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INTEREST RATE CHANGES AND BANK PROFITABILITY

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ABSTRACT

This study looks at how interest rate changes affect Kenyan commercial banks' profitability, with a particular emphasis on loan performance and liquidity management. The study uses correlation analysis and panel regression models with panel data from 38 banks (2018–2023). The cost of keeping sizable reserves is highlighted by the findings, which show that excessive liquidity has a negative impact on profitability even while loan performance has no discernible effect. The study emphasizes how important it is for banks to use financial technology, diversify their sources of income, and improve liquidity management. Additionally, it suggests adaptable regulatory measures to strike a balance between economic stability and profitability. Banks, regulators, and legislators can all benefit from these ideas when it comes to reducing interest rate risks.



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CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

The relationship between interest rate changes and the profitability of commercial banks has been a subject of extensive academic inquiry, particularly in Kenya. Studies from recent years emphasize that interest rate fluctuations significantly impact banks' financial performance through their effects on lending, deposit mobilization, and cost structures. Malalu and Njoka (2024) found that variations in interest rates create interest rate risk for Kenyan banks, particularly those heavily reliant on fixed-rate financial instruments. These risks are especially pertinent in volatile economic environments where central bank policies frequently shift to stabilize inflation or currency value (Richard & Suva, 2023). In a similar vein, Mwangi et al. (2024) note that interest rate policies implemented in Kenya have contributed to fluctuations in profitability, necessitating robust risk management strategies to safeguard bank performance.

The Kenyan context is unique due to its dual challenges of financial inclusion and regulatory constraints. The interest rate capping policy implemented between 2016 and 2019 had a profound effect on the lending practices of Kenyan commercial banks, as noted by Githinji, Simiyu, and Omagwa (2024). They highlighted that while the policy sought to make credit more accessible, it restricted banks' ability to price loans based on market risks, thereby squeezing profit margins. This observation aligns with findings by Muthike (2024), who explored how regulatory interventions influence bank profitability through limitations on interest rate spreads. These studies collectively underscore the interplay between policy interventions and bank performance, emphasizing the need for nuanced strategies to align regulatory goals with financial sector sustainability.

Bank-specific factors such as credit risk management, cost efficiency, and diversification also mediate the effects of interest rate changes on profitability. Mwangi (2024) revealed that effective credit risk management enables banks to mitigate the adverse impacts of rising interest rates, such as increased loan defaults and reduced credit demand. Similarly, Lasoi (2024) argued that pricing strategies and operational efficiency significantly influence how banks respond to changes in interest rate environments. These findings complement the study

by Robert (2024), which demonstrated that Kenyan banks that diversified their income streams beyond interest-related activities experienced better resilience against interest rate fluctuations. The broader economic environment, including inflation, exchange rate volatility, and GDP growth, compounds the effects of interest rate changes on bank profitability. Juma (2024) emphasized that macroeconomic stability is a crucial determinant of bank performance, as it influences credit quality and liquidity. Furthermore, Muthike (2024) explored how external factors interact with interest rate policies to affect profitability and financial stability. These insights are echoed by Simiyu (2024), who identified financial repression policies as a critical factor influencing the operational efficiency and profitability of selected Kenyan commercial banks.

1.2. Problem Statement

Stability would provide clear and effective interest rate regulation to balance bank profits and economic development. Stable interest rates should help banks manage lending and investment risks and boost public trust (Ngugi, 2001; Mishkin, 2018). Predictable interest rates let banks satisfy shareholder expectations and offer loans to companies and families using reasonable profit margins. Macroeconomic indices including inflation, employment, and GDP growth depend on stability (World Bank, 2020). This ideal atmosphere allows regulatory agencies like the Central Bank of Kenya (CBK) to establish policies that support financial stability and equitable economic growth. A theoretical framework like the Taylor Rule links monetary policy instruments to inflation and economic production objectives, supporting the ideal (Taylor, 1993). Unfortunately, emerging economies like Kenya have structural and regulatory constraints that make it difficult to achieve such perfect circumstances. Macroeconomic and regulatory issues cause frequent and unexpected interest rate adjustments in Kenya, deviating from this ideal condition. The 2016 interest rate limit impacted lending availability for SMEs and bank profitability (Central Bank of Kenya, 2019). After the restriction was repealed in 2019, Kenyan banks have had to respond to global economic risks including the COVID-19 epidemic and rising inflation (IMF, 2021). Banking vulnerabilities include declining net interest margins and higher credit risks due to these issues. Kamau and Were (2013) and Barasa et al. (2020) note that regulatory and economic shocks affect bank performance, but they do not analyze Kenya's present economy. Interest rates and profitability have been extensively studied in developed economies (Claessens et al., 2018), but emerging markets like Kenya, with structural issues like high informality and policy inconsistency, have

received less attention (Beck et al., 2014). This gap highlights the necessity for a thorough study of Kenyan banks to understand how interest rate fluctuations affect profitability and resilience.

Using economic models and longitudinal banking data from Kenya, this research will offer insightful information to economic analysts, financial institutions, and policymakers. Stakeholders will get a better understanding of how interest rate changes affect bank profitability and overall financial stability. The study complies with regulatory requirements, protects data, and maintains anonymity in accordance with ethical research methods. Additionally, by providing a context-specific study, it adds to the larger conversation on financial resilience in developing economies. The results will help to improve risk management techniques, shape monetary policy, and create a more sustainable banking environment in Kenya.

1.3. Research Objectives

The study will seek to establish effect of interest rate changes on bank profitability in Commercial banks in Kenya.

1.3.1. Research Objective

- i. To establish the effect of interest rate changes in loan performance and bank profitability in Commercial banks in Kenya.
- ii. To establish the effect of interest rate changes in liquidity position and bank profitability in Commercial banks in Kenya.

1.3.2. Research Hypothesis

H₀₁: Changes in interest rates have a significant effect on loan performance and bank profitability in commercial banks in Kenya.

H₀₂: Changes in interest rates have a significant effect on the liquidity position and bank profitability in commercial banks in Kenya.

1.3.3. Research Questions

- i. What is the effect of interest rate changes in loan performance and bank profitability in Commercial banks in Kenya.
- ii. What is the effect of interest rate changes in liquidity position and bank profitability in Commercial banks in Kenya.

1.4 Significance of the research

Understanding interest rate changes can benefit investors, corporations, policymakers, academia, and the economy. It helps make informed investment decisions, better plan capital expenditures, and design effective monetary policies. This research contributes to existing literature on macroeconomic policy and investment behavior, promoting stable economic growth and predictable growth.

To the government and macroeconomic policy makers, the study is significant in understanding the relationship between the effects of interest rates on bank performances. They will have more knowledge and hence develop better policies to ensure banks financial performance is restored to boost economic growth.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides a comprehensive review of the relevant literature on the effects of interest rate change and bank performance. The chapter is organized as follows; a theoretical review of the independent variables, conceptual framework, empirical review of the existing literature and the research gap.

2.2 Theoretical Framework

Four theories related to the independent variables. The discussion will focus on the arguments, assumptions, application of the theories about the study, and critiques of the theories.

2.2.1 The Keynesian Theory of Investment

The Keynesian Theory of Investment, developed by John Maynard Keynes in 1936, emphasizes the relationship between interest rates, investment decisions, and overall economic activity. According to Keynes, lower interest rates reduce borrowing costs, encouraging firms and individuals to take loans for investment, which in turn stimulates economic growth. Conversely, higher interest rates increase borrowing costs, discouraging investment and slowing economic expansion. This theory highlights the crucial role of monetary policy in influencing financial markets, particularly in the banking sector, where profitability is directly linked to interest rate fluctuations.

Empirical studies on Kenyan commercial banks provide substantial evidence supporting the Keynesian hypothesis. Interest rate spreads—defined as the difference between lending and deposit rates—have been shown to impact key profitability indicators, reflecting the sector's sensitivity to monetary policy changes (Ng'etich, 2011; Muganda, 2020). When interest rates rise, commercial banks tend to experience a reduction in loan demand, as businesses and individuals find borrowing more expensive. This often results in decreased credit uptake, leading to lower interest income for banks. Additionally, studies indicate that high interest rate environments contribute to an increase in non-performing loans (NPLs), as borrowers struggle to meet repayment obligations due to higher debt servicing costs. Amollo (2015) refutes certain aspects of the Keynesian approach, arguing that in some cases, rising interest rates may not

necessarily lead to a proportional decline in investment but rather a shift in credit allocation strategies by banks.

The impact of interest rate fluctuations on commercial bank profitability in Kenya extends beyond just loan demand. Interest rates also influence the liquidity position of banks, affecting their ability to manage cash flows and allocate capital efficiently. High interest rate periods tend to tighten liquidity, forcing banks to be more conservative in their lending strategies. This can result in stricter credit approval processes, thereby reducing the number of loans issued. Research by Ng'etich (2011) and Mugambi (2017) suggests that banks' profit margins tend to be lower in high interest rate environments due to the combined effect of reduced loan issuance and increased loan defaults. Macharia (2016) further supports this claim, noting that during periods of high interest rates, banks prioritize maintaining liquidity rather than expanding their lending portfolios, which in turn affects overall profitability.

Conversely, when interest rates are lowered, borrowing becomes more attractive, leading to an increase in loan applications and approvals. This scenario fosters economic growth by encouraging businesses to expand and invest in productive activities. Onango (2010) highlights that lower interest rates create a favorable lending environment, enhancing credit accessibility for individuals and businesses alike. Consequently, banks experience higher levels of interest income due to increased lending activity. However, while lower interest rates can boost profitability through higher loan volumes, they may also lead to narrower interest margins, particularly if deposit rates remain elevated.

2.2.2 Loanable Fund Theory

Knut Wicksell's Loanable Funds Theory states that interest rates are governed by the loanable funds market's equilibrium between saves and investments. This idea indicates that rising interest rates encourage saving and decrease borrowing, which might diminish bank profitability due to decreased loan uptake.

According to empirical research, its forecasts typically fail in countries with inflexible financial institutions or external shocks, such as Kenya's banking sector during the interest rate capping period (2016–2019) (Were & Wambua, 2014).

The Kenyan example shows that authorities must balance borrower protection with banking sector profitability. Overly strict interest rate limits may discourage private sector lending, whereas uncontrolled rate spikes may hurt vulnerable borrowers, according to Kamau and

Mwega (2021). Thus, central banks are crucial to steady interest rate control environment (Macharia, 2016).

2.2.3 Monetary Policy Theory

John Maynard Keynes' 1936 "The General Theory of Employment, Interest, and Money" was influential. Money supply management may affect macroeconomic concerns including inflation, employment, and interest rates, according to Keynes. Milton Friedman's monetarist theory, which stressed the role of monetary policy in preventing inflation and stabilizing the economy (Friedman, 1968), was another important addition. Fisher's 1930 interest theory examined nominal, real, and inflationary interest rates, advancing the field. Monetary Policy Theory states that central banks control interest rates to affect inflation, employment, and growth. Kenya's Central Bank regulates commercial bank lending rates using the CBR. The idea indicates that these rates impact bank profitability by changing net interest margins, loan demand, and asset quality (Mishkin, 2007).

Despite its popularity, Monetary Policy Theory is criticized. Interest rate-based theories generally ignore commercial banks' non-interest income sources, limiting their explanation. Mixed findings from empirical research. Higher interest rates temporarily boost profits but lower credit quality, resulting in more non-performing loans and worse profitability in Kenya (Were & Wambua, 2014). Extremely low rates reduce margins and profitability. Bank loan interest, investment returns, and financing costs are directly affected by interest rate fluctuations. Kenyan commercial banks might initially benefit from high interest rates by increasing net interest margins. However, persistent high rates lower loan demand and raise default rates, hurting profitability (Kamau & Were, 2013).

In contrast, falling interest rates lower loan and security revenue, reducing margins. Such circumstances may boost loan growth and payback rates, offsetting income losses. Kenyan banks with various revenue streams including fee income and foreign currency trading are resilient to interest rate fluctuation (Kimutai & Barno, 2020).

2.2.4 Interest Rate Parity Theory

The Interest Rate Parity (IRP) theory posits that differences in nominal interest rates between two countries are offset by changes in exchange rates. Its core premise is that arbitrage opportunities in international financial markets ensure that the return on domestic deposits is equivalent to the return on foreign deposits when adjusted for expected exchange rate changes. Specifically, the IRP theory is expressed as:

$$1 + i_d = (1 + i_f) * \frac{F}{S} \dots (1)$$

Where:

i_d and i_f are the domestic and foreign interest rates respectively

F and S are the Forward and Spot exchange rates respectively

The theory shows how international financial markets are interconnected and how interest rate fluctuations affect capital flows and banks profitability by affecting borrowing costs and exchange rates (Chinn & Frankel, 2021; Sarno et al., 2003).

Despite its usefulness, the IRP theory may oversimplify real-world situations. In actual life, perfect capital mobility and no transaction expenses are rare. Geopolitics and speculation cause exchange rate volatility to diverge from the IRP's expectations. Research in developing nations like Kenya shows that capital restrictions and market inefficiencies cause IRP variations (Obsfeld and Rogoff, 2000). These disparities cast doubt on the idea, particularly in nations with weaker financial institutions and greater shock sensitivity.

Kenyan empirical data shows divided support for IRP. The hypothesis explains the link between interest rates and exchange rates, although research demonstrates that real-world deviations are prevalent. This is due to macroeconomic volatility and financial integration concerns. Ndung'u (2013) noted that Kenya's currency markets are speculative, therefore interest rate changes affect exchange rate dynamics even if they don't match IRP expectations. The relationship between bank profitability and currency rates shows that IRP only partly explains Kenyan banks' performance.

2.3 Empirical Review

Ngure (2014) examined Kenyan commercial banks' financial performance and interest rate adjustments. Interest rate changes affected bank profitability by 64%, according to the research. Higher lending rates boosted interest revenue but decreased borrowing and higher loan default risk. These criteria emphasize the necessity to determine appropriate rates to enhance profits and loan performance. The research also evaluated how market rivalry and regulatory limitations impact profitability. Ngure suggested strategic interest rate management to maintain profitability and reduce non-performing loan risks.

Mwangi and Wambari (2017) examined how interest rate variations influenced Kenyan commercial banks' operations and profitability. Their research showed that higher rates first increased profitability but later increased NPL rates owing to repayment concerns. The research revealed elements that foster financial competition, such as banks cutting interest rates to attract clients and diminishing profit margins. Limiting interest rates and other regulations were intended to limit banks' profits while keeping borrower expenses low. Mwangi and Wambari suggested proactive risk management to reduce loan performance impacts from interest rate volatility.

In 2015, Amollo examined how lending interest rates affected Kenyan commercial banks' earnings. Interest rates explained 65% of profitability fluctuations, according to research. While increasing income, high lending rates raised credit risk by making it harder for customers to repay their debts. The study also evaluated GDP growth and inflation to show how interest rates affect profitability. Amollo suggested stricter loan monitoring and stronger borrower credit evaluations to reduce default risk under high interest rates. This strategy was essential for long-term income-credit quality balancing.

Irungu (2013) examined how interest rate spreads influence Kenyan commercial banks. Income metrics like Return on Assets increased dramatically with wider interest rate spreads, which are high lending rates and low deposit rates. The research also found that big spreads discouraged borrowing, which hurt loan performance and credit growth. The major obstacles to banks' enormous spreads were public scrutiny and regulatory constraints. Irungu suggested financial innovation and revenue stream diversification to overcome these issues and lessen interest rate margin dependence while being profitable.

Musiega et al. (2017) examined Kenyan commercial bank performance and interest rate risk. According to the report, interest rate volatility affects liquidity, prompting banks to change their strategy to preserve cash flow. Too much short-term borrowing reduces profit margins, causing liquidity issues for banks. Rising interest rates worsen this behavior. The researchers also found that negative interest rate movements need stricter risk management for net interest margins (NIM). High interest rates negatively impacted banks' capacity to repay loans, underlining the necessity for liquidity management measures to reduce risk. This study illuminates the problems of preserving liquidity and profitability amid shifting interest rates.

Lukorito et al. (2014) found a statistically significant positive correlation between liquidity and Kenyan commercial bank profitability. A 1% increase in liquidity immediately increased profitability, indicating the necessity for a large cash buffer to cushion interest rate shocks. The

research stressed the need of balancing since too much liquidity might lower asset returns. Cautious liquidity banks gained from interest rate hikes because their reserves insulated them from market volatility. The study also found that liquidity management affects loan issuance since tighter liquidity lowers credit availability and profitability.

Mogambi (2017) examined how interest rate changes affect Kenyan bank profitability. The results showed that interest rate-limiting laws meant to safeguard borrowers made banks' liquidity management harder. Liquidity risk's relationship to interest rate movements and profitability was crucial. Higher interest rates improve loan revenue but may strain capital required for effective operations, Mugambi said. Regulations must combine customer safety and long-term banks profitability, the study underlined. Banks cut interest margins to comply with regulations, limiting their financial flexibility and raising liquidity risk.

Mwangi (2014) examined how fluctuating interest rates influence bank profitability and liquidity management. Effective liquidity management reduces interest rate rise risks, according to the analysis. Anticipating liquidity constraints and diversifying financing sources helped banks function better during turbulence. The research found a clear correlation between liquidity concerns and reduced profitability because banks must sell assets or employ expensive short-term borrowing. Increased interest rates increase liquidity difficulties for borrowers facing higher payback costs, growing default rates, and restricted bank revenue streams, Mwangi said.

Richard and Suva (2024) examined how Kenyan commercial banks function and financial concerns such interest rate changes. Their results reveal that changing interest rates affect net interest margins, an important bank profitability measure. The analysis found that banks earn more when interest rates rise. Variable rates may raise loan costs and default rates, threatening profitability. This research also shows that banks with large fixed-rate loan portfolios are vulnerable because they cannot adjust to interest rate movements. Commercial banks should use dynamic pricing models to maximize rate adjustment advantages and minimize negative effects. This research emphasizes the need of risk management in maintaining profitability amid rate volatility.

Githinji, Simiyu, and Omagwa (2024) study Kenyan commercial banks' financial stability and interest rate risk. High interest rates aggravate financial hardship, especially for smaller banks with limited access to cheap loans, they found. The results show that banks with a varied revenue source, including non-interest income, may better withstand increasing interest rates. The authors demonstrate how unexpected interest rate hikes may affect net interest margins,

especially in the highly competitive banking industry. Their data also imply that Kenya's 2016 interest rate limitation legislation, which was eventually overturned, reduced bank profitability and limited risk-based loan pricing. This research highlights the complex interplay between interest rate dynamics and regulation.

Malalu and Njoka (2024) examine how interest rate volatility impacts Nairobi Securities Exchange-listed institutions. When interest rates rise, clients are less inclined to take out loans since they cost more, the research found. This decline in lending affects interest earnings, most Kenyan banks' main source of income. The researchers also note that fixed-rate loans increase losses during rate hikes, whereas floating-rate loans enable banks to shift risks to borrowers, reducing negative effects. The research emphasises liquidity management as a key defence against rate volatility by emphasising that banks with appropriate capital can absorb shocks. Monetary policy must be stable to promote long-term banking expansion.

Ondari, Kimani, and Roche (2024) examine Kenyan commercial banks' financial performance and interest rate risk. They note that interest rate risk generally causes profit volatility since banks struggle to balance financing costs with loan and security income. The report also highlights that Kenyan banks have typically hedged interest rate risk poorly, using deposit repricing, which fails in volatile markets. The authors also believe that duration gap analysis and derivatives may boost bank resilience by managing interest rate risk. Banks must adopt cutting-edge risk management to reduce the negative consequences of shifting interest rates, according to the report.

2.4 Research Gaps

The reviewed literature provides valuable insights into the impact of interest rate changes on the profitability of commercial banks in Kenya, but several research gaps emerge that underscore the need for further study. While Ngure (2014), Mwangi and Wambari (2017), and Amollo (2015) emphasize the significant influence of interest rate changes on loan performance and profitability, their analyses primarily focus on the linear relationship between these variables without addressing the moderating or mediating effects of liquidity management. The existing research demonstrates a strong correlation between interest rate variations and bank profitability but lacks comprehensive exploration of the interconnected roles of loan performance, liquidity position, and profitability. These gaps justify the need for a study specifically aimed at understanding the dual effects of interest rate changes on loan

performance and liquidity position, with an emphasis on their combined impact on the profitability of commercial banks in Kenya. This study will address these deficiencies by examining bank-level data to provide a holistic understanding of these dynamics.

2.5 Conceptual Framework

The conceptual framework outlines the relationship between interest rates and bank profitability

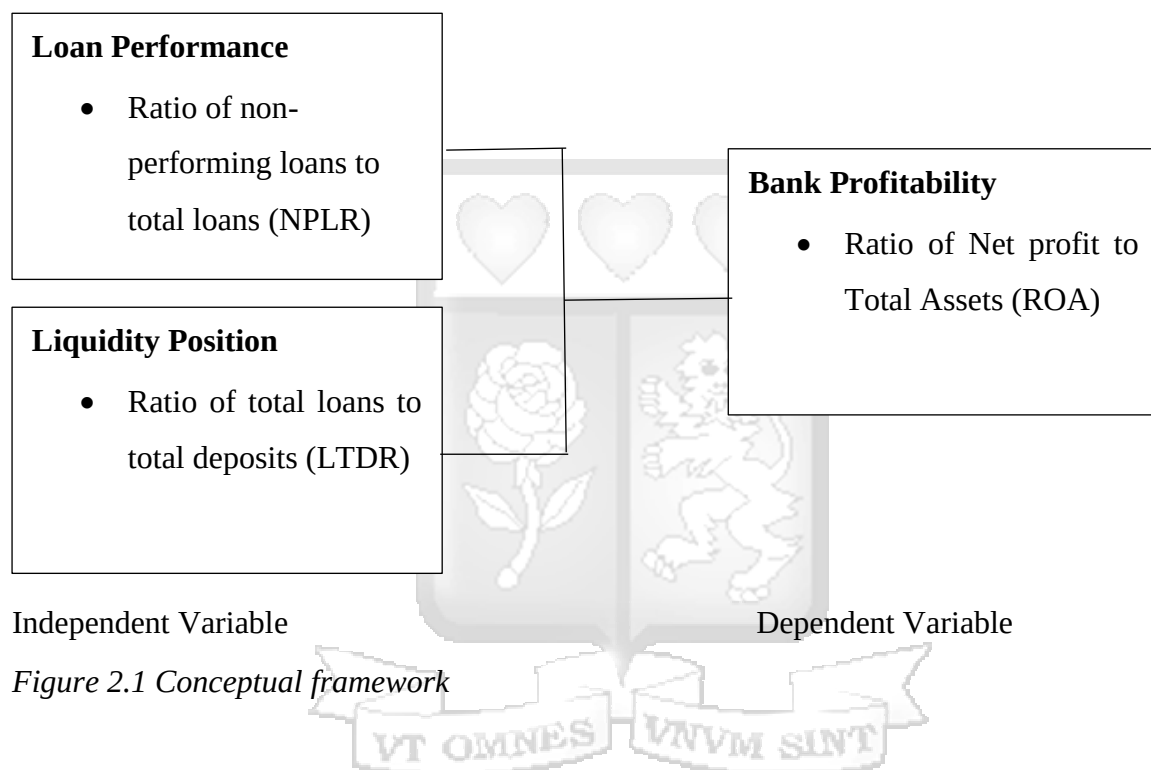


Figure 2.1 Conceptual framework

CHAPTER THREE

METHODOLOGY

3.1 Research Design

The research will employ a quantitative approach to provide a comprehensive analysis of the impact of interest rate changes on the investment decisions of banks in Kenya. The study will use descriptive research design to describe the current state of interest rate changes and their impact on banks' investment decisions and explanatory research design to investigate the relationships and causality between interest rate fluctuations and investment behaviors of banks.

3.2 Population and Sampling

Including people and items in the target population will expand the results (Thanem & Knights, 2019). The study will evaluate all 38 Kenyan commercial banks as of December 31, 2023 listed in the appendix. The 2018-2023 review will encompass 5 years. This study covers all Kenyan commercial banks.

3.3 Data Collection Methods

The study will gather secondary data from secondary sources. Information will be gathered from the CBK website. The gathering of secondary data will be done with the aid of a secondary data collection sheet.

Table 3.1 Measurement and Operationalization of Variables

Variable	Definition	Source
Loan Performance	loan performance analysis is the process of measuring and analyzing the effects of a loan transaction on an entity's financial position, cash flows and profitability. Loan performance analysis can be used to evaluate the impact of a loan on an entity's financial position, cash flows and profitability.	CBK

Liquidity Position	liquidity position at any time means the sum of Borrowers' unrestricted cash plus the amount then available to Borrowers for Advances under the Revolving Facility.	CBK Website
Bank Profitability	Bank profitability, an indicator of bank performance, is a reflection of how banks are run given the environment in which they operate. Healthy and sustainable profitability plays a vital role in maintaining stability in the banking sector	CBK Website

3.4 Data Analysis

Secondary data was extracted from books of accounts were analyzed to derive meaning from them. Descriptive statistics were used to describe and summarize the ratios of the variables in the study that included loan performance and liquidity position and commercial bank profitability. Inferential statistics was used to determine the effect of loan performance and liquidity position on commercial bank profitability. 95% confidence interval was employed to check the significance of the test generated model and to accept or reject the hypotheses.

3.4.1 Normality Tests

The normality assumption ($u \sim N(0, \sigma^2)$) is required to conduct single or joint hypothesis tests about the model parameters (Brooks, 2008). Bera and Jarque (1981) tests will be used to test normality. The study tested the null hypothesis that the disturbances are not normally distributed. If the p-value is less than 0.05, the null of normality at the 5% level is rejected. If the data is not normally distributed a nonparametric test was used appropriate.

3.4.2 Multicollinearity

The study employed Variance Inflation Factor (VIF) to measure multicollinearity (Gujarati, 2009; Cooper & Schindler, 2008). Failure to account for perfect multicollinearity results into indeterminate regression coefficients and infinite standard errors while existence of imperfect

multicollinearity results into large standard errors. When $VIF < 10$; there is no multicollinearity; when $VIF \geq 10$ presence of multicollinearity

3.4.3 Hausman Test

When performing panel data analysis, one must determine whether to run a fixed effects model or a random effects model. Hausman's specification test (1978) was used to determine whether fixed or random effect should be used. P-value > 0.05 implies random and effect model appropriate, otherwise, fixed model is run.

3.4.4 Model Specification

The panel regression model will be used to illustrate the relationship between the independent and dependent variables. The following panel regression model will be used to show the relationship between independent and dependent variables.

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \varepsilon \dots (2)$$

Where.

Y_{it} represents Bank Profitability i at time t

β_0 represents Constant,

X_{1it} Loan performance i at time t

X_{2it} Liquidity Position cash flows i at time

β_1, β_2 , represents the Regression Coefficients of three variables

it represents indices for individuals and time

ε represents the error term that varies non-stochastically over i and t

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND INTERPRETATION

4.1 Introduction

Following the defined research aims, this chapter presents the study's results and interpretations. The data was analyzed using panel regression, descriptive, and statistical methods. Regression analysis was used to determine the impact of interest rate changes on Kenyan bank profitability, while descriptive analysis was employed to address the nature of the variables studied. This section also highlights the diagnostic tests used to assess whether the panel data model was a perfect fit for the data.

4.2 Descriptive Studies

This study's two independent components were loan performance, liquidity performance, and profitability, with one dependent variable respectively. These factors were measured using a number of approaches. It is worth mentioning that the study contained 234 observations, where n is the number of banks analyzed and T is the number of years. The lowest, maximum, standard deviation, and mean values of each measurement were also highlighted. Each of them is emphasized in this section.

Table 4.1 Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Loan Performance	234	.1698812	.1516534	.0009	.886029
Liquidity Position	234	1.58977	4.424912	.027241	52.70358
Profitability	234	.0536663	.1736882	-.42707	1.719565

There are 234 data, and the "Loan Performance" mean of 0.17 suggests a favorable loan repayment. However, the standard deviation (0.15) indicates significant loan performance diversity throughout the sample. Because of risk management and borrower characteristics, the lowest and highest figures, 0.0009 and 0.886, reveal significant difference in repayment success among institutions. With a mean of 1.59 and a standard deviation of 4.42, "Liquidity

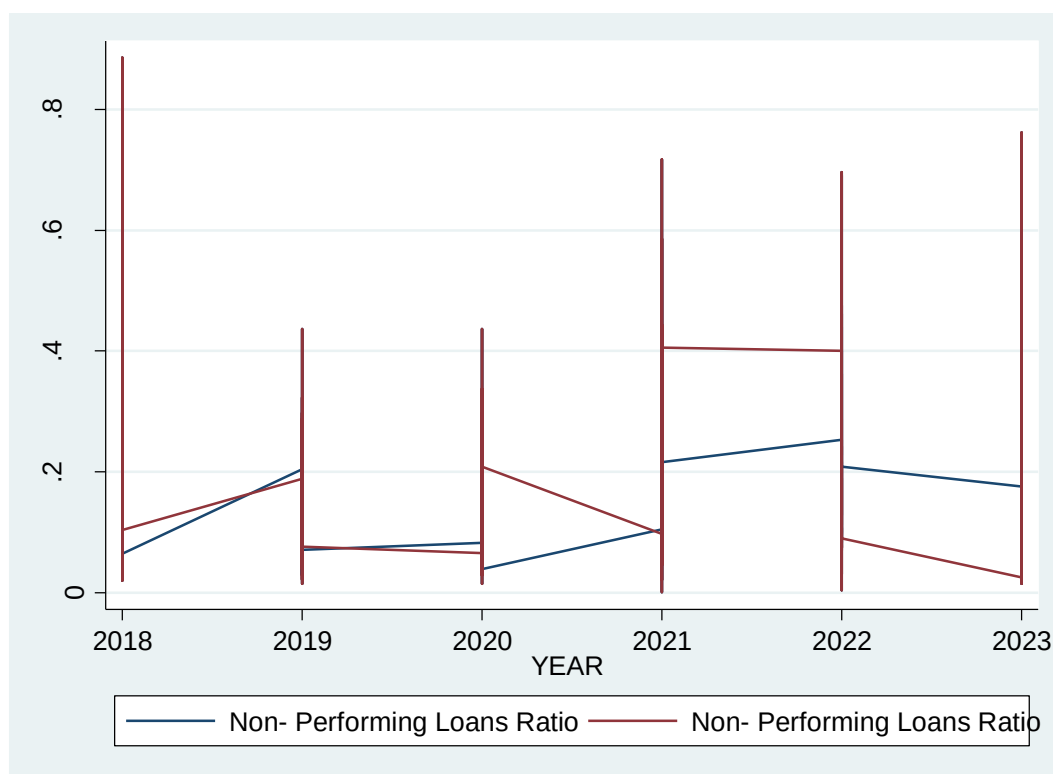
Position" reveals that most banks have enough liquidity, but a high of 52.70 indicates that some have too much. Finally, the average "profitability" is 0.054 (5.4%), with certain banks reporting negative profitability (-0.43) due to non-performing loans or excessive operational expenses.

4.3 Trend Analysis

Line graphs were built to illustrate loan performance, liquidity, and profitability. The line graphs are shown below.

4.3.1 Loan Performance

Graph 4.1



The graph 4.1 below illustrates loan performance tendencies from 2018 to 2023. Loan performance varies owing to interest rate variations, economic conditions, and regulatory actions, which are critical for bank financial analysis. The graph illustrates loan performance spikes and declines. Economic instability and increasing interest rates may make it difficult for borrowers to pay their obligations, hence enhancing loan performance. The differences in the two curves may show fundamental dynamics in the banking system by influencing various types of loans or sectors. End-of-year changes might be due to bank provisioning or reporting.

4.3.2 Multicollinearity Test Results

To assess multicollinearity, the Variance Inflation Factor (VIF) and Tolerance were utilized. VIF demonstrates how additional explanatory variables improve the predictability of the explanatory variable.

Table 4.2 VIF Summary Statistics

Variable	VIF	1/VIF(Tolerance)
Liquidity Position	1.01	0.987489
Loan Performance	1.01	0.987489
Mean VIF	1.01	

The variables "Liquidity Position" and "Loan Performance" have a VIF of 1.01. The tolerance levels of 1/VIF and 0.987 show that each predictor variable in the model is independent. A regression VIF score close to one implies minimal multicollinearity, which increases the reliability of regression results interpretation. The model's mean VIF of 1.01 indicates that multicollinearity is unlikely, allowing for reliable predictions of how interest rate changes influence Kenyan bank profitability.

Recent research has highlighted the importance of analyzing bank profitability and interest rate changes. In Kenya, Omondi and Mungai (2020) found that more rigorous interest rate restrictions had an impact on banks' lending performance and liquidity, which in turn harmed their profitability. They discovered that banks with higher liquidity may maintain profitability more effectively when interest rate restrictions restrict banks' capacity to modify rates flexibly. Teshome's (2021) regional survey of Ethiopian banks found that loan performance and liquidity typically offset the negative effect of shifting interest rates on profitability. These findings, which support the Kenyan banking sector's focus on liquidity and loan performance, suggest that banks with varied assets and robust liquidity management systems may be better able to resist interest rate volatility.

Claessens et al. (2019) discovered that interest rate modifications in emerging countries may increase or decrease bank profitability, depending on regulatory influence and liquidity risk management. According to Claessens et al., when liquidity and loan portfolios stay stable, developing nation banks are less vulnerable to interest rate movements. These findings confirm the study's low VIF values, indicating that Kenyan banks' profitability during interest rate

fluctuations may be based on liquidity and loan performance rather than inter-variable dependency.

4.4 Inferential Results

4.4.1 Correlation Analysis

Correlation analysis makes it easy to determine the degree of association between variables. Table 4.2 presents the correlation data.

Table 4.3 Correlation Matrix

	profitability	Liquidity position	Loan Performance
Profitability	1.0000		
Liquidity position	-0.1566	1.0000	
Loan Performance	0.0232	-0.1119	1.0000

The correlation matrix investigates profitability, liquidity, and loan performance in relation to interest rate movements and bank profitability. Profitability and liquidity have a modest negative connection (-0.1566). Banks' profitability falls as liquidity reserves grow. A negative association indicates the opportunity cost of retaining too many liquid assets, which usually give poorer returns than alternative investments. The correlation between profitability and loan performance is minimal (0.0232) . This might suggest effective risk management or a revenue strategy that overlooks loan performance. Finally, liquidity position exhibits a little negative correlation (-0.1119) with loan performance, indicating that higher liquidity reserves may impair loan performance owing to decreased lending activity, which lowers portfolio quality.

4.5 Diagnostic Tests Results

This section focuses on the various diagnostic test results. The diagnostic tests' main purpose was to determine if the selected panel analysis model was the best fit for the given data. Normality and multicollinearity were two of the diagnostic tests done.

4.5.1 Test for Normality

The Shapiro-Wilk test was used in the study. When normality is present, the Shapiro-Wilk test calculates a test statistic (W) based on the correlation between actual and anticipated values. A p-value indicates the strength of the evidence against the normality null hypothesis. If the p-value is greater than 0.05, it is assumed that the data is regularly distributed. If the Shapiro-

Wilk test reveals an uneven distribution, normality is violated. Log transformation may be used to normalize non-normal variables.

Table 4.4 Shapiro-Wilk W test for Normal data

Variable	Obs	W	V	z	Prob>z
Profitability	234	0.55665	75.868	10.039	0.00000
Loan Performance	234	0.80236	33.821	8.165	0.00000
Liquidity Position	234	0.26143	126.388	11.223	0.00000

Table 4.2's Shapiro-Wilk W test results demonstrate that Kenyan banks' profitability measurements, notably interest rate changes, do not follow a normal distribution. Profitability, Loan Performance, and Liquidity Position follow non-normal distributions with p-values of 0.00000, showing significant skewness or kurtosis. Loan Performance has the greatest W value of 0.80236, while other variables have low W statistics, which indicate data normalcy. The z-scores for Liquidity Position and Profitability are 11.223 and 10.039, respectively, indicating significant non-normality. Such findings imply that profitability and liquidity assessments may not meet common modeling assumptions, particularly at differing interest rates.

According to research conducted by Kenyan banks, interest rate volatility has a nonlinear impact on profitability. High-interest rate constraints restrict lending profit margins, hence Kenyan banks have generally diversified to mitigate volatile interest earnings, according to Maina (2021). In the context of interest rate control, Jefferis et al. (2020) emphasized the importance of liquidity circumstances in profitability results. Ibenyenwa (2020) discovered that interest rate limits in African underdeveloped countries reduced profitability due to limited interest margins. In Kenya, Alper et al. (2020) discovered that interest rate limitations impair bank profitability by decreasing revenue generation.

4.5.2 Hausman Test

Both fixed and random effects estimate coefficients to assist in determining the optimal model to use. Hausman's specification test (1978) was used to differentiate between fixed and random effect models in the study. Table 4.5 shows the results of the Hausman test.

Ho: Random effect is appropriate

Ha: Fixed effect is appropriate

Table 4.5 Hausman Random Test for Random and Fixed Effects

Profitability				
Column 1	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))

	fe	re	Difference	S.E
Loan	.0065718	.0065718	0	0
Performance				
Liquidity	-.0061214	-.0061214	0	0
Position				

The Hausman test results in Table 4.5 show how interest rate variations influence bank profitability by comparing random and fixed effects models. The null hypothesis (H_0) supports the random effects paradigm, whereas the alternative hypothesis (H_a) prefers the fixed effects approach.

The table shows no significant difference between models ($b-B=0$ - $B = 0$ $b-B=0$), with a standard error of 0 for Loan Performance and Liquidity Position. Both random and fixed effects models have the same coefficients. This conclusion supports the null hypothesis, which states that random effects are equally good as fixed ones. The random effects model is suggested for investigating how interest rate changes impact bank profitability in this dataset. Individual heterogeneity among firms had no effect on the explanatory variables in this study (loan performance and liquidity position), according to coefficient equivalence. This example fits the random effects model since it is consistent and can account for unobserved individual attributes.

4.6 Panel Regression Analysis

The study adopted a random effect panel regression model to test the following developed hypotheses;

H₀₁: Changes in interest rates have a significant effect on loan performance and bank profitability in commercial banks in Kenya.

H₀₂: Changes in interest rates have a significant effect on the liquidity position and bank profitability in commercial banks in Kenya.

Table 4.6 Regression Model Summary Statistics

Random-effects GLS regression	Number of obs =	234
Group variable: BANK	Number of groups =	39
R-sq:	Obs per group:	

within = 0.0180	min =	6
between = 0.0780	avg =	6.0
overall = 0.0246	max =	6
Wald chi2(2) = 5.81		
corr(u_i, X) = 0 (assumed)	Prob > chi2	= 0.0546

Profitability	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
Loan Performance	.007	.075	0.09	.93	-.14	.153
Liquidity Position	-.006	.003	-2.38	.017	-.011	-.001
Constant	.062	.018	3.50	0	.027	.097

sigma_u 0	sigma_e .1748284	rho 0
(fraction of variance due to u_i)		

$Y = 0.62 + 0.07X_{1it} - 0.06X_{2it} \dots (3)$
--

Where:

Y : Bank profitability

The regression results provide evidence to evaluate the research hypotheses:

The regression coefficient for loan performance is 0.007, indicating a positive relationship between loan performance and profitability. However, the p-value for this relationship is 0.93, far above the 5% significance level. This high p-value indicates that changes in loan performance, likely influenced by interest rate changes, have no statistically significant effect on bank profitability in this model. Therefore, the data fails to reject the null hypothesis (H01).

The regression coefficient for liquidity position is -0.006, indicating a negative relationship with bank profitability. The p-value for this relationship is 0.017, which is statistically significant at the 5% level. This result suggests that changes in liquidity position, potentially driven by interest rate changes, have a significant but negative effect on profitability. Each unit increase in liquidity reduces profitability by 0.6%, potentially due to risk aversion or overly cautious lending practices in a high-interest-rate environment. Thus, the data rejects the null hypothesis (H02), supporting the conclusion that changes in interest rates significantly affect the liquidity position and bank profitability.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary and Conclusion

The study's findings provide critical insights into the relationship between interest rate changes, loan performance, liquidity position, and bank profitability in Kenyan commercial banks. Addressing the first hypothesis (H01), the analysis revealed that changes in loan performance, influenced by interest rate fluctuations, do not significantly impact bank profitability. With a regression coefficient of 0.007 and a high p-value of 0.93, the results indicate that loan performance does not have a statistically significant effect on profitability. These findings align with studies like Alper et al. (2020) and Maina (2021), which emphasized that Kenyan banks have adapted to interest rate volatility through risk management and diversification, limiting the direct impact of loan performance on profitability. Similarly, Claessens et al. (2019) observed that stable loan portfolios in emerging markets reduce banks' sensitivity to interest rate changes, corroborating the current study's results.

Due to the vast range of data and high standard deviations, the study also found that Kenyan banks differed significantly in terms of loan performance and liquidity. Profitability, loan performance, and liquidity position data all show significant non-normality, according to the results of the Shapiro-Wilk test. This suggests that structural issues like economic instability, shifting interest rates, and regulatory actions have an impact on banks' overall financial performance. According to research by Omondi and Mungai (2020), interest rate regulations have an effect on bank lending performance and liquidity, which in turn affects profitability. These findings are consistent with their findings. The study's finding that keeping large liquidity reserves can lower profitability was further supported by Jefferis et al. (2020), who emphasized the importance of liquidity in reducing interest rate risks. These earlier studies, however, did not thoroughly examine the trade-offs between liquidity management strategies and interest rate fluctuations, leaving gaps in understanding the optimal liquidity levels that balance profitability and financial stability.

Weak correlations between profitability, loan performance, and liquidity situation were found by the correlation analysis. In particular, there was a weak negative connection (-0.1566) between liquidity position and profitability, indicating that maintaining extra liquidity may reduce returns because of capital that is not used. Furthermore, there was only a slight positive

correlation (0.0232) between loan performance and profitability, suggesting that changes in non-performing loan ratios have little effect on bank profitability. This is probably because risk mitigation techniques are working. Unpredictable regulatory changes, changes in central bank monetary policies, and external economic shocks that impact interest rate fluctuations are some of the structural issues that contribute to these findings. Because of these inherent problems, banks must constantly adjust to outside circumstances to stay profitable.

5.2 Recommendations

To improve financial stability and profitability, regulators should examine stringent interest rate regulations, which limit banks' capacity to manage liquidity efficiently. Allowing for more flexible rate modifications may improve liquidity deployment, mitigating the detrimental effect on profitability seen in this research. Banks could also improve liquidity management by investing surplus reserves in short-term, high-yield assets rather than retaining idle cash, since excessive liquidity has been shown to diminish profitability owing to opportunity costs.

Furthermore, although loan performance has little influence on profitability, maintaining solid credit risk management frameworks is critical to ensuring steady loan repayment under variable interest rates. Regulators should also consider if capital and provisioning requirements, which seem to contribute to end-of-year volatility, cause unintended distortions in financial decision-making. Adjusting these rules to better reflect banks' operating reality may enhance financial performance.

Given the limits imposed by interest rate laws, banks should diversify their revenue sources away from interest income. Expanding digital banking, boosting transaction-based income, and providing investment services will help to overcome the profitability issues caused by low lending margins. By resolving these issues, Kenyan banks may better negotiate the obstacles of interest rate regulations, liquidity limits, and profit pressures, resulting in a more robust financial industry.

5.3 Areas for Further Studies

The effect of sophisticated liquidity management techniques on Kenyan banks' profitability should be investigated in future studies. Knowing how banks maximize liquidity while maintaining profitability is essential given the continuous changes in the economy and regulations. Additionally, more research might examine how technological advancements like

digital lending platforms and AI-driven credit scoring can enhance loan performance and reduce interest rate concerns.

Examining how capital adequacy laws affect banks' lending practices and financial stability is another crucial issue. Understanding how banks manage capital restrictions while sustaining sustainable growth can be gained by investigating the trade-off between profitability and regulatory compliance. Finally, research comparing Kenyan banks to those in other developing nations may reveal the most effective strategies for controlling interest rate volatility, improving resilience, and enhancing long-term profitability



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