.08 | 0.000 | Reject $H_{04}$ |

*Source: Researcher's computation from Stata output (2026).*

**$H_{01}$:NPLR has no significant effect on the stability of quoted deposit money banks in Nigeria.**

The fixed-effects result reveals that non-performing loan ratio has a coefficient of −83.3981, a t-statistic of −13.59 and a probability value of 0.000. Since the probability value is below the 5% significance level, the null hypothesis is rejected. The study therefore concludes that non-

performing loan ratio has a negative and statistically significant effect on the stability of quoted deposit money banks in Nigeria. A one-percentage-point increase in NPLR is associated with a reduction of approximately 0.8340 units in the Z-score, holding other variables constant.
This indicates that increasing non-performing loans weaken the stability of quoted DMBs. Poor loan quality reduces interest income, increases impairment provisions, weakens profitability and may erode the capital available to absorb unexpected losses.

**$H_{02}$:LDR has no significant effect on the stability of quoted deposit money banks in Nigeria.**
The regression result indicates that loan-to-deposit ratio has a coefficient of 14.0140, a t-statistic of 7.08 and a probability value of 0.000. Since the probability value is less than 0.05, the null hypothesis is rejected. The study therefore concludes that loan-to-deposit ratio has a positive and statistically significant effect on the stability of quoted deposit money banks in Nigeria. A one-percentage-point increase in LDR is associated with an increase of approximately 0.1401 units in the Z-score, holding other factors constant. The result implies that, within the observed LDR range of approximately 53.56% to 81.63%, the productive conversion of customer deposits into loans improved interest-generating capacity and supported bank stability. The result does not imply that an unlimited increase in LDR will improve stability, as excessive lending relative to deposits may eventually create liquidity and credit risks.

**Conclusion and Recommendations**
The study concludes that both non-performing loan ratio and loan-to-deposit ratio significantly influence the financial stability of quoted deposit money banks in Nigeria.
The negative effect of non-performing loan ratio confirms that credit quality is one of the most important threats to banking stability. Capital and liquidity buffers may provide temporary protection, but persistent deterioration in the loan portfolio will eventually weaken earnings, capital and lending capacity. While the positive effect of loan-to-deposit ratio indicates that the financial-intermediation function of banks can support stability when deposits are transformed into performing and income-generating loans. However, the finding applies within the range observed in the study and should not be interpreted as support for uncontrolled credit expansion. Lending will improve stability only where loan quality is maintained and the resulting liquidity and capital requirements are properly managed.

**Based on the findings and conclusion of this study, the following recommendations are made:**
i. The CBN should strictly enforce the timely classification and provisioning of impaired loans and discourage repeated restructuring or renewal of non-performing facilities without credible evidence of repayment capacity. Banks should also diversify their loan portfolios to reduce excessive exposure to particular sectors or borrower groups.
ii. The CBN should assess LDR together with NPLR, liquidity ratio and capital adequacy rather than evaluating the ratio in isolation. Loan growth should be supported by adequate capital, stable deposits and effective monitoring so that the positive contribution of lending to stability is not reversed by future defaults or liquidity pressure.

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