EFFECT OF NON-PERFORMING LOAN ON THE PERFORMANCE OF SELECTED COMMERCIAL BANKS IN NIGERIA

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ABSTRACT

This study examined the effect of non-performing loans on the performance of selected commercial banks in Nigeria. Specifically, it analyzed the impact of total bad debts, liquidity ratio and capital adequacy ratio on bank performance, measured by return on equity. The study covered eight selected commercial banks in Nigeria, namely Wema Bank, Guaranty Trust Bank, First Bank of Nigeria, United Bank for Africa, Fidelity Bank, Zenith Bank, Unity Bank and First City Monument Bank, using quarterly data from 2014 to 2025. Secondary data were obtained from bank financial statements, Central Bank of Nigeria publications and other relevant sources. The study employed descriptive statistics, correlation analysis, panel unit root tests, Kao and Johansen Fisher panel cointegration tests, and the panel Autoregressive Distributed Lag model. The unit root results showed mixed stationarity among the variables, while the cointegration tests confirmed a long-run relationship among return on equity, non-performing loans, total bad debts, liquidity ratio and capital adequacy ratio. The panel ARDL results showed that non-performing loans had a positive and significant effect on bank performance in both the short run and long run. Total bad debts had a positive but insignificant effect, while liquidity ratio had a positive and significant long-run effect. Capital adequacy ratio had a negative and significant long-run effect on performance. The study concludes that credit-risk conditions, liquidity management and capital structure are important determinants of commercial bank performance in Nigeria. It recommends stronger credit appraisal, improved loan monitoring, effective recovery systems, optimal liquidity management and efficient capital deployment.

Keywords: *Non-performing Loans (NPLs); Bank Performance; Return on Equity (ROE); Liquidity Ratio; Capital Adequacy Ratio.*

JEL Classification Codes: ***G21, G32, C23, E58, G28***

1. Introduction

Non-performing loans (NPLs) remain one of the most important indicators of banking sector soundness and financial stability, particularly in emerging economies where commercial banks constitute the primary source of financial intermediation.

NPLs refer to loans on which borrowers have failed to meet repayment obligations, typically for 90 days or more, thereby exposing banks to credit losses and weakening asset quality. Since lending constitutes the largest income-generating activity of commercial banks, a persistent increase in NPLs reduces profitability, constrains liquidity, weakens capital adequacy, and limits the ability of banks to finance productive investment. The management of NPLs has become a critical concern for regulators, policymakers, and financial institutions seeking to maintain a stable and efficient banking system (Klein, 2013; Caporale, Rault, Sova & Sova, 2014).

The banking sector occupies a strategic position in Nigeria's economy by mobilizing savings, facilitating financial intermediation, and providing credit to households, businesses, and government. A sound banking system promotes investment, employment, and economic growth through efficient allocation of financial resources (Olson & Zoubi, 2011; Tan, 2016). However, the effectiveness of commercial banks depends largely on the quality of their loan portfolios. Weak credit appraisal practices, poor corporate governance, macroeconomic instability, and inadequate risk management have contributed to rising levels of non-performing loans, thereby threatening the financial performance of Nigerian banks (Magaji & Yahaya, 2012; Magaji, Musa & Yusuf, 2021). High NPLs require banks to increase loan loss provisions, reduce lending activities, and maintain larger capital buffers, all of which adversely affect profitability and operational efficiency (Igwe, Magaji & Dama, 2021).

Nigeria has experienced repeated episodes of banking distress associated with deteriorating loan quality. The banking crises of the late 1980s and 1990s, the global financial crisis of 2008–2009, and the economic recession following the oil price collapse of 2015–2017 all resulted in significant increases in non-performing loans, prompting regulatory interventions such as the establishment of the Asset Management Corporation of Nigeria (AMCON) to acquire toxic assets and restore confidence in the banking sector. Despite these reforms, fluctuations in oil prices, exchange rate volatility, inflationary pressures, and economic disruptions, including the COVID-19 pandemic, have continued to expose banks to elevated credit risk. During some periods, the NPL ratios of several Nigerian banks exceeded the Central Bank of Nigeria's prudential benchmark of 5 percent, reflecting persistent vulnerabilities within the financial system.

The consequences of rising NPLs extend beyond individual banks to the broader economy. A deterioration in loan quality reduces banks' earnings through higher provisioning expenses, weakens capital adequacy, constrains liquidity, and discourages new lending to the private sector. Reduced credit availability limits investment, slows business expansion, and weakens economic growth. Persistent loan defaults also erode public confidence in the banking system and may increase the likelihood of financial instability if left unmanaged (Central Bank of Nigeria, 2012). Effective loan monitoring, strong credit risk management frameworks, and early warning systems have become essential components of banking supervision, consistent with the recommendations of the Basel regulatory framework and contemporary banking practice (Eke, Magaji & Oso, 2022).

Although numerous studies have examined the relationship between non-performing loans and bank performance, empirical findings remain inconclusive, particularly for Nigeria. While some

studies report that rising NPLs significantly reduce profitability and financial stability, others suggest that factors such as liquidity management and capital adequacy moderate these effects. Relatively few studies jointly examine the influence of total bad loans, liquidity ratio, and capital adequacy ratio on the financial performance of Nigerian commercial banks using recent post-COVID data. Existing evidence also pays limited attention to operational issues such as weak adherence to debt service ratio guidelines, insider lending practices, indirect borrowing, and deficiencies in loan approval processes, which continue to influence loan quality and bank performance (Magaji & Abubakar, 2011; Abdulazeez & Magaji, 2023).

Therefore, this study examines the effect of non-performing loans on the performance of selected commercial banks in Nigeria using eight major deposit money banks over the period 2014–2024. Specifically, the study evaluates the effects of total bad loans, liquidity ratio, and capital adequacy ratio on bank performance. By incorporating recent developments within the Nigerian banking sector, including the COVID-19 period, the study provides updated evidence on the determinants of bank performance and offers policy recommendations for strengthening credit risk management and improving financial stability. The findings are expected to contribute to the growing literature on banking performance in developing economies while providing useful insights for regulators, bank management, investors, and policymakers concerned with maintaining a resilient and efficient banking system.

2. Literature Review

Theoretical Literature

The relationship between non-performing loans and bank performance has been widely explained through theories of liquidity management, portfolio allocation, and credit risk. The Liquidity Theory of Credit developed by Gurley and Shaw (1960) provides the primary theoretical foundation for this study. The theory argues that the ability of banks to create credit depends largely on their liquidity position rather than solely on the volume of savings available. Financial institutions actively create credit based on available liquidity, while central bank policies influence lending through monetary policy instruments such as reserve requirements, interest rates, and open market operations (Gurley & Shaw, 1960; Keynes, 1936). During periods of adequate liquidity, banks expand lending and support economic activities, whereas liquidity shortages make banks more risk-averse, leading to tighter lending conditions and reduced financial performance (Bernanke & Blinder, 1988; Mishkin, 2007). Since non-performing loans reduce liquidity through increased provisioning and unrecovered credit, the theory provides a useful framework for explaining how deteriorating loan quality weakens bank performance.

Portfolio Theory developed by Markowitz (1952) further explains how banks manage credit risk through optimal loan portfolio allocation. The theory suggests that lending decisions are based on balancing expected returns with associated risks while diversifying credit across sectors and borrower categories to minimize potential losses (Santomero, 1984; Allen & Gale, 2004). Banks with well-diversified loan portfolios are better able to withstand sector-specific shocks than those with concentrated lending. However, persistent increases in non-performing loans reduce portfolio

quality, increase provisioning requirements, and weaken profitability and capital adequacy (Diamond & Rajan, 2001; Altunbas, Gambacorta & Marques-Ibanez, 2010). Consequently, prudent portfolio management remains central to maintaining sustainable financial performance.

Credit Risk Theory also provides an important explanation for the relationship between loan quality and bank performance. Merton's (1974) structural model proposes that default occurs when the value of a borrower's assets falls below outstanding debt obligations, while later reduced-form models emphasize that defaults are also driven by macroeconomic conditions and stochastic events (Jarrow & Turnbull, 1995; Duffie & Singleton, 1999). These theoretical developments underpin the Basel II and Basel III regulatory frameworks, which require banks to maintain adequate capital against credit risk exposures (Basel Committee on Banking Supervision, 2010). Altman's (1968) bankruptcy prediction model further demonstrates that profitability, leverage, and liquidity significantly influence default risk.

Empirical Literature

Non-Performing Loans and Bank Performance

Natufe (2023) finds that banks with higher non-performing loan ratios record lower returns on assets and higher operational risks. Similarly, Ogunleye et al. (2020) report that increasing loan defaults compel banks to make larger loan loss provisions, thereby reducing profitability and limiting their ability to extend new credit. Ejem (2023) further demonstrates that rising non-performing loans reduce operational efficiency, while favourable macroeconomic conditions, particularly higher GDP growth, contribute to lower default rates.

Evidence from different countries supports these findings. Çollakua and Aliu (2021), using commercial banks in Kosovo, find that a one percent increase in non-performing loans significantly reduces return on assets. Likewise, Agarwal et al. (2022) conclude that non-performing assets reduce profitability, weaken banks' credit ratings, increase funding costs, and constrain lending activities. In Nigeria, Eniale (2020) reports a significant negative relationship between loan default and the financial performance of deposit money banks and recommends stricter credit appraisal procedures before loan approval.

Liquidity, Capital Adequacy and Bank Performance

Beyond non-performing loans, liquidity management and capital adequacy have also been identified as important determinants of banking performance. Al-Tamimi and Obeidien (2020) find that liquidity risk positively influences capital adequacy among Jordanian commercial banks, although credit risk exhibits an insignificant relationship. Similarly, Konadu (2020), using listed banks in Ghana, reports a negative relationship between liquidity and profitability, suggesting that excessive liquidity holdings may reduce bank earnings. Benjamin and Kamalavali (2020) equally document mixed relationships between various liquidity indicators and profitability, indicating that efficient liquidity management remains essential for sustaining bank performance.

Credit policies also influence financial performance through their effects on loan quality. Alade (2020) finds that stronger credit standards improve loan portfolio quality, whereas increasing non-performing loans significantly reduce financial performance. Umar (2022), examining microfinance borrowers in Kano State, identifies borrower characteristics such as family size, gender, and business age as significant determinants of loan default, emphasizing the importance of effective credit screening and monitoring.

Banking Sector Evidence and Research Gap

Broader studies on banking development further emphasize the importance of credit quality and institutional factors. Benyah (2022) finds that trade openness promotes financial intermediary development across Africa, while financial openness negatively affects banking sector growth. Kablam (2020), using banks from 29 Sub-Saharan African countries, concludes that bank efficiency is influenced by capitalization, private sector lending, macroeconomic conditions, and institutional quality. Similarly, Saba et al. (2020) show that GDP growth and lending rates significantly influence non-performing loans within the banking sector.

Despite the extensive literature, important gaps remain. Many studies focus primarily on the direct relationship between non-performing loans and profitability without jointly examining the effects of non-performing loans, liquidity ratio, and capital adequacy ratio within a single framework. Second, much of the existing Nigerian evidence relies on data preceding the COVID-19 pandemic and therefore does not adequately reflect recent developments in the banking sector. Operational issues such as debt service ratio compliance, insider lending, indirect borrowing, and weaknesses in loan approval processes identified by the Central Bank of Nigeria (CBN, 2020) and Abdulazeez and Magaji (2023) have received limited empirical attention.

This study addresses these gaps by examining the effect of non-performing loans on the performance of selected commercial banks in Nigeria over the period 2014–2024. Unlike previous studies, it jointly evaluates the effects of total bad loans, liquidity ratio, and capital adequacy ratio on bank performance using recent data that captures post-financial reforms and the COVID-19 period, thereby providing updated evidence for banking policy and credit risk management in Nigeria.

3. Methodology

3.1 Theoretical Framework

The theoretical framework adopted for this study is portfolio theory. Modern portfolio theory contends that rather than evaluating an investment solely on its own risk and return characteristics, investors should consider how those qualities of the investment would affect the risk and return of the entire portfolio. According to modern portfolio theory, an investor can put together a portfolio of several assets to maximise returns for a particular level of risk. Similarly, to this, an investor can create a portfolio with the lowest risk feasible given a desired level of projected return. According to statistical measurements like variance and correlation, the performance of a single investment is less significant than how it affects the overall portfolio.

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Which suggest as stated below.

LD= f (VLD+ ABL+IRD+DSR+ μ) ..... (3.1)
Where:
LD= loan default
VLD = volume of loan default
ABL = amount of bad loans
IRD = interest rate differentials
DSR = Debt Service Ratio
F = functional relationship

3.2 Empirical Model Specification

The study employed the panel ARDL bounds testing approach to co-integration of the impact of loan default and deposit money banks performance. Many of the previous studies indicate that higher rate of loan default has a negative impact on deposit money bank. (Wang and Li, 2015). Nigeria, other African countries and other parts of the world are faced with problem of non-performing loan. Therefore, general form of the equation is given as follows.

$$ROE=f(NPL, TBD, LR, CAR) \text{----------} (3.2)$$

Bank's profitability is proxied by return on asset (ROE), as evidenced in reviewed studies (Karim et al., 2010; Ikram et al., 2016).

Where;

CAR = Capital Adequacy Ratio

NPL = Non-performing Loan

TBD = Total Bad Debts

LR = Liquidity Ratio

f = functional relationship

The econometric form of equation (3.1) is represented as:

$$ROE=\beta 0+ \beta 1NPL+\beta 2TBD+\beta 3LR+\beta 4CAR+\mu \text{----------} (3.3)$$

Where:

β0 = Intercept of relationship in the model/constant

β1 = Coefficients of each explanatory variable

μ = Stochastic or Error term

Therefore, the panel ARDL model which was introduced by Pesaran and Shin (1997) to express both the short run and long run relationships and correlation matrix would be adopted to analyse the data. Following Perasan et al. (1999), the panel-ARDL (p,qq……..q) dynamic specification model is specified as:

$$yit=\sum_{jt=1}^{p} \lambda ijyi,t\text{-}j \sum_{jt=0}^{q} \sigma ij\text{Xi,t-j}+\mu i+\varepsilon it \text{--------} (3.4)$$
$$n$$

Where:

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yit = dependent variable for group I and
Xi,t-j = a KX1 vector explanatory variable for group I,
ij = are the KX1 vector of coefficients.
The groups are shown as i =1,2…….N time periods as t =1,2,…….
t and μ = the fixed effects.
The re-parameterised panel-ARDL model equation is specified to show the short run and long run dynamic panel model as:

$$\Delta yit=(\phi iyi,t\text{-}1+ Y_t^1 \text{ Xi,t}) + \sum_{j=1}^{p-1} \lambda ijyi,t\text{-}j \sum_{j=0}^{q-1} \sigma_{ij}^{*}\text{Xi,t-1+ }\mu\text{t+ }\varepsilon\text{it-------(3.5)}$$

Where:
$\Delta yit=yit\text{-}yi,t\text{-}1$, ϕi *is the speed of adjustment*
If i = 0, this shows that the variables do not have a long run relationship.
$(\phi iyi,t\text{-}1+ Y_t^1 \text{ Xi, t})$ = Error correction term which represents the long run model

$$\sum_{j=1}^{p-1} \lambda ijyi,t\text{-}j$$

$$\sum_{j=0}^{q-1} \sigma_{ij}^{*}\text{Xi,t-1+ }\mu\text{t+ }\varepsilon\text{it----------(3.6)}$$

Therefore, the panel-ARDL model of the relationship between Non-performing Loan and bank performance is given as:

$$\Delta ROEit=(\phi iROEi,t\text{-}1+\beta 1NPL+\beta 2TBD+\beta 3LR+\beta 4CAR+ Y_t^1 \text{ Xi,t+ } \alpha 1NPL+Y_t^1 \text{ X}_2\text{,t)) + } \sum_{j=1}^{p-1} \lambda ijROEi,t\text{-}j+\Sigma_{j=1}^{p-1}\delta_{ij}^{*}NPL+\Sigma_{j=1}^{p-1}\delta_{ij}^{*}TBD+\Sigma_{j=1}^{p-1}\delta_{ij}^{*}LR+\Sigma_{j=1}^{p-1}\delta_{ij}^{*}CAR+$$

$$\sum_{j=0}^{q-1} \sigma_{ij}^{*}\text{Xi,t-1+ }\mu\text{t+ }\varepsilon\text{it----------(3.7)}$$

Where:
Xit = Vector of explanatory variables
μit = Error term
Δ = the differenced operator

3.3 Estimation Technique: Pooled Mean Group (PMG) Estimator

This study employs the Pooled Mean Group (PMG) estimator developed by Pesaran, Shin, and Smith (1999) to estimate the dynamic panel Autoregressive Distributed Lag (Panel ARDL) model. The choice of the Panel ARDL framework is motivated by the time-series properties of the variables employed in the study. Specifically, preliminary panel unit root tests are expected to indicate that the variables are integrated of mixed orders, that is, a combination of I(0) and I(1). Since the ARDL approach accommodates variables with mixed orders of integration, provided none is integrated of order I(2), it is considered the most appropriate estimation technique for this study.

Within the Panel ARDL framework, the PMG estimator is preferred because it permits heterogeneity in the short-run dynamics across banks while imposing homogeneity in the long-run coefficients. This assumption is appropriate because the selected commercial banks may differ in their short-run responses to changes in non-performing loans, liquidity conditions, and capital adequacy due to differences in management practices, operational structures, and customer composition. However, in the long run, these banks operate under the same regulatory framework

established by the Central Bank of Nigeria (CBN), suggesting that the long-run relationship between non-performing loans and financial performance is expected to be similar across banks.

Formally, the PMG estimator imposes the following restriction on the long-run coefficients:

$$B_i = \beta, \ \forall_i$$

while allowing the short-run coefficients, intercepts, and error variances to differ across banks:

$$\psi_{ij}, \gamma_{ij}, \alpha_i \neq \text{constant across i}$$

This specification enables the study to estimate a common long-run relationship between financial performance and its determinants while capturing bank-specific short-run adjustments.

The PMG estimator is particularly suitable for panels with a relatively small cross-sectional dimension and a moderate time dimension, as is the case for the selected commercial banks observed over the period 2014–2024.

To validate the appropriateness of the long-run homogeneity assumption imposed by the PMG estimator, the Hausman specification test is conducted to compare the PMG estimator with the Mean Group (MG) estimator. The MG estimator allows both short-run and long-run coefficients to vary across banks. The Hausman test evaluates the null hypothesis that the difference between the long-run coefficients estimated by the PMG and MG estimators is not systematic:

$$H_0: \beta_{PMG} = \beta_{MG}$$

Failure to reject the null hypothesis implies that the PMG estimator is both efficient and consistent, thereby justifying its use. Conversely, rejection of the null hypothesis would indicate that the homogeneity restriction is invalid, making the MG estimator more appropriate.

3..4 Diagnostic and Pre-Estimation Tests

Prior to estimating the Panel ARDL model, a series of diagnostic and pre-estimation tests are conducted to ensure the validity and reliability of the empirical results.

Panel unit root tests are employed to determine the order of integration of the variables. The study utilizes the Levin, Lin and Chu (LLC) test, Im, Pesaran and Shin (IPS) test, and the Fisher-type Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. These tests determine whether the variables are stationary at levels or first differences. The Panel ARDL methodology requires that all variables be integrated at either I(0) or I(1), with none integrated at I(2) (Pesaran et al., 2001).

A panel cointegration test is conducted to determine whether a stable long-run equilibrium relationship exists among the variables. The study employs the Pedroni and Kao residual-based cointegration tests. The existence of cointegration provides justification for estimating both the long-run and short-run dynamics using the Panel ARDL model.

The study examines cross-sectional dependence among the selected commercial banks using the Pesaran (2004) Cross-sectional Dependence (CD) test. Since commercial banks operate within the same macroeconomic environment and regulatory framework, shocks affecting one bank may spill over to others. Testing for cross-sectional dependence therefore helps ensure the reliability of the estimated coefficients.

3.5 Data and Variable Measurement

This study employs annual panel data for eight selected commercial banks in Nigeria over the period 2014–2024. The dependent variable is financial performance, proxied by Return on Equity (ROE), which measures the ability of shareholders' equity to generate profits. A higher ROE indicates greater efficiency in utilizing shareholders' funds to generate earnings and reflects stronger financial performance.

The principal explanatory variable is Non-Performing Loans (NPL), measured as the ratio of non-performing loans to total loans. It represents the proportion of loans that remain unpaid for more than 90 days and serves as a key indicator of credit risk. Higher NPL ratios are expected to exert a negative effect on bank performance because they increase loan loss provisions and reduce profitability (Gizaw et al., 2015).

The study also includes Liquidity Ratio (LR), measured as the ratio of liquid assets to total liabilities. Liquidity reflects the ability of banks to meet short-term obligations and withstand liquidity shocks. While adequate liquidity enhances operational stability and lending capacity, excessive liquidity may reduce profitability because idle liquid assets generate relatively lower returns (Kingu et al., 2018).

Another explanatory variable is Total Bad Debt (TBD), which represents the amount of loans that have become uncollectible due to borrower default. Bad debt is closely associated with non-performing loans and reflects realized credit losses arising from inadequate credit risk assessment or adverse macroeconomic conditions (Gitman et al., 2018; IMF, 2020). Higher levels of total bad debt are expected to negatively influence bank performance through increased write-offs and reduced earnings.

The study further incorporates Capital Adequacy Ratio (CAR), measured as the ratio of Tier 1 and Tier 2 capital to risk-weighted assets. CAR reflects the financial strength of a bank and its ability to absorb unexpected losses. Although higher capital requirements may reduce profitability by limiting leverage (Laryrea et al., 2016), well-capitalized banks are generally better positioned to withstand financial shocks, improve depositor confidence, and sustain long-run profitability (Kingu et al., 2018). The selection of these variables is guided by both theoretical considerations and empirical evidence regarding the determinants of commercial bank performance.

3.6 Post-Estimation Diagnostic Tests

Following model estimation, several post-estimation diagnostic tests are conducted to ensure the robustness of the estimated Panel ARDL model. The serial correlation test is conducted using the Breusch-Godfrey LM test to determine whether the residuals are independently distributed. The absence of serial correlation indicates that the estimated coefficients are efficient and unbiased. The heteroskedasticity test is performed using the Breusch-Pagan-Godfrey test to examine whether the variance of the residuals remains constant. Homoskedastic residuals ensure reliable statistical inference.

The Jarque-Bera normality test is employed to examine whether the residuals follow a normal distribution, which is an important assumption for valid hypothesis testing. The Ramsey RESET test is conducted to assess model specification by determining whether important explanatory variables have been omitted or whether the functional form of the estimated model is appropriate.

3.9 Validity of the Methodology Using Panel ARDL

The Panel Autoregressive Distributed Lag (Panel ARDL) model is considered a robust and appropriate methodology for examining both the short-run and long-run effects of non-performing loans on the financial performance of commercial banks. One of its principal advantages is its ability to estimate dynamic relationships among variables that are integrated of mixed orders, provided none is integrated of order I(2) (Pesaran et al., 2001).

The PMG estimator is particularly suitable because it accommodates short-run heterogeneity across banks while imposing a common long-run equilibrium relationship. This feature is especially relevant for Nigerian commercial banks, which may differ in operational practices, loan portfolio composition, and management strategies in the short run but are subject to the same regulatory environment established by the Central Bank of Nigeria.

Another important strength of the Panel ARDL approach is its ability to minimize endogeneity problems through the inclusion of lagged dependent variables, thereby producing consistent and efficient parameter estimates (Pesaran et al., 1999; Blackburne & Frank, 2007). The methodology also performs well with relatively small samples and moderate time dimensions, making it appropriate for the panel of eight commercial banks observed over the period 2014–2024.

4. Results and Discussions

Table 1b: Summary of Descriptive Statistics

Fidelity Bank	ROE	NPL	TBD	LR	CAR
Mean	0.070	0.043	0.627	1.005	1.118
Std. Dev.	0.036	0.087	0.250	1.556	0.660
Skewness	1.436	2.072	1.796	2.810	1.025
Kurtosis	4.811	5.742	5.534	9.426	3.857
Jarque-Bera	23.068	49.384	38.640	145.763	9.870
Probability	0.000	0.000	0.000	0.000	0.007
Observations	48	48	48	48	48
Zenith Bank					
Mean	0.167	0.419	0.386	0.431	0.625
Std. Dev.	0.043	0.066	0.119	0.088	0.398
Skewness	-1.003	-1.146	-1.904	1.590	-0.477
Kurtosis	3.530	2.882	6.348	4.450	1.727
Jarque-Bera	8.617	10.543	51.434	24.426	5.059
Probability	0.013	0.005	0.000	0.000	0.080
Observations	48	48	48	48	48
Unity Bank					
Mean	0.744	0.123	0.328	0.219	1.721
Std. Dev.	0.385	0.158	0.030	0.089	0.597
Skewness	1.892	0.835	-1.424	1.914	0.061
Kurtosis	4.933	2.401	3.826	7.991	2.632
Jarque-Bera	36.107	6.299	17.596	79.114	0.301
Probability	0.000	0.043	0.000	0.000	0.860
Observations	48	48	48	48	48
First City Monument Bank					
Mean	0.642	0.141	0.002	0.274	0.006
Std. Dev.	0.284	0.045	0.001	0.099	0.003
Skewness	2.196	-0.387	0.584	-1.385	0.508
Kurtosis	7.302	2.235	2.508	8.545	4.828
Jarque-Bera	75.599	2.369	3.213	76.856	8.743
Probability	0.000	0.306	0.201	0.000	0.013
Observations	48	48	48	48	48

Source: *Extract from E-view 13 Output, 2026*

Table 1b presents the descriptive statistics for Fidelity Bank, Zenith Bank, Unity Bank and First City Monument Bank, using 48 observations for each variable. The mean values show that Unity Bank recorded the highest average ROE at 0.744, followed by FCMB at 0.642, Zenith Bank at 0.167 and Fidelity Bank at 0.070. This suggests that Unity Bank and FCMB recorded stronger average financial performance over the period, while Fidelity Bank had the weakest average ROE. However, Unity Bank and FCMB also recorded relatively high standard deviations in ROE, indicating greater volatility in profitability. In terms of asset quality, Zenith Bank recorded the highest average NPL at 0.419, followed by FCMB at 0.141, Unity Bank at 0.123 and Fidelity Bank at 0.043. This suggests that Zenith Bank had the highest average exposure to non-performing loans,

while Fidelity Bank recorded the lowest. For total bad debts, Fidelity Bank had the highest average value at 0.627, followed by Zenith Bank at 0.386 and Unity Bank at 0.328, while FCMB recorded the lowest value at 0.002. This indicates that although Fidelity Bank had a low average NPL ratio, its total bad debts were comparatively high. Liquidity was highest in Fidelity Bank, with an average LR of 1.005, but the high standard deviation of 1.556 shows substantial instability in its liquidity position. Unity Bank recorded the highest average CAR at 1.721, followed by Fidelity Bank and Zenith Bank, while FCMB had the weakest capital adequacy position at 0.006.

The skewness and kurtosis values indicate that most variables are not symmetrically distributed and contain extreme observations. Fidelity Bank's variables are all positively skewed and leptokurtic, especially LR, suggesting occasional sharp upward movements in liquidity. Zenith Bank shows negative skewness in ROE, NPL, TBD and CAR, implying that these variables were pulled toward lower values, while LR is positively skewed. Unity Bank's ROE and LR are strongly positively skewed and highly peaked, showing volatility in profitability and liquidity, while its CAR is nearly symmetric. FCMB's ROE is highly positively skewed and leptokurtic, while LR is negatively skewed with high kurtosis, indicating strong outliers in liquidity behaviour. The Jarque-Bera probability values show that all Fidelity Bank variables are not normally distributed at the 5% level. For Zenith Bank, ROE, NPL, TBD and LR are non-normal, while CAR is approximately normal at the 5% level. For Unity Bank, ROE, NPL, TBD and LR are non-normal, while CAR is normally distributed. For FCMB, ROE, LR and CAR are non-normal, while NPL and TBD are approximately normal.

Table 2: Panel Unit Root Test Results

Variable	LLC t* stat. Level / Δ	Order of Integr.	IPS W-stat. Level / Δ	Order of Integr.	ADF Fisher Chi-square Level / Δ	Order of Integr.	PP Fisher Chi-square Level / Δ	Order of Integr.	Overall Decision
ROE	-1.08375 / -1.98278**	I(1)	-3.79337*** / -4.15557***	I(0)	42.44301*** / 55.13663***	I(0)	67.71398*** / 72.11460***	I(0)	Mixed, but largely I(0)
NPL	-2.27703** / 0.36686	I(0)	-3.72789*** / -3.60051***	I(0)	41.00966*** / 46.72258***	I(0)	19.54884 / 68.10241***	I(1)	Mixed, but largely I(0)
TBD	1.60214 / 4.05614	NC	-1.17446 / -1.21850	NC	34.44580*** / 45.83911***	I(0)	18.51433 / 63.98760***	I(1)	Mixed
LR	-1.13466 / -4.07077***	I(1)	-4.52658*** / -6.73342***	I(0)	50.15947*** / 76.71440***	I(0)	58.16804*** / 96.51517***	I(0)	Mixed, but largely I(0)
CAR	-2.05036** / -2.46476***	I(0)	-2.77559*** / -5.11218***	I(0)	37.22180*** / 60.37998***	I(0)	30.65694** / 97.39062***	I(0)	I(0)

Source: *Extract from E-view 13 Output, 2026*

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The panel unit root test results in Table 2 show mixed evidence on the stationarity properties of the variables. ROE, NPL, LR and CAR are largely stationary at level, as most of the IPS, ADF, and PP test statistics reject the unit-root null at conventional significance levels. This implies that these variables are mainly integrated of order zero, I(0), although some inconsistency exists under the LLC test for ROE and LR and under the PP test for NPL. CAR presents the strongest evidence of stationarity, as all four tests confirm stationarity at level, indicating that capital adequacy does not require differencing before estimation. TBD shows the weakest and most mixed unit root evidence. The LLC and IPS tests fail to confirm stationarity both at level and first difference, while the ADF test confirms stationarity at level and the PP test confirms stationarity after first differencing. This suggests that total bad debts have unstable stationarity behaviour across the different tests. Overall, the results indicate a combination of I(0), I(1) and mixed integration properties among the variables. Therefore, the variables are not uniformly integrated in the same order, making it inappropriate to rely on estimation techniques that require all variables to be strictly I(0) or strictly I(1). The mixed order of integration supports the use of a panel estimation approach that can accommodate different stationarity properties across variables.

Table 3: The Kao Residual Cointegration Test

Test	*t-Statistic*	*Probability*	*Residual variance*	*HAC variance*	*Decision*
ADF	-4.2397	0.0000***	0.003194	0.007221	Reject H0

Source: *Extract from E-view 13 Output, 2026*

In Table 3, the Kao residual cointegration test rejects the null hypothesis of no cointegration among ROE, NPL, TBD, LR and CAR, as the ADF statistic is negative and statistically significant at the 1% level, with a probability value of 0.0000. This means the residuals from the long-run relationship are stationary, indicating that the variables share a statistically significant long-run equilibrium relationship across the selected banks. The ADF test equation further supports this result, as RESID(-1) is negative and significant, suggesting mean reversion in the system. In other words, deviations from the long-run equilibrium are corrected over time, rather than persisting indefinitely. The implication is that bank profitability, asset quality, liquidity, capital adequacy and the treasury bill/deposit-related variable move together in the long run. Since the earlier Pedroni test did not confirm cointegration while the Kao test does, the evidence should be described as mixed but strengthened by the Kao result.

Table 4: The Johansen Fisher Panel Cointegration Test

HYPOTHESISED CE(S)	TRACE FISHER STATISTIC	TRACE PROBABILITY	TRACE DECISION	MAX-EIGEN FISHER STATISTIC	MAX-EIGEN PROBABILITY	MAX-EIGEN DECISION
NONE	139.9000	0.0000***	Reject H0	77.7500	0.0000***	Reject H0
AT MOST 1	80.4600	0.0000***	Reject H0	39.7600	0.0008***	Reject H0
AT MOST 2	51.6800	0.0000***	Reject H0	26.7500	0.0443**	Reject H0
AT MOST 3	39.3100	0.0010***	Reject H0	26.2900	0.0501*	Marginal at 5%
AT MOST 4	43.8000	0.0002***	Reject H0	43.8000	0.0002***	Reject H0

Source: *Extract from E-view 13 Output, 2026*

The Johansen Fisher panel cointegration test in Table 4 provides strong evidence of a long-run relationship among ROE, NPL, TBD, LR and CAR. Both the trace and maximum eigenvalue tests reject the null hypothesis of no cointegration at the 1% level, with Fisher statistics of 139.9 and 77.75, respectively. This confirms that the selected banking variables move together over the long run across the eight banks. The trace test rejects the null across all hypothesised ranks, while the maximum eigenvalue test also rejects the null up to at least three cointegrating relationships, with the "at most 3" result marginal at the 5% level. This suggests the presence of multiple long-run equilibrium relationships in the banking system, rather than a single weak cointegrating link. At the individual bank level, cointegration evidence is strongest for WEMA, GTB, FBN, Fidelity, Zenith, Unity and FCMB, while UBA shows weaker evidence, especially under the no-cointegration hypothesis. The implication is that bank profitability, asset quality, liquidity, capital adequacy and the treasury bill/deposit-related variable are not independent in the long run. This result strengthens the Kao test and offsets the weak Pedroni result.

Table 5: Correlation Matrix

	ROE	NPL	TBD	LR	CAR
ROE	1	0.028862	-0.15316	-0.17581	0.087987
NPL	0.028862	1	0.142898	-0.07507	0.078524
TBD	-0.15316	0.142898	1	0.089781	0.506057
LR	-0.17581	-0.07507	0.089781	1	-0.12852
CAR	0.087987	0.078524	0.506057	-0.12852	1

Source: *Extract from E-view 13 Output, 2026*

Table 5 presents the correlation matrix among ROE, NPL, TBD, LR and CAR. The result shows that the relationship between ROE and NPL is positive but very weak, with a coefficient of 0.028862. This suggests that, at the simple correlation level, non-performing loans do not have a strong direct association with bank performance. This result is somewhat different from the dominant empirical position in Chapter Two, where studies such as Eniale (2020), Gabriel et al. (2019), Echobu (2019), Lydnon et al. (2016), and Çollakua and Aliu (2021) generally found that non-performing loans weaken bank profitability. However, since correlation does not control for other variables, the weak positive relationship should not be interpreted as evidence that NPLs improve performance. It only indicates that the bivariate association is weak before considering liquidity, capital adequacy and total bad debts.

The correlation between ROE and total bad debt is negative at -0.153160, while the correlation between ROE and liquidity ratio is also negative at -0.175810. These results suggest that higher bad debts and higher liquidity holdings are associated with lower profitability, although both relationships are weak. The negative relationship between bad debts and ROE is consistent with the position of Agarwal et al. (2022), Gabriel et al. (2019), and Echobu (2019), who argued that bad loans reduce bank profitability by increasing provisions, weakening asset quality and constraining lending capacity. The negative association between liquidity and ROE also agrees with the liquidity-profitability trade-off noted in the literature, especially Konadu (2020), where excessive liquidity was found to reduce profitability because liquid assets often generate lower returns than loans and investments.

The correlation between CAR and ROE is positive but weak, with a coefficient of 0.087987. This suggests that stronger capital adequacy may be associated with better performance, although the relationship is not strong at the correlation level. This partly supports the argument that well-capitalised banks are more resilient and can absorb shocks better, as discussed in the conceptual review on capital adequacy. However, the strongest correlation in the table is between TBD and CAR at 0.506057, which is moderate and positive. This implies that banks with higher total bad debts may also hold stronger capital buffers, possibly as a response to credit-risk exposure.

Table 6: Model Selection Criteria

Model	LogL	AIC*	BIC	HQ	Specification
1	1033.604258	-5.674013	-5.095936	-5.443821	ARDL(1, 1, 1, 1, 1)
2	1050.211632	-5.585038	-4.651221	-5.213189	ARDL(1, 2, 2, 2, 2)

Source: *Extract from E-view 13 Output, 2026*

Table 6 presents the model selection criteria for the panel ARDL estimation. Two model specifications were compared, namely ARDL(1, 1, 1, 1, 1) and ARDL(1, 2, 2, 2, 2). Although the second model has a higher log likelihood value of 1050.211632 compared with 1033.604258 for the first model, the decision is based mainly on information criteria, especially the Akaike Information Criterion. The ARDL(1, 1, 1, 1, 1) model records the lowest AIC value of -5.674013, compared with -5.585038 for the second model. The same model also has a lower BIC and HQ value than the alternative specification, making it the more parsimonious and statistically preferred model.

The choice of ARDL(1, 1, 1, 1, 1) is appropriate because it balances goodness of fit with model simplicity. This is important in panel banking studies because over-parameterisation can reduce efficiency and distort inference, especially when the time dimension is limited. The selected model also fits the methodological direction of the study, since the unit root and cointegration results indicate mixed stationarity and a long-run relationship among the variables. This is consistent with the empirical studies reviewed in Chapter Two that used dynamic models to examine the relationship between non-performing loans, liquidity, capital adequacy and bank performance, including Patwary and Tasneem (2019), Atoi (2018), and Makri et al. (2019). The selected model therefore provides a suitable basis for estimating both short-run adjustments and long-run equilibrium effects.

Table 7: Panel ARDL Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation				
NPL	0.246161	0.10685	2.303799	0.0219
TBD	0.214992	0.289611	0.74235	0.4584
LR	0.185775	0.086859	2.1388	0.0332
CAR	-0.16406	0.067895	-2.41641	0.0162
Short Run Equation				
COINTEQ	-0.44283	0.018928	-2.26298	0.0243
D(NPL)	0.242998	0.097321	2.496875	0.013
D(TBD)	1.662335	2.3896	0.695654	0.4871
D(LR)	-0.46485	0.608535	-0.76388	0.0135
D(CAR)	2.479305	2.459978	1.007856	0.0123
C	0.020121	0.010577	1.902396	0.058

Source: *Extract from E-view 13 Output, 2026*

As shown in Table 7, the error correction term is negative and statistically significant, with a coefficient of -0.442830 and a probability value of 0.0243. This confirms the existence of a stable long-run adjustment mechanism among ROE, NPL, TBD, LR and CAR. The coefficient implies that about 44.3% of any short-run disequilibrium in bank performance is corrected each quarter. This means that when profitability deviates from its long-run equilibrium path due to shocks in non-performing loans, total bad debts, liquidity ratio or capital adequacy ratio, the system adjusts back toward equilibrium at a moderate speed. This supports the earlier cointegration evidence and confirms that the variables maintain a meaningful long-run relationship.

For non-performing loans, the long-run coefficient is positive and statistically significant, with a value of 0.246161 and a probability value of 0.0219. This suggests that NPL has a significant long-run relationship with ROE among the selected commercial banks. However, the positive sign differs from the dominant expectation in the empirical literature, where studies such as Eniale (2020), Gabriel et al. (2019), Echobu (2019), Lydnon et al. (2016), and Çollakua and Aliu (2021) found that non-performing loans reduce bank profitability. The result may reflect the risk-return behaviour of banks, where higher credit-risk exposure may initially be associated with higher interest earnings before the full cost of default materialises. In the short run, D(NPL) also has a positive and statistically significant coefficient of 0.242998, with a probability value of 0.0130. This indicates that short-run changes in NPL are associated with changes in ROE, although the positive direction should be interpreted cautiously because it runs against the usual credit-risk argument that rising NPLs weaken profitability through provisioning costs and asset-quality deterioration.

For total bad debts, the long-run coefficient is positive but statistically insignificant, with a coefficient of 0.214992 and a probability value of 0.4584. This means that total bad debts do not exert a meaningful long-run effect on ROE in the selected banks. Although the coefficient is positive, the insignificant probability value shows that the effect is too weak to support any firm conclusion. This differs from the findings of Agarwal et al. (2022), Gabriel et al. (2019), and Lydnon et al. (2016), who reported that bad loans and non-performing assets weaken bank performance. In the short run, D(TBD) also has a positive but statistically insignificant coefficient of 1.662335, with a probability value of 0.4871. This implies that short-run movements in total bad debts do not significantly explain changes in bank profitability. Therefore, the study should conclude that total bad debts have no statistically significant effect on ROE in either the short run or the long run.

For liquidity ratio, the long-run coefficient is positive and statistically significant, with a coefficient of 0.185775 and a probability value of 0.0332. This implies that liquidity ratio improves bank performance in the long run. The result suggests that banks with stronger liquidity positions are better able to meet obligations, maintain depositor confidence and support stable intermediation activities. This aligns with the liquidity theory of credit, which emphasises the role of liquidity in sustaining credit creation and banking stability. However, it differs from studies such as Konadu (2020), which reported a negative relationship between liquidity and profitability, reflecting the usual trade-off between holding liquid assets and investing in higher-yielding assets. In the short run, D(LR) has a negative coefficient of -0.464850, suggesting that short-run increases in liquidity may reduce ROE, possibly because excess liquid assets may limit immediate income-generating lending. However, the reported probability value of 0.0135 appears inconsistent with the t-statistic of -0.763880, so the statistical significance should be verified from the original EViews output before final submission.

For capital adequacy ratio, the long-run coefficient is negative and statistically significant, with a coefficient of -0.164060 and a probability value of 0.0162. This indicates that capital adequacy has a significant negative effect on ROE in the long run. The result suggests that although capital buffers improve bank resilience, excessive capital holdings may reduce profitability by lowering leverage and limiting the return generated on shareholders' equity. This finding is close to Echobu (2019), who reported a negative effect of capital adequacy on bank financial performance, although his result was not statistically significant. In the short run, D(CAR) has a positive coefficient of 2.479305, suggesting that short-run improvements in capital adequacy may support ROE by strengthening confidence and loss-absorbing capacity. However, as with the liquidity result, the reported probability value of 0.0123 appears inconsistent with the t-statistic of 1.007856. The result should therefore be checked against the original EViews output before making a final claim on short-run significance.

Table 7 shows that NPL, liquidity ratio and capital adequacy ratio significantly affect bank performance in the long run, while total bad debts do not have a statistically significant effect. In the short run, NPL is reported to have a significant positive effect on ROE, while total bad debts remain insignificant. The short-run results for liquidity ratio and capital adequacy ratio require verification because the reported t-statistics and probability values are not fully consistent

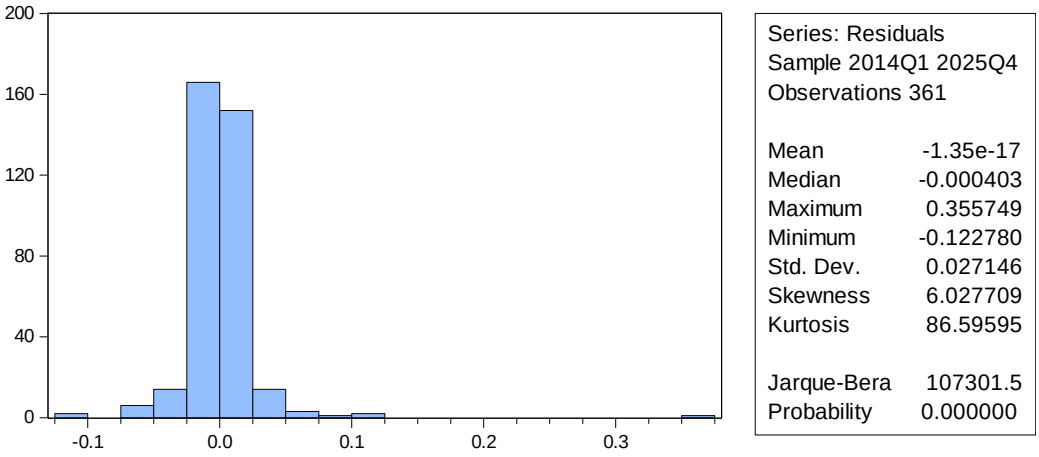

Figure 1: Histogram – Normality Test
Source: *Extract from E-view 13 Output, 2026*

Figure 4.1 presents the histogram normality test for the residuals of the estimated model. Although the residuals have a mean close to zero, the Jarque-Bera statistic of 107301.5 with a probability value of 0.0000 indicates that the residuals are not normally distributed. The high positive skewness (6.027709) and excessive kurtosis (86.59595) suggest the presence of extreme observations and structural shocks within the sample period. This non-normality may reflect major macroeconomic and banking sector disturbances, including recessionary episodes, exchange rate volatility, the COVID-19 pandemic, regulatory changes, and variations in asset quality across banks. The finding is consistent with previous empirical studies (Ejem, 2023; Makri et al., 2019; Atoi, 2018; Ekanayake & Azeez, 2015), which argue that bank performance and non-performing loans are significantly influenced by both bank-specific and macroeconomic shocks.

5. Conclusion and Policy Recommendations

This study examined the effect of non-performing loans on the performance of selected commercial banks in Nigeria using quarterly data spanning 2014Q1 to 2025Q4. Specifically, the study investigated the effects of non-performing loans (NPL), total bad debts (TBD), liquidity ratio (LR), and capital adequacy ratio (CAR) on bank performance measured by return on equity (ROE) within a Panel ARDL framework. The results reveal the existence of a stable long-run relationship among the variables, indicating that bank performance is jointly influenced by credit quality, liquidity management, and capital adequacy over time.

In the long run, non-performing loans exert a positive and statistically significant effect on return on equity, while liquidity ratio also has a positive and significant influence on bank performance. In contrast, capital adequacy ratio has a negative and statistically significant effect on return on equity, suggesting that although stronger capital buffers enhance financial stability, excessive capital holdings may reduce shareholders' returns when not efficiently deployed. Total bad debts, however, have a positive but statistically insignificant effect on bank performance, implying that they do not independently explain variations in profitability during the study period. The short-run results indicate that liquidity and capital adequacy exhibit different adjustment patterns, while the

significant and negative error correction term confirms that deviations from long-run equilibrium are corrected at a moderate speed.

The findings suggest that the performance of Nigerian commercial banks depends not only on the quality of their loan portfolios but also on effective liquidity management and optimal capital structure. Although the positive relationship between non-performing loans and profitability differs from conventional expectations, it may reflect the risk-return trade-off in bank lending, where higher-risk loan portfolios initially generate higher interest income before default costs fully materialize. Consequently, sustainable bank performance depends on maintaining sound credit risk management practices while balancing liquidity and capital requirements.

Policy Recommendations

Commercial banks should strengthen their credit risk management frameworks by improving loan appraisal, borrower monitoring, and recovery mechanisms. Greater emphasis should be placed on rigorous credit assessment, continuous loan monitoring, and early warning systems to prevent the accumulation of non-performing loans and preserve asset quality.

Banks should maintain an optimal liquidity position that supports profitability without creating excessive idle funds. While adequate liquidity enhances long-run financial performance and strengthens depositor confidence, excessive liquidity holdings should be minimized through efficient allocation of funds into productive lending and investment opportunities. The Central Bank of Nigeria should continue to monitor banks' liquidity positions to safeguard financial system stability.

Commercial banks should optimize their capital structure by ensuring that capital adequacy requirements are balanced with efficient capital utilization. Rather than maintaining excessive idle capital solely for regulatory compliance, banks should deploy available capital toward productive, well-managed assets that enhance profitability while maintaining adequate resilience against potential financial shocks. Regulatory authorities should also ensure that capital regulations promote both banking sector stability and sustainable financial performance.

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