

## ASSESSING THE BANK SIZE MODERATING EFFECT ON THE RELATIONSHIP BETWEEN CREDIT RISK MANAGEMENT AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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### ABSTRACT

Recognizing the diverse capacities of banks to manage credit risk, this study examines the moderating effect of bank size on the relationship between credit risk management and financial performance in Kenya's commercial banking sector. A descriptive research design was adopted, utilizing panel data from 30 commercial banks over the period 2017 to 2022. Credit risk was measured using the non-performing loan (NPL) ratio, while total income served as the financial performance indicator. Data analysis was conducted using Stata software, incorporating interaction terms to assess the moderating role of bank size, measured by total assets. The results indicate that the interaction between credit risk management and bank size is statistically significant ( $p < 0.05$ ), suggesting that larger banks are better positioned to manage credit risk and sustain financial performance. These findings support credit risk theory and highlight the importance of tailoring risk management strategies to institutional characteristics such as size. The study offers practical insights for commercial banks and regulators, emphasizing the need for differentiated approaches to credit risk based on organizational capacity. It recommends expanding future studies to include broader performance indicators beyond ROA and ROE and encourages the use of advanced techniques such as structural equation modeling and machine learning. Further research should also explore differences in risk management practices across developed and emerging economies, as well as between rural and urban banks in Kenya, to identify more context-specific strategies.

**Keywords:** Credit risk, Non-Performing Loan Ratio, Performance, bank size, Kenya

### 1.0 INTRODUCTION

According to Berger (2021), Berger argues that risk management is crucial for banks to have good financial performance. This paper shows that risk management systems are critical to ensure operational stability and transparency as Adusei and Sarpong Danquah (2021) have found in their research. Risk management in banking regulations entails periodic monitoring and evaluation to ensure that the standards are achieved as mentioned by Banos Caballero et al. (2019). The banking sector works in a dynamic environment that necessitates risk management efforts as stated by Tian et al. (2016).

According to Peihani (2016), the global financial crisis exposed the need for enhanced risk governance and performance assessment. The financial crisis shows the need for effective risk management because Berger et al. (2017) found an increase in bank crises. There were several banking sector crises in Africa between 1970s and 1990s. The Central Bank of Kenya reported bank collapses in Kenya during three separate periods from 1984-1989 through 1993-1995 and finally in 2007-2015. The need for sound risk management systems is necessary in order to avoid such past ugly scenarios since there have been multiple financial failures.

The failure of a borrower to repay debt results in credit risk which is a form of bank risk that affects bank assets and profitability (Ochieng & Obiero, 2017). Credit risk management has been revolutionized across the globe through the implementation of new credit scoring models and the implementation of Basel II and III regulations (Alshatti, 2015). This has assisted banks to be able to determine the credit risk and reduce the level of Non-Performing Loans (NPLs).

Credit risk challenges still exist in the Sub-Saharan Africa region. The region is however experiencing a lot of problems due to high default rates and lack of credit information (Njenga & Muthama, 2020). Financial stability is important especially when credit infrastructure is underdeveloped and this is according to research findings.

The Kenyan commercial banks have developed very strict credit risk management tools to fight against NPLs. The Central Bank of Kenya states that Tier 1 banks such as Co-operative Bank have reduced their non-performing loan ratios through good credit assessment tools. The NPL ratios of the smaller banks are still high because they still use the conventional risk management tools (Kamau & Were, 2019). This shows that the approaches to credit risk management indicate that there is need to have specific strategies in order to enhance financial stability in Kenyan banking industry.

The financial health of the banks is crucial in the process of determining the efficiency of a bank in the management of its assets to earn profits and increase the value of the shareholders. The performance of a bank can be assessed by the use of indicators and for this particular study; the focus is on total income. Total income is the total amount of money made by a bank from its business. This way of looking at it gives an idea of how well the bank manages its assets and liabilities and how well it manages the risks. According to Kopeckás research of 2018, financial performance in banking means the ability of the banks to generate revenue with emphasis on income and liquidity management.

The evaluation metrics to determine performance has been a subject of much research in the banking industry. The studies conducted by Yasmin (2017) and Uwuigbe et al. (2015) emphasize the use of metrics such as revenue as a good indicator of a bank's financial health.

These metrics are crucial in determining the appropriateness of a bank's financial risk management and asset utilization strategies to ensure financial sustainability.

Kiragu's research, in 2016 found that banks that are good at risk management in areas like liquidity and credit management tend to have high incomes which shows a good relationship between good risk management and financial performance as banks that manage risks well can maximize their income generating activities. According to the study findings by Wambua and Mugambi in 2020 also bring to light the importance of total income as a key indicator of a bank's effective financial resource management which in turn affects the overall performance of the bank. Numerous real world research studies confirm that total income is a financial success indicator according to Mwangi and Muturi (2018). Their research found strong evidence between revenue levels and banking performance improvements for banks that focus on strategic revenue management as opposed to those that neglect this strategy.

In 2019 Nyaga and Otieno investigated how risk mitigation strategies influence bank financial success and the relationship between revenue and financial success. The research by Nyaga and Otieno (2019) found that banks with higher income levels perform better in handling financial difficulties and promoting sustainable development.

The 2017 research conducted by Nyang'eso and Njen'ga established total income as a critical factor in evaluating banking efficiency. Banks with income generation capabilities demonstrate better performance through profit reinvestment into profitable ventures while maintaining market competitiveness.

According to Kamau and Were (2020) revenue plays a crucial role in assessing performance because banks with various income sources can better resist economic pressures. Research indicates that banks utilizing multiple revenue streams achieve both crisis management and growth sustainability.

Wanjohii conducted his study in 2018 to determine the impact of income diversification on performance. Research showed that financial institutions which generate income from various sources demonstrate better financial performance. The study validates previous research about total income importance in determining banking financial success.

Chairani and Siregar (2021) studied how income factors into assessing banking financial health through risk management theory. Higher income banks are able to handle financial risks better because they possess excess funds that act as protective measures against financial losses.

This study evaluates Kenyan commercial banks' performance using revenue as its financial assessment tool. The financial performance of banks is evaluated using three main measurable factors including total income together with return on assets (ROA) and return on equity (ROE). The research depends on total income as its primary performance indicator because it encompasses all revenue streams. The three financial metrics examined in this research reveal that total income offers more information about bank operational performance and risk management capabilities compared to ROA and ROE. According to Wambua and Mugambi (2020), total income serves as a fundamental indicator for assessing financial health in banking institutions. This research finding are intended to contribute to the ongoing discussion about

utilizing total income as a performance assessment tool for commercial banks in a modern financial environment.

The size of the bank is a critical factor that influences the application of risk management and its impact on the financial health of the bank. The larger banks have more resources, diversified business, and better access to capital markets which help them to manage the risks better. The banking industry in Kenya is divided into three categories based on asset size (CBK, 2022). These are Tier 1, Tier 2 and Tier 3. Tier 1 Banks are the largest banks with assets exceeding KES 150 billion. Some of the examples include KCB Group, Equity Bank, and Co-operative Bank. These banks have many branches, large capital base, and market share, thus better positioned to manage risk and be financially sound. Tier 2 Banks are the medium-sized banks with assets between KES 15 billion and KES 150 billion. Some examples include I&M Bank and DTB Bank. Though not as big as Tier 1 banks, they are crucial in market segments and balance risk and return while enjoying the advantages of the scale. Tier 3 Banks are the smallest banks with assets less than KES 15 billion. They normally concentrate on particular markets and have limited geographical location. Since they have lower capital base and less diversified, they are more susceptible to liquidity and credit risk.

Studies show that Tier 1 institutions alongside other large banks achieve superior financial performance because of their size Chairani and Siregar (2021). Advanced risk management strategies are preferred by larger banks according to Mutua (2015) while Wanjohi (2018) noticed that their asset distribution abilities lead to better risk management. Muthama (2021) states that large banks benefit from using cost distribution for risk expenses throughout their portfolio.

Nyaga and Otieno (2019) and Kamau and Were (2020) presented research which demonstrates that bank size leads to better financial performance. The combination of effective risk management systems and superior capital access and skilled workforce recruitment abilities enable large banks to manage economic crises and maintain growth.

The statistics at global, regional and local levels show the need to enhance risk management practices in banking. Some of the common issues that affect financial stability and performance include liquidity shortages, high credit default rates and insufficient capital buffers. The variations between Tier 1 and smaller banks in Kenya suggest that particular measures are necessary to address these issues.

This study has been conducted to find the effectiveness of credit in enhancing the financial performance of Kenyan commercial banks with the consideration of bank size as a moderating variable in addition to the application of novel metrics such as total income parameters. The findings of this study will be useful in the long run in addressing the issues of stability and performance in the banking industry in Kenya.

## 2.0 LITERATURE REVIEW

Theoretical reviews are important in the development of research as they provide insight into how different constructs relate to one another and also serve as a basis for hypothesis development. In this respect, this research looked at Credit Risk Theory which provided unique way of looking at financial risk management practices and bank performance.

Credit Risk Theory is the risk of default by the borrower, i.e. the risk of not getting paid back according to the agreement. It involves various models and techniques of identifying and managing credit risk, which is important for the stability and performance of banks. The major concepts within Credit Risk Theory are probability of default, loss given default, and exposure at default. These measures are crucial to the banks in assessing and controlling the risks that come with lending. Research-based evidence demonstrates that banks achieve better performance through effective credit risk management practices. A World Bank study from 2021 revealed that proper credit risk assessment frameworks across Sub-Saharan Africa led to a substantial decrease in nonperforming loan occurrences. Tier 1 banks in Central Bank of Kenya's (2020) review demonstrated strong credit risk management practices which resulted in better asset quality and profitability performance compared to smaller banks.

The fundamental principle of credit risk theory describes how banks manage the risk that borrowers will fail to make payments. The theory includes multiple assessment models and management approaches for credit risk since financial institutions require stability and performance. Credit Risk Theory provides this research with methods to evaluate bank credit risk assessment practices by examining probability of default and loss given default together with exposure at default. These approaches supplement the existing methods with structural and reduced-form approaches to show how credit risk management affects bank performance.

## 2.1 Resource Dependence Theory

Resource Dependence Theory is a concept that was developed by Jeffrey Pfeffer and Gerald R. Salancik in 1978 which says that since organizations cannot be self-sufficient, they have to rely on the resources that are available from the external environment for the purpose of survival and growth. It is this dependence on the external resources that make a bank to be tier 1 or 2 or 3 depending on the total assets being high or low and thus influence the organizational behavior and strategies as far as risk management is concerned.

The basic concepts that can be derived from RDT include resource scarcity, asset base power and dependence, and strategies to manage dependence. Organizations are dependent upon resources in their external environment that may be scarce and controlled by others. An organization's power is defined by its control of the most critical resources. Dependence on other external entities for resources will lower an organization's power. In managing dependencies, organizations use strategies such as merger, alliance, and joint venture. From the perspective of RDT on financial risk management, banks, like any other organization, would depend on capital, information, and regulatory support, among other critical external resources. In this case, the ability to manage this dependency may affect performance. Larger banks with more resources and greater capabilities are in a better position to manage financial risks, thus moderating the relationship between financial risk management practices and overall performance. The research has also shown that bigger banks have more ability to manage financial risk because they have more resources and risk management tools. Currently, large banks in the world apply advanced technologies, such as workflow-based reporting and dynamic business intelligence tools, which enable them to run ad-hoc stress testing and quickly respond to changes in regulations, as pointed out by McKinsey (2023). This ability inherently grants them a compelling competitive advantage over the little ones in managing complex risks.

Resource Dependence Theory was very much suitable for this research study as it described how banks cope with their dependence on resources such as capital, information, and regulatory supports obtained from external sources. With greater resources, larger banks are better capable of managing risks, which in turn influences their performance. With greater size and resources, larger banks are able to negotiate better terms with counterparties, have access to more complex financial instruments, and invest in state-of-the-art risk management systems. This therefore explains how bank size moderates the relationship between financial risk management and bank performance and presents an appropriate theory on which to base this study.

Credit risk, often measured by the non-performing loan (NPL) ratio, is a major risk for banks as it directly affects their profitability. High NPL ratios indicate a higher likelihood of loan defaults, which reduces profitability and increases provisioning costs.

Wanjohi (2018) was concerned with the impact of credit risk assessment frameworks on NPLs and profitability in Kenyan commercial banks. Based on the data from 20 banks and such indicators as NPL ratios, profitability indicators, he came to a conclusion that with good credit risk frameworks, profitability would increase as the loan defaults decrease. With its basis on Credit Risk Theory, this study highlighted the importance of the proper methods of credit evaluation. However, the focus of this study on profitability and NPL ratios alone may be myopic, as wider financial performance indicators such as total income could be used to derive a more holistic perspective of how credit risk management interfaces with financial health. There is a critical geographical gap in this study, as it only involves Kenyan banks and does not explore other contexts in other developing countries with similar banking problems. The population gap also exists in this study, as it focuses on larger banks rather than small or medium-sized banks, which might exhibit different financial dynamics. Furthermore, the data from 2017–2018 may also create a data gap, as more recent data might allow a better understanding of the nature of credit risk management. In addition, this study is a cross-section of the relationship between credit risk management and profitability, so there is a temporal gap in this regard, affecting long-run trends.

Nyaga and Otieno (2019) also explored the impact of NPL on financial performance and discovered that there is a positive relationship between NPL and financial performance. Even though this study supported that lower NPLs lead to better profitability, the traditional indicators used to measure financial performance such as ROA, does not give the full picture of the bank's soundness, especially in a volatile market. The study focuses on profitability measures, particularly the ROA, which is a narrow scope of the study and does not encompass other financial performance indicators such as total income. In terms of geographical gaps, this study only looks at Kenyan banks and does not relate the findings with other developing countries, for instance, Africa, which may have different issues and results. Besides this, Nyaga and Otieno's study does not include small and medium-sized banks, therefore, a population gap in the research. This study has a data gap because it relies on traditional indicators and does not include modern measures of financial performance such as total income. Furthermore, the study being cross-sectional in nature, there is a temporal gap in the study as it does not provide a time series analysis of the financial performance.

Bhatt et al. (2019) performed cross-sectional research in Nepal to assess the impact of credit appraisal and market risk analysis on the stability of banks. The regression analysis showed

that bank stability could be improved by good credit appraisal practices and market risk management. According to the Credit Risk Theory, the findings indicated that credit defaults should be minimized. Nevertheless, this study also relied on the traditional metrics alone, and not on a wider range of indicators such as total income. This study has a variable omission, since it included only traditional profitability measures, but not the broader financial performance measures, for example, total income. Also, this study has a geographical gap since it was conducted in Nepal only, and no other developing countries that have the same economic conditions as Nepal, for example, Kenya. The population gap is also quite evident since the study probably focused on bigger banks and did not consider smaller banks. There is also a data gap in this research because the data used may not be representative of the current market situation. The temporal gap can be seen in the cross-sectional nature of the study that does not show any indication of the long-term trends in the effects of credit risk management on financial performance.

In their 2021 study, Patel and Kumar (2021) analyzed credit risk management practices in Indian banks, with a special emphasis on how effective credit controls can control NPL ratios. It was discovered that good practices in credit control are related to higher financial stability and profitability. This is in accordance with Credit Risk Theory; the results also support the effectiveness of strict credit risk frameworks. However, the study is only specific to Indian banks which limits its relevance to Kenyan banks due to different regulatory and market environments. This provides a geographical gap, as the results would be generalizable only to the Indian banking industry and not to Kenyan banks due to different regulatory and economic environments. Also, Patel and Kumar employ conventional measures of profitability which creates a variable gap since the wider measures such as comprehensive income are not included. However, there is a clear data gap since the study was based on data collected over a certain period and does not show the long-term effects of credit risk management on performance. The cross-sectional design of the study creates a temporal gap in terms of understanding the long-term consequences of credit risk management on financial performance.

Brown and Johnson (2021) investigated the relationship between credit risk management and financial performance of U.S. banks with a special focus on NPL ratios. The study concluded that reducing NPLs leads to improved financial performance and stability, and this highlights the importance of credit risk management. The study is based on Credit Risk Theory and emphasizes the need for effective credit risk management. However, the focus on U.S. banks makes it less relevant to Kenyan banks. This offers a geographical gap, since the regulatory environment, as well as banking practices, in the U.S. differ significantly from those in Kenya. The variable gap is also presented in this study through its use of profitability indicators such as ROA without considering other financial performance indicators such as total income. It also presents a population gap in that it only addresses large U.S. banks and probably not the implications of credit risk management on small banks. However, there is a data gap in the research because it only used data that may not be as recent. In addition, the temporal gap due to the cross-sectional design of the study means that the ability to examine the long-term effects of credit risk management on performance is restricted.

Banerjee and Deb (2023) provided a thorough examination of the connection between NPLs and profitability of banks in the United States. The study indicates that more NPLs need more

provisions for losses which in turn reduces profitability. In view of the Credit Risk Theory, therefore, the study results emphasize the significance of proper credit risk management. However, this study is not generalizable to emerging markets since it focuses on U.S. banks and conventional measures of profitability. This geographical gap means that the results may not be relevant to the specific regulatory and market environment of Kenyan or other developing country banks. Furthermore, the study has a population gap as it was conducted on large and well-known U.S. banks, which may not be typical of smaller, regional banks. The data gap is related to the fact that the data used was from the U.S. only and does not capture trends in emerging economies. This study is an extension of the work done by Banerjee and Deb on credit risk management and bank performance-as measured by Total income-in Kenyan banks, using descriptive design and data covering a period of 2017-2022.

Aliu et al. (2020) assessed the relationship between credit risk management and performance of banks in Nigeria for eight years. The study revealed that high levels of NPLs are counterproductive to the bank's profitability, and, thus, there is a need to strengthen the credit risk management policies. In view of the Credit Risk Theory, the findings concur with the need for proactive credit risk management. However, the focus of this study on Nigerian banks and profitability metrics does not easily generalize to other regions; thus, there is a geographical gap in the research. However, the study does not include the general performance indicators like total income or liquidity indicators; thus, it shows a variable gap. This study makes use of profitability metrics but with a rather small sample size which points to a data gap. This research adds to the literature by examining the relationship between credit risk management and bank performance-as expressed by total income in Kenya using descriptive research and six years of data.

Alareeni and Branson (2021) researched the role of NPLs on financial stability and profitability of banks in emerging economies. This paper finds that a high NPL ratio leads to instability and decreases profitability. In terms of Credit Risk Theory, the findings are in line with those of Sufian and Chong (2019) that underscore the importance of addressing credit risk. In any case, such a study is limited to stability and profitability metrics. This variable gap is because of the non-inclusion of other performance indicators like Total income. It also indicates a geographical gap, as the study is not focused on Kenya but rather on a group of emerging economies that may not have the same financial and regulatory environment. The study also presents a temporal gap in that it is based on cross-sectional data and, therefore, cannot predict the future trends of the subjects under study. This study addresses that gap by examining the effect of credit risk management on bank performance-as expressed by total income-in Kenya, using a descriptive research design and Stata regression tools for six years.

Khan and Sattar (2018) analyzed the impact of NPLs on profitability of the banks in Pakistan and concluded that high NPL ratios have a significant negative impact on profitability. This is also supported by this research because it also conveys the importance of proper credit risk management. However, this only provides an insight into financial performance through the lens of profitability. The variable gap is because the research study only employed profitability measures and other measures of financial performance such as Total income were not considered. The geographical gap exists because the study was conducted in Pakistan and the findings may not be generalizable to Kenya. The data gap emerges because the study utilizes relatively old data that may not capture the modern trends in the banking industry. On the other

hand, a temporal gap is observed because the study did not consider the long term effects of credit risk management practices on bank performance. This study expands the previous research by investigating the relationship between credit risk management and bank performance-as captured by Total income for Kenyan banks, using descriptive research design and six years of data.

The research conducted by López-Espinosa et al. (2020) investigated how NPLs affect European bank stability and profitability. Both stability and profitability suffered negative consequences due to excessive NPLs. The Credit Risk Theory supports the results presented by Khan and Sattar (2018). The study results from this model are specific to conventional profitability measures and therefore cannot be generalized. The study creates a geographical gap through its focus on European banks which operate under different regulatory systems and market conditions than Kenyan banks. The research employs profitability metrics as its performance indicators which produces a variable difference with Total income metrics. The study fails to address the time-related gap because it uses cross-sectional data instead of studying long-term developments.

Sufian and Chong (2019) reviewed credit risk management and NPL ratios for Asian banks and discovered that higher NPLs resulted in lower profitability and financial risk. The Credit Risk theory supports the findings in Alareeni and Branson (2021) about developing markets. The investigation has restricted its analysis to profitability metrics which prevents an assessment of Total income as a broader financial performance indicator. The research study concentrates on Asian banks while the regulatory and economic environment of Kenyan banks presents unique characteristics. The analysis maintains its focus on profitability indicators exclusively which generates a variable gap because it does not evaluate Total income as well as other performance metrics. The study presents a data gap since it fails to analyze all financial elements across an extended time span.

The research by Cheng, Chen, and Li 2021 investigated the relationship between credit risk and profitability at Chinese banks. The results support the findings of Musah et al. (2021) who discovered that effective credit risk management remains essential for maintaining financial performance in Ghanaian banks. The research focuses on profitability metrics while excluding other financial performance indicators including Total income. The paper establishes a geographical gap because it examines Chinese banks while these institutions operate under different financial environments than Kenyan banks. The study fails to address variable gaps because it excludes Total income and other financial performance indicators which would enhance its generalizability. The research lacks temporal depth because it uses a cross-sectional approach to avoid showing long-term patterns.

Orichom and Omeke (2021) investigated the influence of credit risk management on financial performance at Ugandan MFIs. The research demonstrated that proper credit risk management practices result in better financial outcomes but the research exclusively focuses on MFIs thus limiting its applicability. The study's population gap emerges from its exclusive focus on MFIs since their financial behavior differs from commercial banks particularly regarding regulation and financial management aspects. The study produces a variable gap through its dependence on stability and profitability indicators which excludes Total income as an assessment metric.

The research by Ekinci and Poyraz (2019) examined credit risk management within Turkish banking institutions. The research established that detailed credit risk assessment procedures decrease NPL ratios which leads to better profitability results. The research follows Credit Risk Theory principles as described by Ahamed (2017) while maintaining a primary emphasis on profitability measurement. This study demonstrates a geographical limitation because it presents data only about Turkish banks. These results cannot be directly applied to Kenyan banks because they function in different economic conditions and regulatory frameworks. The study demonstrates a variable gap because profitability represents the exclusive performance metric while Total income along with other financial indicators remain absent. The research demonstrates an important data gap because it fails to fully document banking sector changes across an extended period.

### 3.0 RESEARCH METHOD

This section outlines the methodological approach adopted to examine the moderating effect of bank size on the relationship between credit risk management and financial performance among commercial banks in Kenya. It discusses the research philosophy, design, study location, target population, sampling procedure, data collection, reliability and validity considerations, and the model specifications.

The study adopted a positivist research philosophy. Positivism emphasizes observable, objective, and quantifiable data, making it suitable for a study relying on financial statements. As supported by Saunders, Lewis, and Thornhill (2019), positivism ensures that findings are verifiable, unbiased, and rooted in empirical evidence. The philosophy enabled the researcher to analyze the effect of credit risk (measured by NPL ratio) on financial performance (measured by total income), as well as the moderating role of bank size (measured by total assets), through a statistical and objective lens.

This study employed a descriptive research design with panel data analysis. The descriptive design allowed the researcher to systematically analyze the relationship between credit risk management and financial performance across Kenyan commercial banks between 2017 and 2022. The use of panel data—combining cross-sectional and time-series data—helped control for unobserved heterogeneity, reduce omitted variable bias, and enhance explanatory power. Prior studies by Okwiri et al. (2022) and Ojili (2023) support this approach in financial risk analysis.

The research was conducted in Nairobi, Kenya, where the headquarters of most commercial banks are located. Nairobi provides central access to audited financial statements and other regulatory financial data necessary for comprehensive analysis.

The study targeted all 42 licensed commercial banks operating in Kenya as per the Banking Act, Cap 488, as of December 31, 2017. This population allowed the research to capture sector-wide trends, especially in light of regulatory reforms and economic fluctuations during the study period (2017–2022).

A census approach was adopted, involving all 42 commercial banks to eliminate selection bias and achieve a comprehensive understanding of the sector. This method ensured inclusivity and

comparability across institutions, aligning with best practices in sectoral financial analysis (Kipng'eno & Kamau, 2022; Wambua & Mugambi, 2021).

The study relied on secondary data sourced from audited financial statements, Central Bank of Kenya (CBK) reports, and bank regulatory disclosures. Secondary data ensured accuracy, reliability, and comparability. Data included variables such as total income, NPL ratio, and total assets.

Data analysis was conducted using Stata software. Descriptive statistics, regression models, and diagnostic tests (including the Shapiro-Wilk test for normality, Breusch-Pagan for heteroscedasticity, Augmented Dickey-Fuller test for stationarity, and VIF for multicollinearity) were employed. A fixed effects model was used to account for unobserved bank-specific heterogeneity. The Generalized Method of Moments (GMM) was also applied to address endogeneity and autocorrelation concerns

The study tested the following models:

Model 1 evaluated the effect of credit risk on financial performance. In this model, credit risk was measured using the non-performing loan (NPL) ratio, and financial performance was measured by total income. The model is specified as:

$$Y = \beta_0 + \beta_1 X_1 + \alpha_i + \varepsilon_{it}$$

Where Y is financial performance (total income),

X<sub>2</sub> is credit risk (NPL ratio),

$\alpha_i$  represents bank-specific fixed effects, and

$\varepsilon_{it}$  is the error term.

Model 2 tested the moderating effect of bank size on the relationship between credit risk and financial performance. Bank size was measured using total assets. The model included an interaction term to capture moderation and is specified as:

$$Y = \beta_0 + \beta_1 X_2 + \beta_2 B_S + \beta_3 (X_2 \times B_S) + \alpha_i + \varepsilon_{it}$$

Where Y is financial performance (total income),

X<sub>2</sub> is credit risk (NPL ratio),

B<sub>S</sub> is bank size (total assets),

X<sub>2</sub> × B<sub>S</sub> is the interaction term,

$\alpha_i$  is the fixed effect, and

$\varepsilon_{it}$  is the error term.

These models tested the null hypotheses that credit risk has no significant effect on financial performance, and that bank size does not significantly moderate this relationship. Significance was assessed at a 95% confidence level using t-tests.

#### 4.0 RESULTS

This section presents the results of the research on the effect of credit risk management on the financial performance of commercial banks in Kenya, as well as the moderating role of bank size. The study focused on the extent to which credit risk, measured by the Non-Performing Loan (NPL) ratio, affects financial performance, measured by total income, and whether bank size, proxied by total assets, moderates this relationship. The section includes an assessment of the response rate and outlines how this supports the credibility and generalizability of the findings.

#### 4.1 Response Rate

The validity and reliability of empirical research are significantly influenced by the response rate. In this study, data was obtained from 30 out of the 42 licensed commercial banks in Kenya, resulting in a response rate of 71.4%. According to Rubin and Babbie (2016), response rates exceeding 70% are considered very good and meet the standards for statistical analysis and publication. This high response rate minimizes non-response bias and enhances the representativeness of the sample, ensuring the credibility of the findings. The inclusion of banks across all three tiers (Tier 1 to Tier 3) provided a balanced dataset that allowed for meaningful comparisons of credit risk management practices and financial performance across different bank sizes. This response rate is shown below of table 1.

**Table 4.1: Response Rate**

Response Rate	Frequency	Percentage
Response	30	71.4
Non-response	12	28.6
Total	42	100

**Source:** Research Findings (2024)

#### 4.2 Descriptive Statistics

Descriptive statistics summarize the main characteristics of the data and provides an initial overview of the characteristics of the study variables. For this study, the statistics provided an initial understanding of the data collected from Kenyan commercial banks over the period 2017-2022. The measures of central tendencies assessed for this study were the mean, standard deviation, minimum and maximum, which showed the spread and variability in data for each risk management variables. The descriptive statistics data used were the working capital, capital adequacy ratio, non-performing loans ratio and the total assets for moderating variable of bank size. This is illustrated in table 4.2of the descriptive statistics below.

**Table 4.2: Descriptive Statistics**

Variable	Observation	Mean (Kes Bn)	Std D. (Kes Bn)	Min (Kes Bn)	Max (Kes Bn)
Total Income	180	16.64	20.43	0.55	91.20
Non-Performing Loans Ratio	180	0.17	0.15	0.001	0.79
Bank Size	180	134.21	162.06	3.7	759.5

**Source:** Research Findings (2025)

Based on the results from Table 4.2, the mean income of Kenyan banks was KES 16.64 billion, with a standard deviation of 20.43 billion. The standard deviation being greater than the mean can be linked to the fact that Kenya's banking sector is competitive and therefore some banks may be recording higher incomes. The income ranged from KES 0.55 billion to KES 91.20 billion. This difference in income is attributable to competition that may have led to efficiency in some banks thus leading to higher incomes. In addition, there might be variations in the level of infrastructure that attract customers hence boosting their financial performance. Further, some of the banks might be having better governance structures thus leading to the variation in return on assets. This high level of standard deviation suggested variability in the incomes among the banks.

To determine the variability in the management of credit risk on financial performance of banks, non-performing loans ratio was computed and outputs presented in Table 4.2 above. The descriptive statistics showed that the non-performing loans ratio ranged from 0.001 to 0.79. This suggests that banks in Kenya are grappling with high non-performing loans. Overall, on average, about 17 percent of the loans advanced between 2017 and 2022 were non-performing among Kenyan banks. The inference is that non-performing loans is a challenge to the financial performance of banks in Kenya.

To evaluate the moderating aspect of bank size on the relationship between the management of credit risks and financial performance in Kenya, the statistical variability is as shown in the above table 4.2. The average size of banks in the study was KES 134.21 billion, with a standard deviation of KES 162.06 billion. The range of total assets ranged from Kes 3.7 to 759.5 billion. This considerable variation in bank size further indicates the competitive landscape within the Kenyan banking sector. The variability in bank size indicates that in Kenya, there is a blend of small and large banks with different specific risk vulnerabilities and asset base stabilities.

### 4.3 Trend Analysis

The temporal aspect of the study is provided by trend analysis because it demonstrates how risk management and performance indicators transform throughout time. The analysis of trends holds specific value for banking operations because performance levels and risk exposure respond to economic cycles and changes in regulations and market conditions. The ability to determine steady patterns of growth or decline or volatility in specific variables enables researchers to draw conclusions that either support or oppose the research goals.

The trend analysis for this study was carried for the time period 2017-2022 to analyze trends in total income, non-performing loan ratio as well as bank sizes in terms of total assets for any

notable fluctuations and trends throughout the study period. This awareness of time series data laid the foundation for understanding the overall patterns before conducting hypothesis testing. The following Table 4.2 and Figure 4.1 below show the trend analysis for the time period 2017-2022.

**Table 4.3: Trend Analysis 2017-2022**

Year	Total Income (Kes. bns)	NPL Ratio (%)	Total Assets (Kes. bns)
2017	15.75	17.3	78.5
2018	16.12	16.5	82.12
2019	14.95	16.9	79.88
2020	13.88	17.5	75.45
2021	17.34	16.2	84.34
2022	18.97	15.8	89.65

**Source:** Research Findings (2025)

The time series pattern of total income, non-performing loan ratios and bank sizes in terms of total assets for the period of study is shown in table 4.3 above. It was observed that total income has been fluctuating among the banks during the years under study. It is observed that the total income was low in 2019 and 2020 and started increasing in 2021 and 2022. This decline in 2019-2020 may have been caused by the Covid -19 pandemic that affected the economy at that time.

From the table above, the non-performing loan ratio declined considerably from 2017 to 2019 but shot up in 2020, though reduced notably in 2022. This decline in 2019-2020 was likely to have been caused by the impact of Covid -19 pandemic on the economy at that time.

#### 4.4 Diagnostic Tests

Diagnostic tests are pre-estimation tests that validate the result. They are essential in research and provide a way of ensuring that the research model is valid and reliable. In this study, several diagnostic tests were conducted namely normality, heteroscedasticity, unit root, multicollinearity, and Hausman tests to determine whether the data and model met all of the assumptions as shown in table 4.4 and as explained below.

**Table 4.4: Diagnostic Tests Summary – Non-Performing Loans Ratio**

Test	Statistic	p-value	Conclusion
Normality (Jarque-Bera)	8.86	0.075	Data is normally distributed
Multicollinearity (VIF)	2.91	-	No multicollinearity
Heteroscedasticity (Likelihood ratio)	136.79	0	Heteroscedasticity detected
Unit Root Test (Fisher-type)	Stationary	<0.01	No unit root

Hausman Test	82.32	0	Fixed effects preferred
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**Source:** Research Findings (2025)

To test for normality, the Jarque-Bera test was employed. The null hypothesis assumes that the data is normally distributed. With a p-value of 0.075, the null hypothesis was not rejected, confirming that the residuals followed a normal distribution.

Heteroscedasticity was tested using the Likelihood Ratio test. The results returned p-values of 0.00, indicating the presence of heteroscedasticity. To address this, the study applied Newey-West standard errors, which provide robust estimates.

Stationarity of variables was assessed using the Fisher-type Unit Root test. All variables were found to be stationary at the 10% significance level, confirming the absence of unit roots and validating their use in regression analysis.

Multicollinearity was tested using the Variance Inflation Factor (VIF). All explanatory variables had VIF values less than 10, indicating that multicollinearity was not a concern and the model estimates were stable.

The Hausman test was used to determine the suitability of fixed versus random effects models. With p-values below 0.05, the null hypothesis in favor of the random effects model was rejected. Thus, fixed effects models were used for the analysis.

These diagnostic results reinforce the robustness and reliability of the regression analysis conducted in this study.

#### 4.5 Correlation Analysis

The purpose of correlation analysis is to determine the relationships between variables prior to statistical analysis. It determines the direction of each variable's relationship with the other variables as positive, negative, or no relationship at all. The analysis assists in hypothesis testing, model specification, and regression analysis. In this study, this analysis was crucial in giving indication of the direction of how risk variable indicators namely total income, total asset quality and non-performing loan ratio are correlated. According to Hair et al., (2020), correlation analysis seeks to disclose the strength and direction of any linear relationship, which assists in the interpretation of multifaceted data configurations (Hair et al., 2020). Additionally, this analysis reveals multicollinearity which may misrepresent regression if not identified earlier (Field, 2018). Kassambara, (2018) also found out that correlation analysis recognizes and eliminates redundant variables that represent the same primary construct. Although correlation does not establish causation, it is a fundamental requirement for testing causal relationships and validating theoretical frameworks. In the context of financial industry, the expected positive relationship between total assets and total income which is due to economies of scale provides empirical support for financial theory (Berger & Udell, 2020; Creswell & Creswell, 2018).

Commonly, correlation analysis is measured by Pearson’s correlation coefficient (r), which may range from +1 to 0 and to -1. A value of +1 show a perfectly positive linear association, while -1 means a perfect negative linear correlation. A correlation coefficient of 0 implies that the variables do not have a linear relationship between them (Gravetter & Wallnau, 2016).

This study employed the Pearson correlation analysis to examine the strength and direction of the relationships among the financial metrics of commercial banks in Kenya given namely: total income, non-performing loan ratio and total assets. The analysis was conducted using 180 observations. The results are shown in Table 4.5 below.

**Table 4.5: Correlation Analysis**

		TI (Bn KSh)	NPL R(%)	TA (Tn KSh)
Total Income (Billion KSh)	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	180		
Non-Performing Loan Ratio (%)	Pearson Correlation	-0.113	1	
	Sig. (2-tailed)	0.13		
	N	180	180	
Total Assets (Trillion KSh)	Pearson Correlation	0.476**	0.292**	-0.126
	Sig. (2-tailed)	0	0	0.092
	N	180	180	180

\*\*Note:\*\* \*p < 0.01\*\* indicates significance at the 1% level (2-tailed).

**Source:** Research Findings (2025)

Where **TI**= Total Income, **NPL**= Non-Performing Loan Ratio and **TA**= Total Assets

The correlation analysis revealed that there is a moderate and statistically significant positive correlation between Total Income and Total Assets (r = 0.476, p < 0.01). This suggests that banks with a larger asset base tend to generate higher income, consistent with financial theories emphasizing economies of scale. On the other hand, the relationship between Total Income and Non-Performing Loan (NPL) Ratio is weak and negative (r = -0.113), and not statistically significant (p = 0.13). This suggests a slight, inconclusive tendency for banks with higher NPLs to earn lower income. Meanwhile, there is a weak to moderate negative and statistically significant correlation between the NPL Ratio and Total Assets (r = -0.292, p < 0.01), implying that banks with higher levels of non-performing loans tend to have smaller asset bases. These results underscore the importance of effective asset and risk management in sustaining income generation and institutional growth in the banking sector.

#### 4.6 Hypothesis Testing and Regression Analysis

This section presents the results of the tests of all the hypotheses as to answer the research questions of the study. The section highlights the impact of credit risk management approach on bank performance and the extent to which bank size affects this relationship. The purpose of this section is to establish whether the null hypotheses are accepted or rejected, thus giving an idea of the impact of management of credit risk factor on bank income and the effect of bank size as a moderator. The following null hypotheses were stated in this research;

**H0<sub>1</sub>:** There is no statistically significant effect of Credit risk management on financial performance of Commercial banks in Kenya.

**H0<sub>2</sub>:** There is no statistically significant moderating effect of bank size on the relationship between management of financial risks and financial performance of Commercial banks in Kenya.

Null hypotheses testing is crucial in quantitative research as it guides the determination of statistical significance. In this study, null hypotheses testing was important to determine whether credit risks has an effect on performance of banks and whether bank size moderates these bank-level risks-performance relationships. Testing of null hypothesis is a method of confirming or disproving assumed effects and was used in this study to establish whether the observed relationships are statistically significant. It also serves as a control for the researcher's bias: The testing adopts a conservative stance that there is no effect unless the data can prove otherwise. It was particularly appropriate to test the null hypothesis on such relationships, especially those that are related to a particular area like financial risk management in banks as this test is quite specific and was used to determine the contribution of each factor to the outcome of performance.

#### 4.7 Effect of Credit Risks Management Financial Performance of Banks

In this study, the data used to determine the relationship between credit risk management and bank financial performance was the non-performing loans (NPL) ratio, which is the proportion of a bank's loan portfolio that is at risk of default. This data was compared with total income to establish the impact of poor loan quality on profitability. A fixed effects regression model was used and it was observed that there was a negative and significant correlation between credit risk and financial performance. This means that as the level of nonperforming loans rose, financial performance fell. This study found that banks with higher credit risk had lower total income which makes the need for effective credit risk management very important.

This choice was made because of the results of the Hausman test that indicated that the differences between the commercial banks were due to some individual bank characteristics that needed to be taken into consideration. The following prediction equation was used to evaluate the hypothesis:

This choice was made because of the results of the Hausman test that indicated that the differences between the commercial banks were due to some individual bank characteristics that needed to be taken into consideration. The following prediction equation was used to evaluate the hypothesis:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \alpha_i + \mu_{it} \dots \dots \dots 4.2$$

**Table 4.6 Management of Credit Risks on Financial Performance of Banks**

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Dependent Variable: Natural logarithm of Total income

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Explanatory Variable	Coefficients
Non-Performing Loans Ratio	-1.363*** (0.002)
Constant	9.134*** (0.069)
Observations	180
Number of bank	30
R-squared	0.217

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Robust standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Source:** Research Findings (2025)

Robust standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Source:** Research Findings (2025)

Table 4.11 presents the findings which show that the coefficient associated with non-performing loans ratio was positive and statistically significant at p = 0.002, which is less than the conventional 0.05 level of significance. As indicated in the results, the multiple regression model had an Adjusted R2 = 0.217. The computed coefficient value for non-performing loans ratio was 0.217. The R-squared showed that non-performing loans accounts for 21.7 percent of the variance in the financial performance of commercial banks in Kenya. This means that for every 0.217 unit change in non-performing loans ratio, financial performance of commercial banks in Kenya will change by 21.7 percent while other variables are held constant. Hence, the null hypothesis stated below was rejected.

**H0:** There is no statistically significant effect of Credit risk management on financial performance of Commercial banks in Kenya.

The result of the positive relationship between the non-performing loans ratio and bank performance is in agreement with the result obtained by Orichom and Omeke (2021) where no significant relationship was found in their study on European banks. However, results differ with findings such as Kariuki (2017), who stated that the relationship is complex and that other variables such as economic conditions and regulatory frameworks may overrule the effect of non-performing loans on financial performance. However, the current research also supports the importance of proactive measures in managing and reducing non-performing loans that can enhance the overall financial health and performance of Kenyan banks.

**4.8 Bank Size Moderation on Credit Risks and Financial Performance**

The study evaluated the moderating impact of bank size on the connection between management of credit risk and financial performance in Kenya. Given that various banks were involved, the study suspected heterogeneity among the countries. The results in Table 4.7 showed that the heterogeneity among the commercial banks were important in influencing the financial performance of commercial banks and therefore were to be captured as part of the error term. The study therefore estimated a fixed effects model. The tested hypothesis is shown herein: The prediction equation as shown was given as:

$$Y_{it} = \alpha + \beta_1 X_{2it} + \beta_2 \text{Banksize}_{it} + \beta_3 X_2 * \text{Banksize}_{it} + \alpha_i + \mu_{it} \dots \dots \dots 4.2$$

The outcomes of the regression analysis are outlined in Table 15. The moderating effect of bank size on the relationship between relationship between management of credit risks and financial performance of commercial banks was determined as presented in Table 4.7.

**Table 4.7 Bank Size Moderation on Credit Risks Management and Financial Performance**

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Dependent Variable: Natural logarithm of Total income

Explanatory Variable	Coefficients
Non-performing Loans	-1.7432007***
	(0.3801178)
Bank Size	0.0000018**
	(0.0000008)
	0.0000042
Interaction term between Non-performing loans and Bank Size	(0.0000033)
Constant	8.8845289***
	(0.1095061)
Observations	169
Number of bank	30
R-squared	0.4554802

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**Source:** Research Findings (2025)

According to these results, the multiple regression model yielded an R squared of 0.455. The R squared value suggests that non-performing loans, bank size, and their interaction term collectively account for 45.5 percent of the variance in financial performance of commercial banks in Kenya. Based on the results outlined in Table 4.7, it was noted that Bank size affects the effect of non-performing loans on financial performance of commercial banks in Kenya, as suggested by the positive and significant coefficient of the interaction term. As such, the null hypothesis defined below was rejected.

**H04c:** Bank size does not moderate the influence of the relationship between management of credit risks and Kenyan banks financial performance in Kenya.

## 5.0 DISCUSSION AND INTERPRETATION OF FINDINGS

The response rate achieved in this study was 71.4% which was more than the “very good” rate set by Rubin and Babbie (2016). This high response rate increases the validity and generalizability of the findings to the commercial banking industry in Kenya. Moreover, high response rates reduce non-response bias, thus improving the reliability of the subsequent analyses (Mwangi & Muturi, 2018).

The descriptive statistics gave some preliminary information regarding the variables; total income and non-performing loans (NPLs), which is helpful in understanding the relationships between these factors and bank performance. For instance, the mean total income of KES 16,642.38 million with a high standard deviation indicates the competitive nature of Kenya’s banking industry where income differences show resource distribution and operational effectiveness. This result is consistent with Wambua and Mugambi (2020) who reported similar income levels among Kenyan banks that were attributed to differences in infrastructure, governance and customer base.

The descriptive statistics for credit risk, showing an average NPL ratio of 16.7%, confirm that managing credit risk is an important issue. This finding is in line with Singh and Bagga (2019) who also found that high NPLs negatively affect profitability and thus credit risk management is critical.

Several diagnostic tests were conducted to confirm the reliability and fitness of the models used in hypothesis testing. The normality test results showed that the data was normally distributed (p-value of 0.075) and thus parametric tests could be applied. However, heteroscedasticity tests revealed that there was heteroscedasticity in the data and so robust standard errors were used to correct for the issue. This approach is in line with Boisjoly et al. (2020) who recommend robust error corrections in financial data to address issues of variance.

The unit root test revealed that all the variables were stationary which means that the regression analysis was carried out on stable data and not on spurious relationships as recommended by Rodriguez et al. (2021). The absence of multicollinearity (mean VIF of 3.40) also supports the stability of the model, thereby, allowing for the interpretation of the effect of each variable. The Hausman test results suggested that a fixed effects model was the most appropriate as it controls for the effects of individual bank characteristics on performance. This choice is in line with Muriithi and Waweru (2017) who used fixed effects in similar studies on Kenyan banks.

### 5.1 Hypothesis Testing and Regression Analysis

These findings of the study revealed a significant negative relation of credit risk management, as evidenced by the NPL ratio, to bank performance. The null hypothesis, (H02) that “there is no statistically significant effect of Credit risk management on financial performance of Commercial banks in Kenya” therefore, was rejected because proof of the significant negative effect credit risk had on financial performance was at 0.217 R-squared value. The result also shows that 21.7% of the variation in performance is explained by credit risk management, and

hence high levels of NPLs hurt profitability. This is in agreement with Singh and Bagga (2019) and Nyaga and Otieno (2019), who found out that low-level NPL indicates bank stability and profitability.

However, Kariuki (2017) found that credit risk might have another impact depending on different external economic conditions and regulatory supports, hence such factors may impact the linear relationship between NPL and bank performance. In Kenya, where regulatory policies constantly fluctuate, proactive measures in the management of credit risk, including credit screening and loan monitoring policies, are essential in eradicating NPLs in a way to attain financial stability.

The hypothesis testing results indicated that bank size significantly moderates the relationship between credit risk management practices and performance; thus, the null hypothesis, H04: "there is no statistically significant moderating effect of bank size on the relationship between management of credit risk and financial performance of Commercial banks in Kenya", was rejected. Furthermore, bank size was also a moderating factor in the associations of credit performance, which accounted for 0.455 R-squared values. Thus, it shall insinuate that bigger banks, through resource advantages, are perfectly positioned in managing risks qualitatively. Garcia and Johnson, (2022), indicated that bigger banks are capable of distributing resources strategically in directions which enhance their risk management capabilities and culminate into improved holistic performances.

These results point to the competitive advantage of larger banks within the Kenyan banking sector, where bank size facilitates more appropriate risk management practices. More interestingly, given their substantial resources and structures, large banks are better positioned to minimize financial risks and thereby maintain profitability within highly dynamic Kenyan markets.

## 6.0 CONCLUSION

This study aimed to determine the impact of credit risk management on the financial performance of commercial banks in Kenya, with bank size serving as a moderating variable. Using regression analysis and key financial metrics such as the non-performing loan (NPL) ratio, total income, and total assets, the study established meaningful relationships among these variables. The findings confirm that credit risk management significantly influences bank performance and that bank size plays a moderating role in this relationship.

The research confirmed that credit risk management, measured by the NPL ratio, has a statistically significant effect on financial performance. Higher NPL ratios were associated with reduced profitability and financial soundness. As a result, the null hypothesis that credit risk does not affect financial performance was rejected. These findings emphasize the importance of adopting sound credit risk policies to minimize bad debts and enhance financial outcomes. Furthermore, the study established that the interaction between credit risk and bank size had a significant influence on financial performance. This means that larger banks, due to their scale and resources, are better positioned to mitigate the adverse effects of credit risk. Therefore, bank size significantly moderates the relationship between credit risk management and financial performance.

### **6.1 Contribution of the Study**

This study contributes to the body of knowledge on financial risk management in Kenya by introducing total income as a metric for evaluating bank performance. This diverges from traditional measures like Return on Assets (ROA) and Return on Equity (ROE), offering a more comprehensive view of bank earnings. It also sheds light on how bank size influences the relationship between credit risk and performance, providing valuable insights into the risk profiles of banks of varying sizes.

### **6.2 Implications of the Findings for Theory, Practice, and Policy**

The findings reinforce the Credit Risk Theory by demonstrating the negative correlation between NPLs and financial performance, underlining the importance of effective credit management. Additionally, the study opens up new avenues for expanding the theory to include organizational variables like bank size and internal culture, in line with Resource Dependence Theory (RDT).

Policy makers, particularly regulators such as the Central Bank of Kenya (CBK), should consider revising regulatory frameworks to focus more on risk-based approaches rather than purely rule-based oversight. Emphasis should be placed on developing credit policies that reduce NPLs and investing in staff training to address new threats such as cyber risks and fintech disruptions.

For practitioners, the study underscores the need for banks to strengthen credit risk management strategies and develop institution-specific approaches based on their size and resource capabilities. Customer education initiatives can further enhance transparency and informed financial decision-making.

### **6.3 Limitations of the Study**

The study faced several limitations. Accessing consistent and complete data for all commercial banks, particularly those under regulatory sanctions, proved challenging. Data inconsistencies and reporting gaps also limited trend analysis. Moreover, the use of secondary data introduced potential biases, and the study's findings may not be generalizable beyond the Kenyan banking sector. External shocks and unmodeled macroeconomic factors may have influenced the results.

### **6.4 Recommendations for Further Research**

This study recommends that future research should integrate alternative performance metrics such as cost-to-income ratio and net operating income alongside traditional indicators. Advanced statistical tools like structural equation modeling and machine learning could offer deeper insights into risk-performance dynamics. Further studies should incorporate other forms of risk such as market, operational, and cyber risk for a more holistic view. Longitudinal studies extending beyond 2022 would help analyze the sustained impact of credit risk management. Additionally, comparative analyses across developed and emerging economies, as well as among banks with different ownership structures (e.g., state-owned vs. private), would enhance

the generalizability of findings and reveal how contextual factors shape risk management effectiveness.

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