



# Impact of Credit Default on the Capital Adequacy Ratio of Quoted Deposit Money Banks in Nigeria

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## Abstract

The need for the proper and efficient management of credit default and capital adequacy ratio of the quoted deposit money banks (QDMBs) in Nigeria is urgent. It continues to constitute challenges detrimental to the Nigerian banks' progress and, by extension, the country's economy at large. This study, thus, investigates the impact of credit default on the credit adequacy ratio of QDMBs in Nigeria. Thirteen (13) deposit money institutions listed on the Nigerian stock exchange were utilised to accomplish the purpose, and panel data was obtained between 2011 and 2023. This study adopts Modern Portfolio Theory (MPT) as the theoretical framework. Developed by Harry Markowitz in the 1950s, MPT is the foundation for creating investments that maximise return while minimising risk. The basis for this is that investors are rational and risk-averse and can create different investments to optimise the risk-return of the business. According to this theory, banks acquire assets from assets to manage credit risk. The study used panel regression analysis to establish the relationship between dependent and independent variables. The panel regression results confirm that both credits spread, and non-performing loans substantially and favourably affect banks' tier 1 capital ratios. Furthermore, the loan loss provision and regulatory capital have a negligible effect on banks' tier 1 capital ratios during the specified period. This study concluded that banks' tier 1 capital ratios are increasingly affected by the influence of non-performing loans and credit spread, which forms their credit default on their capital adequacy ratio. This study recommended that the management of Nigeria's publicly traded Deposit Money Banks should strive to minimise losses from bad debts arising from non-performing loans and

other relevant credit charges while maintaining a satisfactory level of overall and easily convertible assets, as immediate action is necessary to prevent further deterioration of the banking sector.

## Subject Areas

Economics

## Keywords

Credit Defaults, Capital Adequacy Ratio, Tier 1 Ratings, Quoted Deposit Money Banks, Nigeria

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## 1. Introduction

The stability and efficiency of financial institutions are crucial not just for global economic growth but also for the well-being of the local economy. The capital adequacy ratio (CAR) plays a pivotal role in assessing banks' financial health; adequate capital ensures banks can absorb losses and meet capital requirements [1]. The Basel Accords, particularly Basel III, impose stricter regulations on capital adequacy to protect banks against credit defaults and other financial risks. African businesses are diverse, with varying regulatory compliance and challenges. However, credit defaults significantly impact banks' profitability and stability, posing a threat to the financial health of these institutions that should not be underestimated [2]. Banks in Africa, including Nigeria, often face higher interest rates due to economic instability, low loan portfolios, and high non-performing loans. Even with these efforts, credit failures continue to create competition in the economy and affect the capital adequacy of deposit banks [3]. These violations cause banks to gain resources, reduce profits and undermine trust in the financial system [4]. The Nigerian banking sector, a crucial economic player, provides essential financial services to individuals and businesses. Despite its significance, the sector has faced numerous challenges, including credit default. This occurs when borrowers fail to meet their debt obligations, resulting in losses for banks and potentially impacting their CAR [5]. CAR, a crucial measure of a bank's financial health, represents the proportion of its capital to risk-weight assets. They shield against potential losses and ensure banks have sufficient capital to weather unexpected shocks. However, credit defaults can erode a bank's capital base, leading to a decline in its CAR below regulatory requirements. The Central Bank of Nigeria (CBN), recognising the gravity of the situation, has implemented measures to mitigate these risks. However, persistently high risk requires greater caution and robust risk management to maintain capital adequacy and financial stability [6].

In Nigeria, the issue of credit default has been impaired by various factors, including economic downturns, inadequate risk management practices, and weaknesses in the legal and regulatory framework. These challenges have resulted in high levels of non-performing loans (NPLs) within the banking sector, constraining

banks' ability to lend and undermining their overall financial stability [7]. Despite the significant implications of credit default on DMBs' CARs and the importance of maintaining adequate capital buffers for financial stability, there is a notable gap in empirical research examining the specific impact of credit default on the CARs of quoted DMBs in Nigeria. Another notable gap is the inability of studies to effectively combine the proxies of credit default: non-performing loans, loan loss provisions, credit rating, credit spreads and that of the dependent variable (Capital Adequacy Ratio) as return on equity and leverage ratio as proxies. This gap in understanding hinders the development of effective risk management strategies and regulatory interventions to mitigate the adverse effects of credit default on the stability and resilience of the banking sector [8]. Therefore, there is a pressing need for comprehensive empirical analysis to elucidate the relationship between credit default and CARs, providing insights that can inform policy decisions and enhance the financial stability of Nigerian banks. Existing studies often overlook the specific dynamics of the Nigerian banking sector, including its regulatory environment, market structure, and unique risk factors [9].

This study's significance lies in its potential to provide crucial insights into how credit default impacts the capital adequacy ratios (CARs) of quoted deposit money banks (DMBs) in Nigeria. Understanding this relationship is essential for enhancing financial stability, improving risk management practices, informing regulatory frameworks, bolstering investor confidence, and fostering economic development [10]. By addressing this gap in the literature, the study offers valuable insights for academia, industry practitioners, policymakers, investors, and society, contributing to theoretical understanding and practical applications in banking and finance. Policymakers, regulators, investors, and bank management must understand how credit default affects Nigeria's CARs of quoted DMBs [11]. The study aims to investigate how credit default impacts the capital adequacy ratios (CARs) of quoted deposit money banks (DMBs) in Nigeria. It seeks to analyse the relationship between credit default and CARs, identifies influential factors, evaluate risk management practices' effectiveness, and offers empirical evidence to inform policy, regulation, and risk management strategies [12]. This research addresses a crucial gap in understanding the dynamics of the Nigerian banking sector, providing valuable insights for stakeholders aiming to enhance financial stability and resilience in the face of credit default challenges [13]. This study addresses this knowledge gap by analysing financial reports and regulatory disclosures [14]. It seeks to provide empirical insights into the relationship between credit default, capital adequacy, and the overall financial stability of Nigerian banks. The study examined the impact of credit default on the capital adequacy ratio of quoted deposit money banks in Nigeria. The study's target population consisted of the 13 quoted deposit money banks on the Nigerian Stock Exchange. The understanding gained from this study is crucial for fostering a sound and resilient banking sector that supports economic growth and development in Nigeria. The remainder of the sections will be presented as Literature review, methodology,

findings, discussion, and conclusions.

## 2. Theoretical Framework

Banks face many risks, such as credit, liquidity, market, exchange rate, interest rate, foreign exchange, and operational and political risk. However, the focus of this study is credit risk. Among the risks banks face, credit risk (sometimes called credit default) is a significant concern for most banks and their managers [15]. Credit risk refers to the borrower's default and default in debt repayment [16]. The Basel Committee (2021) defines credit risk as the possibility that the borrower in a company or a partner cannot fulfill its obligations under the approved conditions or that a partial or complete loan will arise due to a credit event. [17] states that credit risk is the most critical and significant risk associated with financial institutions, and its impact on performance is significant compared to other risk factors. Credit risk refers to financial loss from the borrower's failure to fulfill its commitments. The debtor may be the debtor, the appraiser, the seller or the guarantor. Credit risk is the most critical risk that banks face in daily business banking, not only through direct lending and commercial lending but also through loan agreements, guarantees, letters of credit, and reverse-purchased securities. Bonds and deposits from financial institutions, brokerage firms and contract markets are exposed to credit risk. Funds cannot be transferred to third parties.

[18] view credit risk management as a joint effort between functions and activities that manage and direct the institution's risks by combining strategies that manage critical risks and processes related to the institution's objectives. [19] showed that banks manage credit risk to increase income (profitability) and reduce credit losses due to lack of credit. Therefore, banks with better risk management strategies should have lower non-performing loans [15]. [20] agrees that the lack of credit risk management causes major financial problems in banks. Additionally, representations of different topics are briefly discussed. Capital adequacy ratio refers to the value of shareholders' equity and other assets. This storage area protects rescuers from getting lost [21]. According to Basel II regulations, banks' CAR must be at least 10%. Similarly, the Central Bank of Nigeria (CBN), the top regulator of Nigerian banks, requires a capital adequacy ratio of at least 10% for domestic and 15% for international banks. Asset quality is measured by the ratio of total non-performing loans to total loans. This ratio shows the credit risk of the deposit bank. Measuring where the bank is exposed to credit risk shows how much of the bank's loans and advances turn into non-performing loans [22]. Performance management (price-income ratio) is frequently used in financial markets. It is an essential indicator of how prices change in terms of income [22]. The cost-earnings ratio measures a bank's ability to generate profits from limited resources. Rajkumar and Hanitha (2021) stated that the higher the ratio, the better the result. The liquidity coverage ratio helps improve the bank's risk in the short term [23]. Financial performance refers to a firm's ability to generate new capital through daily operations over time, measured by revenue and cash flow. To measure financial

performance, organisational researchers often use financial measures based on profitability ratios, such as ROA, return on sales (ROS), and ROE, or market value measures, such as Tobin's Q and return on business [24].

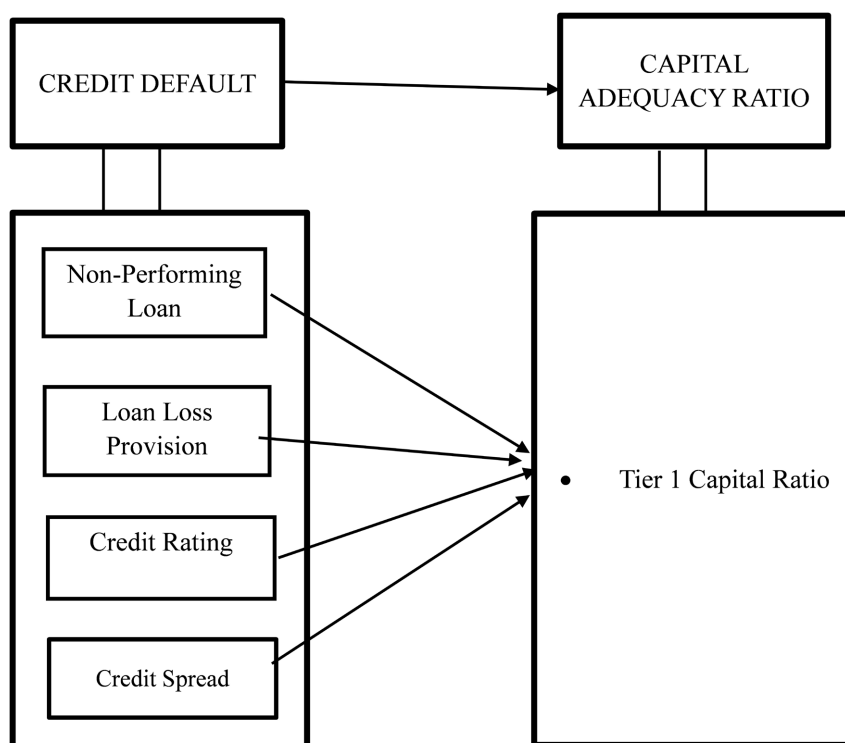
Tier 1 capital adequacy is a crucial measure of a bank's financial strength, focusing on critical resources such as products and promotional materials. This ratio is essential for ensuring that banks can cover financial losses without disrupting their operations, thereby upholding stability and confidence in the financial sector. In Nigeria, loan defaults have significantly impacted deposit banks' Tier 1 capital adequacy. High levels of non-performing loans (NPLs) make capital even more critical, as banks are forced to write off bad debts, reducing their capital [25]. This decrease in capital diminishes banks' ability to absorb additional losses, may raise regulatory concerns, and could necessitate additional capital to meet regulatory requirements. The ongoing credit crisis in Nigeria, stemming from economic fluctuations, poor credit risk assessment, and high interest rates, has considerably strained banks' capital. As default rates rise, banks must allocate more capital to cover non-performing loans, depleting their Tier 1 capital and adversely affecting their capital adequacy [26]. This underscores the importance of robust credit risk management and regulatory oversight to uphold the financial stability of Nigerian banks. Financial metrics relate to past or short-term financial performance, while economic metrics relate to future or long-term financial performance. This study uses modern research as a theoretical framework. Based on this perspective, banks range from assets to credit risk management, which includes assessing the quality of loans and other credit risks, applying credit risk, and collecting analysis results to determine the necessary information. [27] argue that asset-by-asset evaluation is the analysis of credit quality and internal borrowing cost risk. [28] also argued that credit analysis and credit risk allow management to identify changes in individual loan or portfolio trends over time. The asset-to-asset ratio is essential for risk management but does not provide a complete picture of credit risk [29].

Therefore, to understand credit risk more deeply, banks seek ways to add assets from assets and analyse data using credit models. Banks are increasingly addressing the problem of assets being unable to assess individual shocks using market-based approaches adequately. [30] finds that market theory assumes that investors generally seek to maximise return on investment at a given level of risk. It also provides a framework for informing and evaluating risk capital and establishing a relationship between risk and expected return. One of the weaknesses of the heritage-based approach is the difficulty in identifying and measuring concentration. Subprime risk is another risk arising from increased exposure to the borrower or a group of related borrowers [31].

### **Conceptual Framework (See Figure 1)**

Non-performing loans (NPLs) are loans where borrowers fail to make scheduled payments, indicating poor asset quality and increased credit risk for banks. High levels of NPLs typically lead to higher Loan Loss Provisions (LLPs), as banks set aside

reserves to cover potential losses from these bad loans. This increases short-term costs but provides a financial buffer. High NPLs and LLPs can negatively impact a bank's credit rating by signalling higher credit risk and potential financial instability.



**Figure 1.** Shows the link between credit default and capital adequacy ratio. Author's Conceptualization, (2024).

Credit ratings, provided by rating agencies, assess borrowers' creditworthiness. Poor credit ratings increase borrowing costs and restrict access to capital markets.

Credit spreads, which measure the yield difference between corporate and risk-free government bonds, reflect borrowers' perceived credit risk. Lower credit ratings result in broader credit spreads as investors demand higher yields to compensate for increased risk.

Consequently, increased NPLs and LLPs signal higher credit risk, leading to lower credit ratings and wider credit spreads. This sequence affects banks' and corporations' borrowing costs and financial stability, highlighting the interconnected nature of NPLs, LLPs, credit ratings, and credit spreads in credit risk management and financial stability.

The Tier 1 capital ratio measures a bank's core capital as a percentage of its risk-weighted assets (RWAs). This metric is crucial for assessing a bank's financial strength and stability. Tier 1 capital includes standard equity tier 1 (CET1) capital, which consists mainly of common shares and retained earnings, and additional tier 1 (AT1) capital, which includes other financial instruments considered to have a similar loss-absorbing capacity.

This study adopts Modern Portfolio Theory (MPT) as the theoretical framework.

Developed by Harry Markowitz in the 1950s, MPT is the foundation for creating investments that maximise return while minimising risk. The basis for this is that investors are rational and risk-averse and can create different investments to optimise the risk-return of the business. According to this theory, banks acquire assets from assets to manage credit risk. This approach involves assessing lousy credit and other credit risks using the credit risk factor and combining the results to determine portfolio loss. The basis of the asset approach is a solid credit recovery and risk assessment system. [32] also argued that credit analysis and credit risk allow management to identify changes in individual loan or portfolio trends over time. The asset-to-asset ratio is essential for flawed debt analysis but does not provide a complete picture of creditworthiness. Therefore, to understand the credit market more deeply, banks are increasingly trying to identify assets and assets using credit money models. Banks are increasingly struggling with the problem of assets not being sufficient to measure the shock of the individual using the operating method. [33] found that economic theory assumes that investors generally seek to maximise risk and provides a framework for identifying and analysing the relationship between risk and expected return in investment and development strategies. A weakness of the property-based approach is the difficulty in defining and measuring concentration. MPT helps investors make decisions by evaluating the risk-return of the business and determining the best fund allocation according to the investor's goals and risks.

Another risk that increases the impact on the debtor or group of debtors is high. Two methods are used in the traditional business method: professional methods and credit scoring models. The expert system leaves credit decisions to loan officers. The loan officer must rely on knowledge, judgment, and weighing of some of the most critical factors in the loan decision [34]. The traditional approach is to evaluate the borrower's credit score based on the opinion or opinion of the loan officer. However, heuristic decision-making is not necessarily arbitrary or arbitrary as it has been over the years, allowing people to identify solutions quickly. Banks always use 5C credit standards to evaluate the creditworthiness of borrowers. The 5Cs of credit are mnemonic tools for attributes, capabilities, conditions, financing, and capital [35]. Weaknesses of Modern Portfolio Theory (MPT) include reliance on assumptions such as investor rationality and market efficiency, the possibility of miscalculations of risk and forecast returns, poor performance in business environments, and limitations on diversification. Current issues include market dynamics, investor limitations, and the complexity of the MPT mathematical framework. While MPT provides excellent insight, investors must be aware of its limitations and complement it with additional analytical tools for effective data management. Despite the above criticisms, the theory will continue to be used due to its advantages in diverging results, rigorous quantitative analysis, well-established methods and quality of the field, the basis of asset allocation and understanding of the field—Risk management.

Similarly, a study by [36] examined the impact of credit risk management on

the profitability of six business enterprises in Ghana using the impact model. The study uses non-performing loans, loan loss ratio, loan/asset ratio and capital adequacy as credit risk indicators. In contrast, return on equity (ROE) measures profitability. The results show that capital adequacy is related to bank profitability. In contrast, loan defaults, loan loss ratios, and loan-to-asset ratios have a statistically negative relationship with bank profitability. Similarly, the study by Marshal and Onyekachi (2021) used panel regression analysis to investigate the relationship between credit risk and the performance of five deposit banks in Nigeria from 1997 to 2011. The ratio to total deposits positively impacts bank performance as measured by return on equity. (ROE).

Additionally, [37] analysed the impact of risk management on bank deposit performance and bank lending in Nigeria using data for the period 1998-2014 obtained from the 2014 Statistical Bulletin (CBN) of the Central Bank of Nigeria and the 2015 World Bank Development Indicators (WDI). Various regression results show that non-performing loans do not affect bank loan growth. On the other hand, the loan/deposit ratio positively affects bank loans. Ogboi and Unuafé (2023) examined the impact of risk management and capital adequacy on financial performance using evidence from 6 deposit banks in Nigeria from 2005 to 2009. When the results of the Ordinary Least Squares (OLS) method are compared, it is seen that the ratio of non-performing loans to loans and advances and the ratio of bad loans to debtors and capital are not related to financial performance. On the other hand, the ratio of loans and advances to total deposits has a negative impact on financial performance. The authors also reported the positive relationship between capital adequacy ratio (CAR) and financial performance represented by ROA.

Furthermore, a study by [38] examined the impact of credit risk management on the financial performance of two state-owned enterprises in Sri Lanka. It used the CAMEL index for credit risk management and ROE as a financial indicator. Performance indicator. Multivariate OLS regression found that capital adequacy, asset quality, management performance, and efficiency were negatively associated with financial performance. In contrast, income has a positive relationship with financial performance. [39] evaluate the relationship between credit risk management and profitability in European banks. Based on the results obtained, the authors use non-performing loans and capital adequacy as indicators for credit risk return on assets (ROA) and return on equity (ROE). The results show that non-performing loans have a positive effect on profitability, and capital adequacy has a negative effect. [40] used a panel data approach to examine the role of credit risk management in pricing in 10 deposit banks in Nigeria between 2006 and 2010. Research results show that the rate of non-performing loans indicates that the ratio of non-performing loans to loans and advances positively impacts ROE. In contrast, the ratio of non-performing loans and advances for all loans and advances has no impact on ROE. In a study of 10 deposit banks in Nigeria, [41] evaluated the relationship between risk management and financial performance

from 2006 to 2009. Additionally, non-performing loans and performance do not significantly impact business results such as return on capital employed (ROCE), return on assets (ROA), and ROE.

Despite extensive research on the correlation between non-performing loans and capital adequacy of deposit banks in Nigeria, there are still significant gaps in the literature. [42] point out that the relationship between exchange rates and capital extends beyond bank deposits, and many studies generalise findings across different industries or financial institutions without focusing on the specific Nigerian context. While most studies emphasise the impact of credit and risk on financial performance, they often overlook other important factors, such as credit scores and credit spreads, as well as insufficient attention to Nigeria's unique economic and regulatory environment, suggesting further research. Although it is known that non-performing loans influence capital adequacy ratios, the exact mechanisms and consequences in Nigeria are still unclear, especially regarding how economic instability, policy changes, and trade specifically impact this relationship. Additionally, most studies rely on qualitative tests or case studies and lack accurate analyses to identify significant determinants of changes in capital adequacy due to non-performing loans and other complex nonlinear problems. Long-term studies are also necessary to track changes in these effects over time. Furthermore, existing theoretical frameworks often use international models that may not be suitable for the specific needs of the banking sector in Nigeria. Developing a theoretical model that considers Nigeria's unique financial ecosystem is crucial in addressing the challenges of the Nigerian business economy.

### 3. Methodology

This study adopts ex-post factor and longitudinal research designs to analyse the impact of credit default proxies by non-performing loans, loan loss provisions, credit ratings, and credit spread on the capital adequacy ratio surrogated by leverage ratio and return on equity. The use of secondary data, which the researcher has no power to manipulate, and panel data, which combines time series (2014-2023) and cross-sectional units (13 banks), justify the choice of the designs. The study utilised 13 deposit money banks quoted on the banking sub-sector of the Nigerian Stock Exchange (NSE) as of 31st December 2023 and remained listed on 31st December 2023. The quoted deposit money banks used in this study are Access Bank Nigeria Plc, Stanbic IBTC Bank Plc, Fidelity Bank Plc, Guaranty Trust Bank Plc, Sterling Bank Plc, United Bank for Africa Plc, Union Bank of Nigeria Plc, Unity Bank Plc, Wema Bank Plc and Zenith Bank Plc, Eco bank plc, First City Monument Bank and First Bank Plc. Data will be obtained from the bank's annual reports, and financial statements utilised in this study. Specifically, the income statements, statements of the financial positions, notes to the financial statements, results briefly, and risk management portion of the annual reports will be utilised in data gathering; in measuring the study variables, the procedures adopted by [30] were utilised. CAMEL components and ROE are measured using the [43]

approach, while the Leverage ratio is defined using the formula adopted by [44]. **Table 1** presents the variables and how they are measured.

This study adopts descriptive statistics and panel regression as analysis techniques. Descriptive statistics consisting of mean, median, minimum, maximum, standard deviation, coefficient of variation, skewness and kurtosis are utilised in the present study for data presentation. Panel data techniques comprising Pooled Ordinary Least Squares (POLS), Fixed Effects Model (FEM) and Random Effects Model will be used in analysing the impact of the independent variables on the dependent variable. To deal with problems of Heteroscedasticity and autocorrelation, Robust Heteroscedasticity-and Autocorrelation Consistent (HAC) standard errors will be used for POLS and FEM, and Generalized Least Squares (GLS) will also be utilised for REM. Variance Inflation Factor (VIF) is employed to ascertain the existence or otherwise of multicollinearity among the explanatory (independent) variables.

This study used the Rajkumar and Hanitha (2022) model to examine how credit default affects the capital adequacy ratio of quoted deposit money banks in Nigeria. The following is the functional model specification for the study:

$$T1CR = f(NPL, LLP, CRSP, CRRT) \quad (1)$$

Hence, the econometrical form of the equation is:

$$TICR_{i,t} = \beta_0 + \beta_1 NPL_{i,t} + \beta_2 LLP_{i,t} + \beta_3 CRSP_{i,t} + \beta_4 RGS_{i,t} + \mu_0 \quad (2)$$

where:

T1CR = Tier 1 Capital Ratio

NPL = Non-Performing Loan

LLP = Loan Loss Provision

CRS = Credit Spread

RGS = Regulatory Capital

$\beta_1 - \beta_3$  = Beta coefficient that measures the sensitivity of variable X to change in variable Y(ROE)

$\beta_0$  = constant

$\mu_0$  = error term

## 4. Results and Discussion

### Descriptive Statistics

The outcome of **Table 1** delineates the descriptive statistics for the data obtained between 2011 and 2023 for this study. It shows that the variable with the highest range is LLP, and the lowest is NPL, with 800.85 and 122.38, respectively. Also, the minimum value was obtained from RGS, and the maximum was derived from LLP, which had -19.85 and 936.12 correspondingly. Consequently, the maximum mean value of 666.30 was obtained for LLP, while the variable with the highest standard deviation for the period under review is T1CR with 183.90. Likewise, for variance, skewness and kurtosis, the variable with the highest amount of variance is 34228.995, while the least variable is 1728.126. The variable with the highest skewness is RGS with 0.065, while the lowest entails LLP with a value of

–1.897. Furthermore, the highest kurtosis resides with LLP, with a value of 6.242, and the least is RGS, with a –1.917 value.

**Table 1.** Descriptive statistics.

| STATISTICS         | CRS      | LLP       | NPL      | RGS       | TICR      |
|--------------------|----------|-----------|----------|-----------|-----------|
| Range              | 113.82   | 800.85    | 122.38   | 335.85    | 522.25    |
| Minimum            | 457.80   | 135.27    | 70.10    | –19.85    | 401.78    |
| Maximum            | 571.62   | 936.12    | 192.48   | 316.00    | 924.03    |
| Mean               | 521.8077 | 666.3023  | 134.4108 | 130.3485  | 756.8838  |
| Standard deviation | 36.10975 | 185.01080 | 41.57074 | 127.27776 | 183.90070 |
| Variance           | 1303.914 | 34228.995 | 1728.126 | 16199.627 | 33819.467 |
| Skewness           | –0.399   | –1.897    | –0.305   | 0.065     | –1.040    |
| Kurtosis           | –1.047   | 6.242     | –1.491   | –1.917    | –0.169    |

**Source:** Author's Computation, (2024).

### Test of Multicollinearity using Variance Inflation Factor (VIF)

Multicollinearity is considered an econometric issue where a very strong correlation is observed between two or more regressors, making it almost impossible to distinguish the effect of each of the concerned regressors on the response variable. It simply captures the movement of two or more regressors moving simultaneously in the same direction and rate. **Table 2** presents the variance inflation factor (VIF) result used to check for multicollinearity among the variables of interest. Accordingly, all the regressors show a VIF value of less than 6, which is well below the benchmark of less than 10 [45]. As a result, a robust outcome is expected by applying the panel least square estimators without necessarily logging the variables.

**Table 2.** Test of multicollinearity.

| Model coefficients <sup>a</sup> | Collinearity statistics |      |
|---------------------------------|-------------------------|------|
|                                 | Tolerance (1/VIF)       | VIF  |
| CRS                             | 0.297                   | 5.34 |
| LLP                             | 0.821                   | 1.07 |
| NPL                             | 0.820                   | 1.06 |
| RGS                             | 0.571                   | 4.05 |

<sup>a</sup>Dependent variable: TICR. **Source:** author's computation, (2024).

### Unit Root Test

The rationale behind conducting the unit root test is to ascertain if the series has a unit root or otherwise in **Table 3**. A series that can be relied upon for making policy prescriptions or forecasts should be stationary, *i.e.* its statistical properties do not change over time. This is valid as a non-stationary series is bound to produce a spurious regression estimate, which can occasion misleading policy recom-

mendddations. According to a priori, a series should extend to a period of 20 years and above to fit in for unit root test however, when dealing with panel data that requires the use of a panel linear estimator of fixed effect and random effect of which the Hausman test is needed to choose the most appropriate between them, the test for unit root become necessary even with a series with a shorter period. Thus, the Hadri unit root test is desirable for this unit root test [45].

**Table 3.** Unit-root test results.

| Ho: Panels contain unit roots |                      | Number of panels  | 13.000  |            |
|-------------------------------|----------------------|-------------------|---------|------------|
| Ha: Panels are stationary     |                      | Number of periods | 12.000  |            |
| Xtunitroot                    | Statistic            | Statistic         | p-value | Decision   |
| CRS                           | Intercept only*      | 2.31001           | 0.000   | Stationary |
|                               | Intercept and Trend* | 12.5052           |         |            |
| LLP                           | Intercept only*      | 3.16176           | 0.000   | Stationary |
|                               | Intercept and Trend* | 7.18799           |         |            |
| NPL                           | Intercept only*      | 4.33813           | 0.000   | Stationary |
|                               | Intercept and Trend* | 11.1881           |         |            |
| RGS                           | Intercept only*      | 2.782798          | 0.000   | Stationary |
|                               | Intercept and Trend* | 9.6865            |         |            |
| T1CR                          | Intercept only*      | 4.01787           | 0.000   | Stationary |
|                               | Intercept and Trend* | 7.51360           |         |            |

\*Stationary at level, *i.e.* (p-value < 0.05). **Source:** author's computation, (2024).

### The Hadri Unit Root Test

The Hadri unit root test estimates are presented in **Table 4**. The test considered the case of intercept only, and alternatively, intercept and trend both at levels as theory demands that the variables of interest must all be stationary at a level to apply the Hausman. Accordingly, the unit root estimates show that all the variables are stationary at the level with the intercept only and intercept and trend. This implies that the data is suitable for policy purposes.

**Table 4.** Hadri panel unit root result.

| Variables | Hadri (Intercept only) | Hadri (Intercept and Trend) |
|-----------|------------------------|-----------------------------|
| CRS       | 3.42110***             | 12.50652***                 |
| LLP       | 4.27187***             | 7.19677***                  |
| NPL       | 4.33813***             | 11.1881***                  |
| RGS       | 2.782598***            | 9.6863***                   |
| T1CR      | 4.01787***             | 7.51460***                  |

\*\*\*, \*\*, \* imply significance at 1%, 5%, 10% level, respectively. **Source:** author's computation, (2024)

### Panel Regression Model

**Table 5** presents the panel regress results from the expected effect, fixed effect, and random effect estimators, with T1CR (dependent variable) representing the measures of financial performance of the quoted deposit banks in Nigeria. The model estimate in italics is the selected estimate for hypothesis testing, as validated by the ML and Hausman tests. Thus, random effect estimates are discussed in the current study for the ROA and EPS models.

**Table 5.** Estimated results.

| T1CR             | PEM       |        |        | FEM       |        |        | REM        |               |        |
|------------------|-----------|--------|--------|-----------|--------|--------|------------|---------------|--------|
|                  | Coef.     | T      | P >  t | Coef.     | T      | P >  t | Coef.      | Z             | P >  z |
| CRS              | -0.024421 | -1.19  | 0.040  | -0.208412 | -0.63  | 0.243  | -0.0056520 | -1.91         | 0.001  |
| LLP              | 0.456432  | 2.10   | 0.163  | -0.507700 | -0.67  | 0.686  | -0.401400  | -0.28         | 0.752  |
| NPL              | 0.55556   | 0.92   | 0.030  | 0.517305  | 0.74   | 0.032  | 0.6008081  | 0.41          | 0.048  |
| RGS              | 3.51290   | 2.08   | 0.310  | 0.54670   | 0.61   | 0.521  | 0.005617   | 1.37          | 0.406  |
| _cons            | -1.40031  | -1.001 | 0.227  | -0.076356 | -0.05  | 0.840  | -0.074648  | -0.16         | 0.830  |
| Number of groups |           | 5      |        |           | 5      |        |            | 5             |        |
| Number of obs    |           | 65     |        |           | 65     |        |            | 65            |        |
| F(5, 58)         |           | 7.80   |        |           | 3.00   |        |            | 5.13          |        |
| Prob > F         |           | 0.0001 |        |           | 0.0022 |        |            | <i>0.0010</i> |        |
| R-squared        |           | 0.5642 |        |           | 0.5133 |        |            | <i>0.5509</i> |        |
| Adj R-squared    |           | 0.5345 |        |           | 0.5033 |        |            | 0.5133        |        |

**Source:** author's computation, (2024).

### Hausman Test

The Hausman test for the model using the T1CR has a p-value of 0.8190, which is statistically insignificant at all significance levels. This implies that the random effect estimate is more appropriate for the current data than the fixed effect and common effect estimators, as delineated in **Table 6**. Thus, the study utilises the random effect estimate to test the proposed hypothesis.

**Table 6.** Hausman test for the ROA model.

|     | Coefficients |           |            |   |
|-----|--------------|-----------|------------|---|
|     | (b)          | (B)       | (b - B)    | sqrt(diag( V <sub>b</sub> - V <sub>B</sub> )) |
|     | fixed        | random    | Difference | S.E.  |
| CRS | -0.0530545   | -0.047874 | 0.0159419  | 0.0051203                                     |
| LLP | -0.099229    | -0.013622 | -0.117412  | 0.0058986                                     |
| NPL | 0.0129517    | 0.011020  | 0.0110327  | 0.0035977                                     |
| RGS | 0.0129517    | 0.011920  | 0.0192327  | 0.0025254                                     |

$$\text{chi2}(5) = (b - B)'[(V_b - V_B)^{-1}](b - B) = 2.94, \text{ Prob} > \text{chi2} = 0.8190.$$

### Discussion of Findings

The outcome of this study, depicted in **Table 6**, indicates that for the PEM, FEM, and REM, the impact of credit risk and non-performing loans are felt by the banks on their tier 1 capital ratio as outlined by their p-values less than the .05 level of significance for each. This indicates a regression line of  $T1CR = -1.40031 - 0.024421CRS + 0.55556NPL$ ,  $T1CR = -0.076356 - 0.208412CRS + 0.517305NPL$ , and  $T1CR = -0.074648 - 0.0056520CRS + 0.048NPL$  for PEM, FEM and REM with an R-Square of 0.56, 0.51 and 0.55 respectively. This shows that CRS is negative but has a low predictive value for T1CR. At the same time, the RGS is a low but positive predictive value of T1CR, meaning that the banks feel the reverse impact of CRS during the considered period, but the same cannot be said of NPL. Equally, the outcome indicates that while both CRS and NPL impact the banks' tier 1 capital ratio, other factors impact the bank's tier 1 ratio more than both.

However, RGS and LLP do not have any statistically significant impact on the bank's tier 1 capital ratio for the period under review and are, therefore, expunged from the model; however, they have high values. This suggests the need for strong credit risk management to keep the level of NPL as low as possible, which will enable maintaining the high tier 1 capital ratio of deposit money banks in Nigeria. To reduce NPL, Nigerian deposit money institutions should assess the risks that could lead borrowers to default on their loan obligations [46]. There is compelling evidence to suggest that a fall in credit spread and regulatory capital values is significantly linked to a minor reduction in banks' tier 1 capital ratio. As banks' credit risk increases, the return on assets decreases, discouraging potential investors from investing in these banks. In other words, the level of return on assets is not primarily influenced by the level of non-performing loans. Instead, the amount of provision made negatively correlates with profit.

While inadequate risk management in trading can rapidly lead to the downfall of a bank, [34] emphasised the impact of non-performing loans as a significant expense contributing to bank failure. They argued that loans that become delinquent remain the oldest and fundamental reason for the collapse of banks. It reveals that non-performing loans can have a catastrophic economic effect if left unregulated, as consecutive bank collapses will erode public confidence in the banking system, consequently impacting the banking sector. Banks are anticipated to exercise prudence before and after extending a credit facility. A bank's capital adequacy and liquidity are inversely correlated with the magnitude of non-performing loan instances [44]. One significant risk that banks encounter is the uncertainty surrounding the complete repayment of a loan by its due date. Non-performing loans pose an inevitable risk to money deposit institutions [28]. Inadequate credit management leads to financial losses for a bank and hurts other aspects of its operations, including customer loyalty, reputation, service quality, efficiency, and the profitability of shareholders' investments [47]. To maintain the efficient operation of a bank, a financial institution must address non-performing loans with utmost seriousness. This is because such loans can hurt the bank's tier

1 capital ratio, as evidenced by the findings of this study.

## 5. Conclusions

This study investigates the impact of credit default on the capital adequacy ratio of quoted deposit money banks in Nigeria. Thirteen deposit money institutions listed on the Nigerian stock exchange were utilised to accomplish the purpose, and panel data was obtained. The study used panel regression analysis to establish the relationship between dependent and independent variables. The researcher used the random panel regression technique after considering the data, as the Hausman test was not statistically significant at a 5% significance level. The panel regression results confirm that both credit spread, and non-performing loans have a substantial and favourable effect on the tier 1 capital ratio of the banks. Furthermore, it is seen that the loan loss provision and regulatory capital have a negligible effect on banks' tier 1 capital ratio during the specified period. Based on the findings, we can conclude that banks' tier 1 capital ratios are increasingly affected by the influence of non-performing loans and credit spreads, which form their credit default on their capital adequacy ratio. This study recommends that.

1) The management of Nigeria's publicly traded Deposit Money Banks should strive to minimise losses from bad debts arising from non-performing loans and other relevant credit charges while maintaining a satisfactory level of overall and easily convertible assets.

2) It is advisable for deposit money banks in Nigeria to improve their ability to evaluate credit and manage loans. At the same time, the regulatory authority should prioritise banks' adherence to the Bank and other Financial Institutions Act (1999) and prudential guidelines. Regulators should prioritise ensuring that capital charges accurately reflect a bank's credit exposure by establishing new regulations dictating the amount of capital banks must reserve to mitigate potential losses.

3) The senior executives of Nigeria's publicly listed Deposit Money Banks should formulate strategic plans to attract sufficient deposits to sustain their operations.

4) The study suggests that deposit money banks should regularly evaluate their credit risk control strategies to ensure that every credit they provide carries a minimal chance of default, which has a detrimental effect on profitability.

## Conflicts of Interest

The authors declare no conflicts of interest.

## References

- [1] Lucky, L.A. and Tamunoiduabia, I.F. (2024) Prudential Stress Test of Capital Adequacy of Quoted Commercial Banks in Nigeria: A Panel Data Approach. *Journal of Banking and Finance Research*, **8**, 48-66.
- [2] Odebode, O.K., Ezi, C.T. and Ishioro, B.O. (2024) Effects of Non-Performing Loans on Return on Equity of Selected Commercial Banks in Nigeria. *World Journal of Advanced Research and Reviews*, **21**, 2599-2608.
- [3] Karugu, C., Achoki, G. and Kiriri, P. (2018) Capital Adequacy Ratios as Predictors of

- Financial Distress in Kenyan Commercial Banks. *Journal of Financial Risk Management*, **7**, 278-289. <https://doi.org/10.4236/jfrm.2018.73018>
- [4] Kumshe, H.M., Umar, B. and Modibbo, S.A. (2024) Effect of Risks Management on the Financial Performance of Listed Deposit Money Banks in Nigeria. *Journal of Economics, Management and Trade*, **30**, 27-36. <https://doi.org/10.9734/jemt/2024/v30i41202>
- [5] Odinaka Frank, I., Gloria Ogochukwu, O. and Chinedu Jonathan, N. (2024) Financial Risk, Capital Adequacy and Liquidity Performance of Deposit Money Banks in Nigeria. *International Journal of Trend in Scientific Research and Development*, **8**, 175-186.
- [6] Akemiyefa, M. (2024) Effect of Microfinance Banks' Performance on Agricultural Growth in Nigeria. *FUW-International Journal of Management and Social Sciences*, **9**, 452-473.
- [7] Akande, O. and Olorunfemi, J. (2020) An Empirical Analysis of Capital Adequacy Determinants in the Nigerian Banking Sector. *International Journal of Economics and Finance*, **8**, 159-170.
- [8] Gao, J. and Li, X. (2021) Does Bank Liquidity Matter in the Loan Supervision Effect of Bank Capital Adequacy Ratio? *Modern Economy*, **12**, 849-868. <https://doi.org/10.4236/me.2021.124042>
- [9] Abubakar, A. (2020) Market Risk and Market Value of Listed Deposit Money Banks in Nigeria. *Islamic Banking, Accounting and Finance International Conference (iBAF) 2020*, Bayero University, 23-26 September, 376-384.
- [10] Natufe, O.K. and Evbayiro-Osagie, E.I. (2023) Credit Risk Management and the Financial Performance of Deposit Money Banks: Some New Evidence. *Journal of Risk and Financial Management*, **16**, Article 302. <https://doi.org/10.3390/jrfm16070302>
- [11] Usman, A., Wirawan, H. and Zulkifli, (2021) The Effect of Human Capital and Physical Capital on Regional Financial Condition: The Moderating Effect of Management Control System. *Heliyon*, **7**, e06945. <https://doi.org/10.1016/j.heliyon.2021.e06945>
- [12] Aruwa, S.A. and Naburgi, M.M. (2020) Impact of Capital Adequacy on the Financial Performance of Quoted Deposit Money Banks in Nigeria. *4th International Conference of Faculty of Administration*, Nasarawa State University, 11-13 July.
- [13] Puspitasari, E., Sudiyatno, B., Aini, N. and Anindiansyah, G. (2021) The Relationship between Net Interest Margin and Return on Asset: Empirical Study of Conventional Banking in Indonesia. *Academic Journal of Interdisciplinary Studies*, **10**, 362-374. <https://doi.org/10.36941/ajis-2021-0090>
- [14] Apochi, J.G. and Baffa, A.M. (2022) Credit Risk and Financial Performance of Deposit Money Banks in Nigeria: Moderating Role of Risk Management Committee. *European Journal of Accounting, Auditing and Finance Research*, **10**, 98-115. <https://doi.org/10.37745/ejafr.2013/vol10n1098115>
- [15] Salami, A.A., Uthman, A.B., Ibrahim, R.O. and Nageri, K.I. (2022) Bank Funding Strategy and Income Smoothing Practices in Nigeria: IFRS and Solvency Risk Analysis. *Global Journal of Accounting*, **8**, 13-30.
- [16] Chijoriga, M.M., Robert, N. and Abdul, A. (2021) Fiscal Governance, Budget Needs and Public Expenditure in Tanzania. With Analysis on Aspects of Inequality and Trust. Pilot4dialogue, Finland.
- [17] Marouli, A.Z., Giannini, E.N. and Caloghirou, Y.D. (2023) A Non-Performing Loans (NPLs) Portfolio Pricing Model Based on Recovery Performance: The Case of Greece. *Risks*, **11**, Article 96. <https://doi.org/10.3390/risks11050096>
- [18] Bhattarai, B.P. (2020) Effects of Non-Performing Loan on Profitability of Commercial

- Banks in Nepal. *Itihas—The Journal of Indian Management*, **10**, 15-22.  
<https://doi.org/10.5958/2456-7302.2020.00011.7>
- [19] Nyabicha, O.O. (2022) Humanitarian Intervention and Conflict Situation in Somalia, 1992-2015. Ph.D. Thesis, Kenyatta University.
- [20] Kiptum, J.K. and Ayuo, A. (2023) Business Process Re-Engineering and Organisational Performance: A Survey of Savings and Credit Co-Operative Societies in the South Rift Region, Kenya. *International Academic Journal of Human Resource and Business Administration*, **4**, 125-144.
- [21] Rahmanullah, R. (2021) The Effects of Credit Risk on the Profitability of Commercial Banks in Afghanistan. *Journal of Asian Finance, Economics and Business*, **8**, 477-489.
- [22] Abubakar, A., Sulaiman, A., Usman, B. and Mohammed, M. (2019) Credit Risk Management and Financial Performance of Quoted Deposit Money Banks in Nigeria. *Journal of Finance, Accounting and Management*, **10**, 57-74.
- [23] Agubata, N.S., Okolo, L.I. and Ogwu, S.O. (2022) Effect of Employee Benefits on Organizational Growth of Consumer Goods Firms in Nigeria. *Studia Universitatis „Vasile Goldis” Arad—Economics Series*, **32**, 116-137.  
<https://doi.org/10.2478/sues-2022-0015>
- [24] Nyebare, A., Obalade, A.A. and Muzindutsi, P. (2023) Effectiveness of Credit Risks Management Policies Used by Ghanaian Commercial Banks in Agricultural Financing. In: Peprah, J.A., Derera, E., Ngalawa, H. and Arun, T., Eds., *Financial Sector Development in Ghana*, Springer, 231-264.  
[https://doi.org/10.1007/978-3-031-09345-6\\_10](https://doi.org/10.1007/978-3-031-09345-6_10)
- [25] Al Zaidanin, J.S. and Al Zaidanin, O.J. (2021) The Impact of Credit Risk Management on the Financial Performance of United Arab Emirates Commercial Banks. *International Journal of Research in Business and Social Science* (2147-4478), **10**, 303-319.  
<https://doi.org/10.20525/ijrbs.v10i3.1102>
- [26] Beaupain, R. and Braouezec, Y. (2024) International Banking Regulation and Tier 1 Capital Ratios. on the Robustness of the Critical Average Risk Weight Framework. *International Review of Financial Analysis*, **91**, Article ID: 103025.  
<https://doi.org/10.1016/j.irfa.2023.103025>
- [27] Ali, B. and Oudat, M.S. (2020) Financial Risk and the Economic Performance in Listed Commercial and Investment Banks in Bahrain Bourse. *International Journal of Innovation, Creativity and Change*, **13**, 160-180.
- [28] Amdework, M. (2021) The Effect of Credit Risk and Macroeconomic Factors on the Performance of Commercial Bank of Ethiopia. Ph.D. Thesis, ST. Mary's University.
- [29] Andersen, H. and Juelsrud, R.E. (2024) Optimal Capital Adequacy Ratios for Banks. *Latin American Journal of Central Banking*, **5**, Article ID: 100107.  
<https://doi.org/10.1016/j.latcb.2023.100107>
- [30] Apochi, J.G., Mohammed, S.G., Onyabe, J.M. and Yahaya, O.A. (2022) Does Corporate Governance Improve Financial Performance? Empirical Evidence from Africa Listed Consumer Retailing Companies. *Management Studies*, **12**, 111-124.
- [31] Ayeni, T.Y. and Emeka, H.O. (2021) Financial Risks and Performance of Listed Manufacturing Firms in Nigeria. *Journal of Public Administration, Finance and Law*, No. 22, 156-163. <https://doi.org/10.47743/jopaf-2021-22-11>
- [32] Fali, I., Nyor, T. and Mustapha, O.L. (2020) Financial Risk and Financial Performance of Listed Insurance Companies in Nigeria. *European Journal of Business and Management*, **12**, 143-153.
- [33] González, O. and Keddad, B. (2024) The Piggy Bank Index: An Intuitive Risk Measure

- to Assess Liquidity and Capital Adequacy in Banks. *Finance Research Letters*, **60**, Article ID: 104846. <https://doi.org/10.1016/j.frl.2023.104846>
- [34] Hambolu, V.O., Omuemu, S.O. and Abdul Majeed, A.T. (2022) The Impact of Credit Risk on the Profitability of Commercial Banks in Nigeria. *Fuoye Journal of Finance and Contemporary Issues*, **3**, 21-35.
- [35] Isamade, B.A., Udeh, S.N. and Okoh, J.I. (2022) Effect of Financial Risk on Performance of Selected Manufacturing Firms in Nigeria. *European Journal of Finance and Management Sciences*, **6**, 86-99.
- [36] Jegede, C.A., Soyebbo, Y.A., Fakunmoju, S.K. and Okunbanjo, O.I. (2021) Financial Risk Management and Financial Performance of International Authorisation Quoted Deposit Money Banks (DMBs) in Nigeria. *Annals of Dunarea de Jos University of Galati. Fascicle I. Economics and Applied Informatics*, **27**, 178-185. <https://doi.org/10.35219/eai15840409209>
- [37] Taiwo, A. (2020) Financial Development, Real Sector and Economic Growth in Sub-Saharan Africa: The Threshold Effect. *Journal of African Business*, **22**, 603-626. <https://doi.org/10.1080/15228916.2020.1773608>
- [38] Iyinomen, O.D., Okoye, E. and Ifeoma, O.H. (2022) Effect of Credit Risk on Management and Banking Profitability of Deposit Money Bank Listed on Stock Exchange of West African Countries. *Journal of Accounting and Financial Management*, **6**, 256.
- [39] Odubuasi, A., Uduak, W. and Ifurueze, M. (2020) Effect of Market Risks on the Financial Performance of Firms in Nigeria. *European Journal of Accounting, Auditing and Finance Research*, **8**, 28-45.
- [40] Hamisu, M., Ibrahim, M.A. and Zango, A.G. (2021) Credit Risk Management and Financial Performance of Selected Banks in Nigeria. *POLAC Economic Review (PER)*, **1**, 1-12.
- [41] Vikiru, T., Guyo, W., Moronge, W. and Amuhaya, J. (2023) Financial Governance and Performance of Deposit Taking SACCOs in Kenya. *International Journal of Recent Research in Social Sciences and Humanities*, **10**, 44-53.
- [42] Onsongo, S.K., Muathe, S.M.A. and Mwangi, L.W. (2020) Financial Risk and Financial Performance: Evidence and Insights from Commercial and Services Listed Companies in Nairobi Securities Exchange, Kenya. *International Journal of Financial Studies*, **8**, Article 51. <https://doi.org/10.3390/ijfs8030051>
- [43] Purnomo, A.N. (2020) The Impact of Financial Performance on the Profitability of the Indonesian Banking during the Covid-19 Pandemic. *International Journal of Innovative Science and Research Technology*, **8**, 593-598.
- [44] Alnawaiseh, I. and Latif, M.A. (2024) Internal Risks Affect the Financial Performance of the Banks: Evidence from Jordan. *Journal of International Crisis & Risk Communication Research (JICRCR)*, **7**, 314-324.
- [45] Olisaji, C.J. and Agubata, N.S. (2023) Effects of Accounting Information on Stock Returns of Quoted Non-Financial Firms in Nigeria. *International Journal of Advanced Academic Research*, **9**, 91-110.
- [46] Idris, M.R.I., Kadri, N. and Razali, M.W.M. (2024) The Relationship between Financial Risks and Commercial Banks' Performance in Malaysia. *UNIMAS Review of Accounting and Finance*, **8**, 121-135.
- [47] Odebode, A.A. and Ogunbayo, O.T. (2025) The Potential of Digital-Based Technology in Improving Organizational Performance. *Journal of Management Development*, **44**, 96-106. <https://doi.org/10.1108/jmd-04-2024-0145>