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The Effect of prudential regulation on non-performing loans in Kenyan commercial banks.

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THE EFFECT OF PRUDENTIAL REGULATION ON NON-PERFORMING LOANS IN KENYAN COMMERCIAL BANKS

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other university. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made in the dissertation itself.

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DEDICATION

To Keirra Lyn Muthoni, my beloved child, my constant source of inspiration and motivation. Your unwavering love and support gives me the strength to persevere. You are my greatest joy and achievement. You have taught me the true meaning of courage, love, sacrifice and determination. May God keep you and bless you always.

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GLOSSARY OF TERMS

Bank means "a commercial bank licensed under the Banking Act Chapter 488 Laws of Kenya"

Bank specific factors means "internal factors that impact a bank's non-performing loans"

Base accords means "A set of international banking regulations set by the Basel Committee on Bank Supervision to enhance the soundness and stability of the banking system"

Capital adequacy means "sufficiency of a bank's capital to absorb potential losses by comparing its capital to its risk weighted assets"

Capital buffer means "additional capital marinated by banks beyond regulatory minimums"

Core capital means "the minimum amount of capital that banks are required to hold to absorb losses during crises"

Credit allocation means "directing to specific sectors or purposes"

Credit risk management means "strategies and processes implemented by banks to identify, assess and mitigate potential risks associated with lending activities"

Liquidity means "the ability of banks to meet their short term obligations"

Loan classification means "categorization of loans depending on their repayment performance"

Loan loss provisions means "reserves set aside by banks to cover potential losses from non-performing loans"

Macro-economic factors means "external economic factors that influence non-performing loans."

Non-performing loan means “a loan for which the principal and interest are due and unpaid for ninety (90) days or more or where interest payments for ninety (90) days or more have been refinanced or rolled over into a new loan”

NPL ratio means “the percentage of gross non-performing loans s to total gross loans and advances”

Pro-cyclicality means “tendency of banks to reduce lending during crises that cab exacerbate a crisis”

Prudential regulation means “regulatory measures aimed at ensuring the stability and soundness of the banking system”

Regulatory minimum means “minimum standards set for banks by regulatory authorities to govern their prudential positions”

Restructured loans means “loans whose terms of repayment have been modified”

Stability means “the ability of a bank to maintain its financial soundness by withstanding shocks and continuing with operations with significant disruptions”

Z-sore means “a measure of a bank’s stability taking into account profitability, assets quality and leverage”

ABBREVIATIONS AND ACRONYMS

ADF	Augmented Dickey–Fuller
BIS	Bank of International Settlements
BCBS	Basel Committee on Bank Supervision
CAR	Capital Adequacy Ratio
CBK	Central Bank of Kenya
CEIC	Census, Economic and Information Center
EBIT	Earnings Before Interest and Tax
EBU	European Banking Union
ECL	Expected Credit Loss
GDP	Gross Domestic Product
IFRS	International Financial Reporting Standards
NPLs	Non-Performing Loans
ROA	Return on Assets
SEC	Securities Exchange Commission
TGL	Total Gross Loans
VIF	Variance Inflation Factor

ABSTRACT

The banking sector plays an important role in the economy and its growth prospects. In 2021, total assets in the banking sector contributed to an average of 65% of Kenya's Gross Domestic Product (GDP). The high levels of Non-Performing Loans (NPLs) in Kenya is a major concern. This study sought to ascertain the effect of bank specific aspects of prudential regulation assessed by core capital, capital adequacy, liquidity and bank stability on NPLs. The study examined the controlling effects of profitability, bank size, operational efficiency, interest rate and credit quality on NPLs. The study drew upon the capital buffer theory, credit creation theory and the financial repression theory. The study followed the positivist research philosophy and employed descriptive correlational research design. The population of the study was commercial banks operating in Kenya between 2011 and 2021. Data was analyzed using panel regression analysis According to the findings, core capital had a significant positive effect on gross NPLs implying that an increase in core capital is associated with an increase in gross NPL. There was no significant relationship between capital adequacy and liquidity on NPLs. The effect of bank stability on NPLs was significant implying that a unit increase in bank stability is associated with a reduction in gross NPL. The study findings will assist regulators in developing more efficient policies and regulations for management of NPLs. It is anticipated that banks will benefit by enhancing their credit risk management practices. By adding to the existing literature on NPLs and policy interventions, the study will contribute to advancing discussions surrounding financial markets. As a result, the general public is likely to gain enhanced confidence in the banking system and the efficacy of policy interventions.

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

The study of NPLs is important because it is an indication of the credit quality of a bank's loan portfolio. Collectively, the credit quality of the banking sector's loan portfolio is an indicator of the stability of an economy's banking system. NPLs is therefore a critical indicator of the extent of credit risk exposure of a financial system (Ozili, 2019). NPLs are also commonly used by scholars to assess the asset quality of a bank as well as profitability (Sugiarto, 2016; Kohlscheen, 2018). The level of NPLs is of further significance given its effect on the level of capital provisions by banks and their ability to advance new loans and performance (Ozili, 2015). The efficiency of a financial system is lowered with the rise of NPLs and this could result to slow down of the transmission of monetary policy. To maintain growth and stability, banks should aim to keep their NPL ratio to a minimum (Kuzucu & Kuzucu, 2019). An understanding of the key factors influencing NPLs and an analysis of their sensitivity to prudential regulation is important for risk management by both banks and regulators charged with the responsibility of bank stability.

The role of financial regulation is to achieve stability of a financial system and to ensure proper market conduct by players in the system (Michael, Goo & Wojick, 2020). According to Naude (2009), the efficacy of financial regulation is important because it can influence the severity of financial and economic rises. The global financial crisis of 2008 brought into question the ability of the prevailing financial regulation to curb risks inherent in the system (Crotty, 2009). Gualandri, Landi and Venturelli (2009) examined the financial crisis in light of liquidity risk and found that whereas capital adequacy may provide assurance to market participants, well capitalized banks could still face severe liquidity issues. They argued that

had Basel II been implemented in USA before the crisis, the impact could have been less severe. Basel II's aim was to strengthen risk management in banks but the controls introduced gave supervisory authorities a high degree of discretionary powers (Repullo & Suarez, 2008). Levine (2011) attributed the global crisis to weak governance structures in implementation of financial policies. He argued that the absence of autonomous institutions that gauged financial policies from the public's perspective was a critical deficiency.

In response to the global crisis, the United Kingdom introduced reforms in 2012 to strengthen the Bank of England's role as the center of financial and monetary stability with special emphasis placed on macro-prudential policies. Further reforms were made in 2016 to enhance market integrity and consumer protection (Lopez & Saeidinezhad, 2016). In 2017, the Basel Committee on Bank Supervision (BCBS) issued guidelines to promote harmonization in measurement and application of NPLs exposure (BCBS, 2017). The United Kingdom's NPL ratio declined form 4% in 2010 to 0.7% in 2017. Since 2017, the NPL ratio has been maintained at an average of 1%.

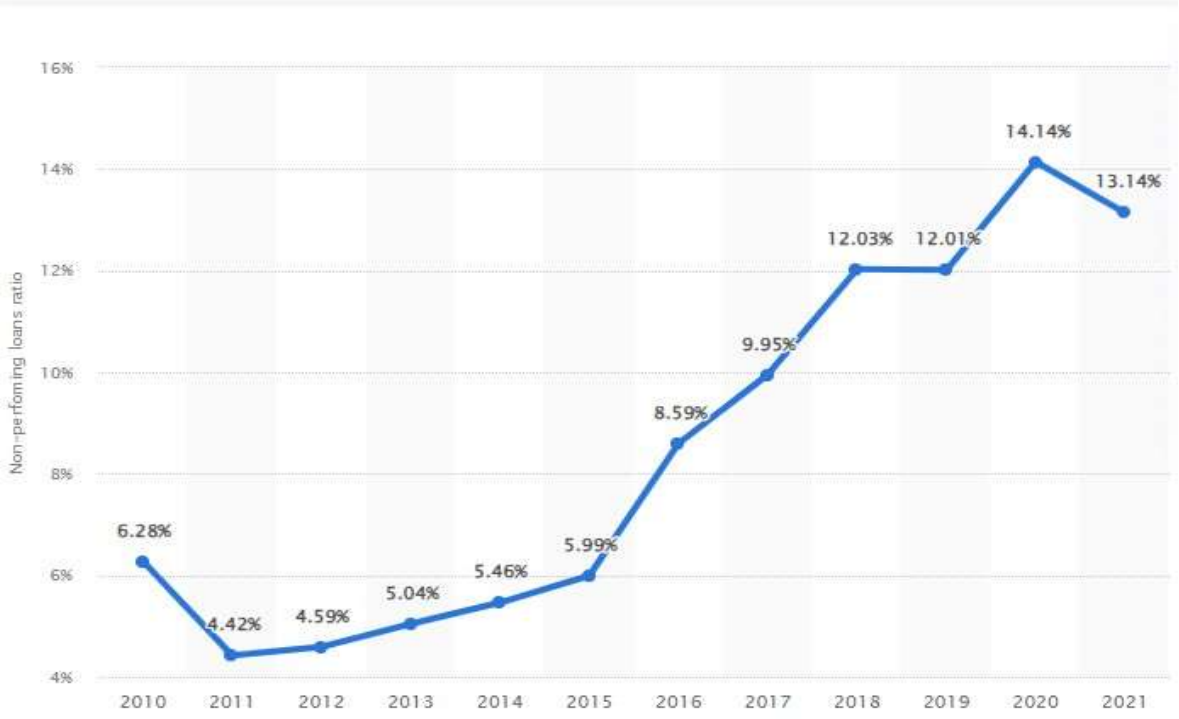
In the United States, the Securities Exchange Commission (SEC) underwent reforms to enhance consumer protection while maintaining their ability to take risks. With the emergence of technology in almost all aspects of the financial system, the United States recognized the need for a robust regulatory regime (SEC, 2017). In the aftermath of the global crisis, the state of NPLs in the United States saw a decline from 5% in 2009 to 0.9% in 2019. There was a slight increase in 2020 to 1.1% largely attributed to the Covid 19 pandemic but 2021 saw the NPL ratio decline to 0.9% (Statista, 2022).

The incidence of NPLs in Asian and African countries on the contrary has risen over the years. China recorded a low of 1.51% in 2017 but this has risen steadily over the years to almost 3% in 2021(Statista, 2022). According to CEIC Data (CEIC), India's NPL stood at 7.3

in 2021 up from 2.3 in 2011. The same trend was largely the same for African countries with South Africa recording a low of 2.8 in 2017 and a high of 5.2% in 2021 (CEIC, 2022). The rise in NPLs has largely been attributed to government failures and policy ineffectiveness (Giammanco, Gitto & Ofria, 2022). The entire East African banking sector faced numerous challenges during the COVID-19 period. A sampling of the top Kenyan banks during the period 2011 -2021 identified an average increase in NPLs by 8%. The increase in problematic loans resulted in a decrease on ROE hence affecting the credit rating of the banking sector in Kenya (The East African, 2021).

The state of NPLs in Kenya has changing characteristics depending on the prevailing economic situation. The Census, Economic and Information Center while outlining a comparison over the years of NPLs in Kenya, observed that in 2019, the country recorded one of the highest amount in NPLs estimated at 2.661 Million USD (CEIC, 2022). Figure 1.1 below illustrates the state of NPLs in Kenya from 2010 to 2021:

Figure 1.1: Total NPLs in Kenya: Percentage of Loans and Advances



Source: Statista, 2022/Central Bank of Kenya

The entry of COVID-19 in 2020 worsened the situation of the NPLs majorly due to the closure of companies and surging unemployment occasioned by the containment measures put in place by the Government. The increase in bad loans affected leading lenders like Kenya Commercial Bank whose NPL ratio rose from 14.7% in 2019 to 16.5% in 2020 with a total of Kenya Shillings 171 billion restructured (Central Bank of Kenya, 2021). Cooperative Bank recorded restructured loans worth Kenya Shillings 46 billion representing 14.9% of its loan book with its NPL rising from 11.2% in 2019 to 18.7% in 2020. The bank's loan loss provisions increased from Kenya Shillings 11.3 billion in 2019 to Kenya Shillings 22.5 billion representing a 99.6% increase (Cytonn, 2021).

The immediate adjustment mechanism was the reduction in loans to sectors that were considered risky during the COVID-19 period. Provisions by some of the biggest lenders in Kenya reduced and the setting of funds meant to cushion debt losses commenced. The adjustments affected the growth of some of the economic sectors but the objective of

reducing bad loans from 14% to slightly over 12% was attained (Ombok, 2021). The anticipation of the disruptions brought by the COVID-19 pandemic were seemingly not factored in by the lenders (The East African, 2021). The emerging concern was that there was need to widen the risk factors to NPLs beyond the traditional economic factors. A multi-sectoral survey by the Central Bank of Kenya (2021) observed that the NPLs loans differed within sectors. Some of the sectors like personal and household, transport, tourism and the real estate saw an increase in NPLs, whereas sectors like agriculture, energy, construction and mining were able to withstand the economic turbulence (CBK, 2021).

In Kenya, the Central Bank of Kenya (CBK) is charged with the responsibility promoting financial stability through maintenance of a well-functioning banking system. CBK has issued regulatory requirements for banks to govern their prudential position and market conduct (CBK, 2020). The incidence of abnormal losses arising from bank lending has been extensively studied. However, an examination of the role of prudential regulation in managing losses arising from NPLs has not received extensive analysis. This study sought to provide insight into the extent to which prudential regulation addresses the problem of rising NPLs in Kenya.

1.1.1 Prudential Regulation

The main objective of prudential regulation is to reduce the possible risks and losses that customers and financial institutions such as banks could face (Dewatripoint & Tirole, 1994). The regulatory frameworks have been praised by both practitioners and researchers for their benefits to both banks and their customers. The objective of prudential regulation is to achieve financial stability and proper market conduct in an economy (Michael, Goo & Wojick, 2020). Regulators of a financial system use prudential regulations to tackle various risks to the stability of the system. Financial stability has been described by the World Bank

(2020) as resilience of the system to stress and the absence of system wide episodes of failure or crises.

The BCBS was set up by global central banks and national regulators in 1974 to enhance the soundness and stability of the international banking system through supervisory oversight. Over the years, membership to the BCBS has grown to fourty eight members from twenty-eight countries. In discharge of its mandate, the BCBS develops and maintains international standards for known as the Basel Accords. The BCBS has published three accords since its establishment. The latest, Basel III, is a set of international banking regulations aimed at strengthening the resilience of banking systems with the objective of promoting financial stability and risk management practices. It was published by the Basel Committee in 2010 to set standards for capital adequacy, liquidity and a requirement for banks to undertake stress tests (BCBS, 2021).

A key pillar of Basel III is the requirement for banks to hold sufficient core capital to absorb losses in periods of financial distress. Banks are required to hold a minimum amount of core capital as a percentage of risk weighted assets based on the riskiness of their assets. Core capital is a signal of a bank's strength and stability and it helps protect the interest of shareholders, depositors and banks managers alike (Ozili, 2018). Another key feature of Basel III is the requirement for banks to maintain minimum levels of capital adequacy. Inherently, banks are risky enterprises that operate on high leverage hence vulnerable to shocks in the financial system. Capital adequacy requirements help to mitigate these risks (Michael, Goo & Wojick, 2020). Basel III also sets liquidity standards for banks to ensure they maintain sufficient liquidity buffers to meet their shorty term funding needs and support their long term activities (BCBS, 2021). Scholars widely accept that if properly applied, Basel III is critical to the functioning and stability of the banking system.

1.1.2 Non-Performing Loans

Studies on NPLs have identified twofold determinants; macroeconomic factors and bank specific factors. Macroeconomic determinants have been identified as Gross Domestic Product (GDP), income growth rate, housing price index, inflation, unemployment rate and public debt whereas bank specific determinants include capitalization, liquidity, poor credit quality, efficiency, size and profitability. GDP growth rate has often been associated with NPLs. Global risk factors may also influence NPLs (Espinoza & Prazad, 2010). During economic booms, economies record lower NPLs and vice versa (Beck et al., 2015). High unemployment rates have also often been associated with high NPLs (Ozili, 2018). Inflation rate, government expenditure, public debt, corruption, rule of law and governance have also been found to have a positive effect on NPLs (Ghosh, 2015; Boudriga et al., 2010; Umar & Sun, 2018; Rachid, 2019; Anastasiou et al., 2019a; Liu et al., 2020; Ofria & Mucciardi, 2022).

Internal bank factors such as capital adequacy, credit risk exposure and profitability also influence NPLs (Klein, 2013). Profitable banks have lower NPLs due to high interest incomes (Ozili, 2015). Return on Assets (ROA) has also been identified as a crucial determinant on the performance of loans. Since banks invest some of their income on assets, as with other economic players, scholars note that the decrease on the ROA will directly lead to a possible increase on NPLs. The risk assessments that the lending players undertake will therefore inform credit priorities based on the possibility of return on investments in any asset (Khan, Siddique & Sarwar, 2020). The effect of NPLs has been considered by some scholars as “financial pollution” due to the losses that could be incurred and its ability to create fragility within the banking sector (Makri et al., 2014). NPL determinants are categorized as; bank specific factors which depict the environmental scenarios within banks and, macroeconomic factors outside of the jurisdiction of banks.

The aggregate NPLs for many nations rose significantly after the global financial crisis in 2008 compared to the period before which recorded relatively lower numbers (Ozili, 2019). Basel II had been introduced in 2004 prior to the global financial crisis to strengthen risk management in banks. However, many countries had not implemented it when the financial crisis happened. A NPLs crisis prevents banks from allocating credit in an economy. This is because their profitability suffers, income drops, provisioning increases and costs rise as banks seek to cover the risks of lending. NPLs could damage a nation's growth prospects. Banks with high NPLs have reduced capacity to extend new credit (Baudino & Yun, 2017). Banking systems with high NPLs experience low profitability and growth (Beck et al., 2015).

1.1.3 Prudential Regulation and Non- Performing Loans

A key feature of prudential regulation is management of NPLs. NPLs pose a significant risk to the stability of the financial system. High levels of NPLs can lead performance issues for banks and loss of public confidence in the financial system both of which trigger crises (Levine, 2011). NPLs are a therefore a major global concern. Regulators have implemented prudential regulation to address the incidence of NPLs. These regulations are mainly aimed at maintenance of adequate levels of capital and liquidity as well as development and implementation of risk frameworks by banks.

The European Banking Union (EBU), established in 2008 in response to the global financial crisis of 2008, set minimum standards covering minimum loss coverage, timely recognitions and write backs, NPL reduction targets and workout frameworks, recovery frameworks and stress testing to strengthen the resilience of the European banking system (Makri et al., 2014; Couailler et al., 2022). In Asia, many countries require banks to provision for loan losses and stress tests to help ensure banks are adequately prepared for losses (Santoso et al., 2020; Budhijono, 2021). African countries have implemented various guidelines including

provisioning, reporting requirements and maintenance of minimum requirements on capital and liquidity as well as risk management as envisaged in Basel III (Ozili, 2019).

In Kenya, the CBK introduced the Prudential Guidelines in 2013 and 2016 to set minimum thresholds for core capital, capital adequacy, liquidity management, risk classification of assets and provisioning. In 2018, the CBK issued a guideline note on computation of regulatory capital following introduction of IFRS 9. IFRS 9 required banks to recognize not only incurred losses but loses to be incurred in future (Expected Credit Losses). The study examined bank specific prudential regulation variables of core capital, capital adequacy, liquidity and bank stability and their relationships with NPLs in Kenya.

1.1.4 Prudential Regulation and Non- Performing Loans in Kenya

In Kenya, the CBK has issued regulatory requirements for banks to govern their prudential position and market conduct. Key features of prudential regulation cover capital adequacy, liquidity management, risk management, asset quality and corporate governance (CBK Prudential Guidelines, 2016). CBK's application of Basel III involves four key components: capital requirements, liquidity requirements, disclosure requirements and risk based supervision. CBK has set minimum core capital requirements for commercial banks in Kenya aimed at ensuring they have sufficient capital to absorb losses in times of distress. Banks are required to maintain a minimum core capital level of Kenya Shillings 1 billion for banks with national licenses. Banks are also required to maintain adequate levels of capital to cover risks associated with lending and investments. CBK's threshold for capital adequacy is 10% of which Tier 1 and Tier 2 capital should not be less than 6% and 4% respectively (CBK, 2021). The Capital Adequacy Ratio (CAR) is calculated by dividing a bank's capital by its risk weighted assets which are determined by the risk profile of the bank's portfolio of assets (Ngungu & Abdul, 2020). Capital adequacy is aimed at mitigating the impact of bank failures and reduce the risk of systemic crises.

CBK requires banks in Kenya to maintain a minimum liquidity ratio of 20%, which is the ratio of a bank's liquid assets to its total assets. Further, banks are required to maintain a statutory reserve ratio of 4.25% of their deposits (CBK, 2021). The z-score is widely adopted as the measure of financial stability of a bank at individual level. The z-score is popular since it has a negative relationship to the probability of a financial institution's insolvency (World Bank, 2020). It is a useful tool for assessing bank stability as it takes into account a bank's profitability, asset quality and leverage. It is calculated by taking a bank's Earnings Before Interest and Tax (EBIT) and dividing it by its total assets adjusting for the banks equity and provision for losses. The World Bank recommends use of the z-score as part of regulators supervisory processes to monitor the financial health of individual banks.

CBK employs a range of tools and measures through prudential regulation to assess and monitor NPLs and ensure that banks are effectively managing their loan portfolios. In addition to capital and liquidity requirements, CBK also employs loan classification and provisioning, credit risk management policies and procedures as well as prudential reporting to manage NPLs (CBK, 2021). The study utilized core capital, capital adequacy, liquidity and bank stability as prudential regulatory frameworks to assess their effect on NPLs.

1.1.5 Commercial Banks in Kenya

The Banking Act Chapter 488 Laws of Kenya (2009) has defined a commercial bank as a company which carries or proposes to carry out the banking business. The banking business has been defined to include companies that accept money deposits and current accounts from the public payable on demand or after a specified period, and which employ such money or current accounts for lending, investments or otherwise at the risk of the depositor or account holder. Commercial banks in Kenya are supervised by the CBK and are subject to prudential regulation to ensure they operate in a sound manner and comply with regulatory requirements. According to the CBK Bank Supervision Report of 2021, there were thirty-nine

(39) commercial banks operating in Kenya out of which two (2) were majority owned by the Government of Kenya (local public banks), twenty (20) were local private commercial banks and seventeen (17) were foreign commercial banks representing 5.1%, 51.3% and 43.6% respectively of the commercial banking sector (CBK, 2021).

The total net assets of the banking sector stood at Kenya Shillings 6 trillion in 2021. Private commercial banks controlled the banking sector with total net assets of Kenya Shillings 4 trillion accounting for 68.3% of the total net assets (CBK, 2021). Local public banks accounted for 0.5% with a total net asset of Kenya Shillings 31.753 Million. The banking sector plays an important role in the economy and its growth prospects. In 2020, total assets in the banking sector contributed to 65.7% of Kenya's Gross domestic product (GDP). Uncovering the incidence of NPLs is of great importance to the stability of the banking system. The study highlighted the prudential policies that impact NPLs with a view of strengthening the stability of the banking industry.

1.2 Statement of the Problem

Despite policy measures introduced by CBK in 2013 and 2016 to set minimum thresholds for core capital, capital adequacy, liquidity management, risk classification of assets and provisioning, the rising incidence of NPLs continues to persist in Kenya. In 2018, CBK issued a guidance note on the application of IFRS 9 which required banks to recognize expected losses. However, NPLs in Kenya continued to rise exponentially over the years. During the period 2011 – 2021, commercial banks in Kenya recorded an average increase of 8% in NPLs. In 2011, the NPL ratio was at 4.42%. It rose steadily to 5.04% in 2013 and to 8.59% in 2016. The NPL ratio increased exponentially to 12.03% in 2018 and ultimately the highest ever recorded ratio of 14.14% in 2019. March to December 2020 saw a total of 401,498 loans valued at Kenya Shillings 1.63 trillion restructured representing 54.2% of the banking sector's TGL (CBK, 2020).

A high level of NPLs can erode the financial health and stability of banks. A widespread NPL crisis can undermine the stability of the banking system. Capital flight can make banks vulnerable to insolvency and systemic risk as was apparent in the 2015/2016 bank crisis in Kenya that led to placement of three banks under statutory management (CBK, 2016). There may be need to intervene by recapitalizing troubled banks posing a significant fiscal burden on the government and taxpayers. Contraction of credit as a result of NPLs could hinder investments and overall economic growth. It is therefore important to evaluate the efficacy of prudential regulation in managing NPLs (Naude, 2009).

In Kenya, the determinants of NPLs have been studied extensively. Maina (2015) studied the determinants of NPLs in Kenya found a negative correlation between loan loss reserves and government deficits. Studies on NPLs and financial performance have found that NPLs have a negative effect on Return on Assets (ROA) and profitability (Mutuku, 2016; Muthitu, 2020). Kubai (2016) found that NPLs have a negative effect on operational efficiency. Studies on the relationship between lending rates and NPLs found that the interest rate has a significant positive effect on NPLs (Robert & Koori, 2022; Kihara, 2017). Sheefeni (2016) found that high levels of NPLs negatively influence credit demand and supply. Ngungu and Abdul (2020) studied firm characteristics and NPLs and found that whereas bank size and capital adequacy had a significant effect on NPLs but liquidity had an insignificant effect. Unlike Robert and Koori (2022), they further found that interest rate had no significant effect.

The variance in existing studies in Kenya on NPLs needed to be investigated and sealed. Further, the study aimed to provide a comprehensive understanding on bank specific factors affecting NPLs by focusing on a ten (10) year study period between 2011 – 2021, unlike previous studies which studies six years and less, failing to account for the cyclic nature of NPLs. The objective of the extended period was to provide a more comprehensive assessment of the incidence of NPLs and account for the prudential regulatory guidelines issued in 2013,

2016 and the introduction of IFRS 9 in 2018. The study also assessed the effect of bank stability on NPLs, a gap in existing studies. Most importantly, the obtaining legal framework plays a crucial role in addressing the NPL problem by setting minimum standards for compliance. It was necessary to explore and provide valuable insight into the effectiveness of prudential regulation in managing NPLs.

1.3 Objectives of the Study

1.3.1 General Objective:

The overall aim of this study was to examine the relationship between prudential regulation and non-performing bank loans in Kenya.

1.3.2 Specific Objectives:

1. To examine the effect of core capital on non-performing loans in Kenya.
2. To ascertain the influence of capital adequacy on non-performing loans in Kenya.
3. To evaluate the effect of liquidity on non-performing loans in Kenya.
4. To establish the effect of bank stability on non-performing loans in Kenya.

1.4 Research Questions

1. What is the effect of core capital on the non-performing loans in Kenya?
2. What is the effect of capital adequacy on non-performing loans in Kenya?
3. Is there an effect of liquidity on non-performing loans in Kenya?
4. What is the effect of bank stability on non-performing loans in Kenya?

1.5 Scope of the Study

The study focused only on the NPLs in commercial banks in Kenya. Some of the established private banks like Kenya Commercial Bank, Equity Bank and others have established regional presence. However, the study limited its assessment to prudential regulations for the banking sector within the Kenyan market. The justification for limiting the study to Kenya is

the uniformity of the regulatory frameworks provided by CBK and the market within which the banks operate.

This research was a panel study for non performing bank loans that involved tracking commercial banks in Kenya for the period 2011 – 2021. Data for select banks that were in operation between 2011 and 2021 was collected annually to identify and assess patterns and trends in the research variables. The study identified the prudential regulatory frameworks applicable to NPLs.

1.6 Significance of the Study

The banking sector in Kenya is growing and has attracted the attention of global players like the Bretton Woods Institutions and other international investors. The banking sector has an immense impact on the growth prospects of the Kenyan economy. The streamlining of banking regulation in both policy and law is necessary. This study sought to contribute to a better understanding of the dynamics of NPLs from a policy perspective. The utility of the findings from this study will be useful to various stakeholders as explained below:

1.6.1 Policy Makers

The findings will help regulators and policy makers to design more effective policies and regulations to manage NPLs and prevent crises. The findings will further help them develop policy strategies for reducing the incidence and impact of NPLs that are more proactive such as predictive models that allows early intervention. Overall, the study findings will help policy makers to assess the health of the banking system and take measures to mitigate NPL risks.

1.6.2 Banks

The study findings will be useful for banks in improving their credit risk management practices through a better understanding of the factors that contribute to NPLs. This will

allow banks to implement early warning systems to identify the risks associated with NPLs. Banks will further understand the impact of capital levels on NPLs and allow them to allocate capital more effectively. Banks will also benefit by complying with regulatory requirements. Overall, banks will benefit by implementing systems that will enhance operational efficiency.

1.6.3 Investors

Investors such as shareholders, stockholders and bondholders will find the research findings useful in understanding the risks associated with investing in banks. High levels of NPLs can lower investor confidence and thus the study findings will aid investors to assess the risk profile of their investments, conduct due diligence and provide insights to managing NPLs more effectively. Overall, the study findings will help investors in their investments decisions and potentially achieve attractive returns.

1.6.4 Researchers and Academicians

The study will also contribute to the existing literature on NPLs and policy interventions. Academics and researchers studying banking and financial markets will gain a deeper understanding of the mechanisms through which prudential regulation impacts NPLs. The study findings will advance the conversation on financial markets and contribute to further research on developing strategies to manage NPLs.

1.6.5 General Public

Finally, the insights and findings of the study will give the general public greater confidence in the banking system and the efficacy of policy interventions. The general public will be equipped with the necessary knowledge on the incidence of NPLs and seek guidance in management of their debts. A stable banking system benefits the public by safeguarding their savings and investments.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides a review of the theory and empirical literature that have been conducted on the subjects of prudential regulation and NPLs. The chapter identifies the gaps that the study aimed to fill. This chapter also outlines the conceptual framework and analyzes the variables of the study.

2.2 Theoretical Review

This section discusses the theories that guided the study with the aim of explaining the results and findings. It provides the basis for conducting the research whilst ensuring that the study remains within the limits of accepted theories (Grant & Osnloo, 2014). To explain the relationship between prudential regulation and NPLs, the study reviewed the capital buffer, credit creation and financial repression theories. The theories were used to conceptualize and establish the study variables.

2.2.1 The Capital Buffer Theory

The capital buffer theory is a concept that has been developed over time by various economist and scholars. It refers to the practice of financial institutions maintaining levels of capital beyond their regulatory minimums. Rob and Calem (1996) formulated the presumption that banks increase their capital even after they attain the regulatory thresholds with the objective of protecting them from costs that arise from penalties for breach of maintain the stipulated capital levels. The additional capital is known as the capital buffer. The idea behind the capital buffer theory is that by maintaining a buffer of extra capital, banks can better absorb losses and continue with operations during crises. Whereas banks are required by regulatory authorities to maintain minimum levels of capital to ensure that they

have the ability to meet their obligations, these minimum requirements may not be sufficient to absorb the shocks of severe economic downturns (Heider & Gropp, 2009).

The capital buffer theory became increasingly important in the wake of the global financial crisis of 2008. Regulators around the globe implemented stricter capital requirements some of which included provisions for capital buffers. The theory has however been critiqued for its effectiveness in promoting financial stability. Some scholars argue that strict capital requirements could hinder economic growth by increasing the cost of borrowing and reducing the availability of credit (Klein, 2013). It has been argued that the capital buffer may not be sufficient to protect banks and the banking system from crises due to pro-cyclicality. Banks may reduce lending during a crisis to conserve their capital buffers which could exacerbate the crisis (Ozili, 2015). Measuring the adequacy of capital buffers could be challenging since it depends on the risk profile of each bank and the overall economic climate. The calculation of the buffer may require assumptions and judgments that could be difficult to verify (Ngungu & Abdul, 2020).

The capital buffer theory provides a useful framework for understanding the implications of NPLs. The existence of NPLs could reduce the amount of capital available to banks as they represent losses that must be absorbed by a bank's capital. This could have the effect of reducing the bank's ability to absorb further losses or respond to shocks in the financial system. CBK regulations require banks to maintain a minimum level of capital in relation to risk weighted assets, with higher levels of capital required for riskier assets. NPLs have a high risk rate meaning they could increase the amount of capital that banks must hold in order to meet minimum regulatory requirements. From the perspective of the capital buffer theory, the study sought to understand the effect of bank capital on NPLs as well as the implications on the stability of the banking system and policy interventions to strengthen capital requirements.

2.2.2 Credit Creation Theory of Banking

The credit creation theory also known as the credit multiplier theory explains how banks can create money through the lending process. According to Hahn (1920), banks can create money for lending at individual level through accounting operations. Keynes (1936) argued that banks have the power to create credit and increase money supply through the lending process thereby increasing money supply, with significant effects on the overall health of the economy. Banks do not need to rely on deposits or reserves to extend credit, they can do so from nothing. Bank can create money and credit whenever they purchase assets or enter into a loan agreement. This means that banks can lend out a significant portion of deposits they receive, while still maintaining enough reserves to meet customer demands for withdrawals. Over time, their balance sheets show a rising trend when credit grows (Werner, 2016). The theory emphases the importance of considering accounting, legal and financial aspects of banking together.

Scholars have lauded the credit creation theory of banking for its practicality and ease of impact monitoring. The settling of non-cash transactions with non-cash transfers has been identified as one of the approaches fronted by the theory. The banks also have the flexibility to turn some of the liabilities into assets at the money creation processes (Starkey, 2018). The other argument advanced by scholars on the strength of the credit creation theory is the fact that banks may not need to receive client deposits first to create credit. Good policies and creation of opportunities for lending gives banks the latitude to create money that can circulate within an economy. The ease with creation of money, as scholars of the theory opine, is because it is not a physical resource. Although it can be used for acquisition of resources like assets, a simple 'expansion' of the balance sheet helps banks create the credit (Freimanis & Senfelde, 2019).

The credit creation theory of banking has been criticized for oversimplifying the complex interactions between banks, borrowers and the broader economy. It assumes that banks can issue loans without constraints such as capital requirements or reserve ratios when the reality is that they do face limitations in their ability to create credit (Werner, 2016). Some critics argue that the theory fails to account for the role of regulators and policy makes in managing money supply. It assumes that banks can create credit and money independent of the central bank. In reality, the central bank has power to control money supply and influence credit creation though monetary policy (Werner, 2016). It is also argued that the theory does not address potential risks of excessive credit creation which could lead to financial instability as was seen in the 2008 global crisis.

The credit creation theory of banking provides a useful basis for assessing the role of prudential regulation on liquidity, capital adequacy and bank stability on NPLs. The theory suggests that the amount of credit created by banks could improve their capital bases and their ability to meet their obligations in a timely manner. However, if a bank creates too much credit without sufficient reserves, it could impact on their liquidity and adequacy of their capital bases (Freimanis & Senfelde, 2019). On the other hand, NPLs represent a failure of the lending process as they reduce the ability of banks to create credit. From the theory's perspective, the study sought to evaluate the relationship between liquidity and bank stability on NPLs. By understanding how banks create credit and the risks associated with excessiveness, policy makes can take steps to ensure that banks maintain sound practices.

2.2.3 Financial Repression Theory

The financial repression theory was first proposed by Ronald McKinnon and Edward Shaw in 1973. They argued that developed countries have stifled competition in their financial systems through government policies and interventions (Cole, 1974). Ideally, a financial system that is efficient should record growth through efficient allocation of capital. However,

regulations that bring about restrictions do not allow financial intermediaries such as banks to function optimally. The restrictive policies have been cited by McKinnon (1973) and Shaw (1973) as capped interest rates, liquidity requirements, capital controls, bank reserve requirements, credit allocation and entry into the financial system.

Proponents of the theory have argued that financial repression policies are necessary for governments to control fiscal resources in order to finance their budgets. The financial repression theory envisions the work of regulation that governments undertake to reduce the full functionality of institutions. Chari, Dovis and Kehoe (2016) argue that governments can decide to place their debts with financial institutions at comparatively low interest rates or have financial intermediaries to hold more government bonds. Financial repression has been used by developed countries during times of crisis. Financial repression has been used by the Bank of England and by the United States during the Civil War to finance its defense expenses (Chari, Dovis & Kehoe, 2016).

Critics of the theory have cited dangers with the application of this theory. Financial repression could result in inefficiencies as it distorts market signals and misallocates resources. By capping interest and directing credit, governments may discourage private investments and lead to inefficiencies in capital allocation. The stability of banks could also suffer. In some Latin economies, economic growth was stifled by the financial repression policies that governments applied (Roubini & Martin, 1992). While governments may implement repression models to increase money demand and increasing revenue, the banking sector is likely to be affected and its growth destabilized (Edwards, 1992). A repressed financial system discourages savings and investments thereby impeding economic growth (Roubini & Sala-i-Martin, 1992). Critics of the financial repression theory agree that the costs and risks associated with financial repression often outweigh the potential benefits.

The financial repression theory provides a useful framework for understanding the implications of NPLs. Capping of interest rates and directed lending can create distortions in the allocation of credit which can lead to accumulation of NPLs. NPLs reduce profitability of banks and limit their ability to lend. The theory informed the study by highlighting the potential impact of repressive policies on the ability of banks to maintain adequate capital and liquidity levels. Repressive policies could affect the ability of banks to maintain sufficient capital and liquid buffer making them vulnerable to shocks. In essence the study delved into prudential regulation on capital adequacy and how they affect the banking sector.

2.3 Empirical Review

Scholars have studied role of prudential regulation and found empirical support for the importance of a strong policy framework for survival of financial institutions. Overall, NPLs are a complex matter that involve many factors and understanding the determinants of NPLs requires a multi-faceted approach. According to scholars including Ozili (2015) and Ali et al. (2020) among others, the factors that influence NPLs have been categorized into two; macroeconomic factors (external) and bank specific factors (internal). This study focuses on bank specific variables. In the following empirical review, the integration between core capital, capital adequacy, liquidity, and bank stability as aspects of prudential regulation and NPLs is discussed.

2.3.1 Core Capital and Non-Performing Loans

Minimum core capital requirements are used by bank regulators to minimize the risks of lending. A key feature of Basel III is the requirement for banks to hold sufficient core capital to absorb losses in times of financial stress (BIS, 2021). Banks are required to hold a minimum amount of core capital, also known as Tier 1 capital, as a percentage of its risk weighted assets based on the riskiness of the bank's assets. Estrella, Park and Peristiani (2000) argue that risk-weighted, the leverage between debt and assets and gross revenues that

banks earn are useful for regulation of banks and can further be used to estimate the stability of a particular bank or lender. These ratios have been used informally before but were formalized at the Basel Accords which further improved the capital ratio into classification of lenders (Estrella et al., 2000).

The grounds requiring banks to hold core capital are to reduce the risk of bank failures and contagion in the financial system as well as helping align the interests of banks and shareholders with those of depositors. It is a signal of a bank's financial strength and stability (Demirgunes, 2016). While growth and competition are acceptable, there are many risks of NPLs in the Kenyan sector as it grows. Ignoring the capital ratio is therefore an impediment in mitigation of bad loans that could accrue. Maximizing profitability is acceptable but, the pursuit of it while ignoring the leverage a bank can have and the available buffers entirely ruins banking sectors because of the NPLs. The long-term impact is unattractiveness of the sector to investments and worst of it all, the collapse of banks (Mwangi, 2018).

Scholars have argued that core capital has a great influence on NPLs since its application in countries like the United States (Abbas, Masood, Ali & Rizwan, 2021). Capital ratios have been identified as one of the key prudential regulators. The banks have better capital ratios which strengthened their prudential loans buffers (Couaillier et al., 2022). In Ethiopia, scholars have pointed out the weak policy environment leading banks to lend more and increasing NPLs (Mwangi, 2018). The result is that there is excessive lending and an increase in debt stress because of defaults. Besides competition impacting growth of the Kenyan banking sector, Kimunio (2021) warns that competition is leading banks to play outside the regulatory framework and making credit risks one of the immediate dangers. Some banks in the drive to maximize profits, are lending out beyond their capital ratio. Studies on the effect of core capital on NPLs are limited. In Indonesia, Santoso et al. (2020) studied the determinants of bank profitability based on core capital. Applying panel regression, they

found that NPL negatively affected profitability. Budhijono (2021) aslo studied the interactions between core capital to NPLs in Indonesia and found that there was no significant effect. The studies were done on banks Indonesia and the findings cannot be applied to the Kenyan context, a gap the study sought to fill.

2.3.2 Capital Adequacy and Non-Performing Loans

Capital adequacy requirements are aimed at promoting the stability of the banking sector by ensuring banks are able to withstand shocks and maintain solvency in the wake of unexpected losses (BCBS, 2021). Banks are inherently risky institutions which operate with a high degree of leverage meaning they rely on debt financing to support their lending and investment activities. The Capital Adequacy Ratio (CAR) measures the available capital in a bank as a percentage of its exposure to risks like NPLs. The rise in NPLs in Kenya is concerning since banks depend on lending for sustainability. Capital adequacy requirements encourage banks to adopt prudent risk management practices as banks with higher levels of risk are required to maintain higher levels of capital (Ngungu & Abdul, 2020).

Capital adequacy is one of the strengths of the European banking sector which has buffered it from NPLs (Ozili, 2015). Shamshad (2007) conducted a study of banks in Pakistan found that banks that had sufficient capital were not exposed to bad loans and had the ability to recoup some of the losses that they could make. Africa led in NPLs globally and the impacts could be more compared to the developed countries. The World Bank had issued warnings of the need for capital adequacy regulations and the monitoring of African banks because of the risks that they were exposed to (Chege, Omagwa & Abdul, 2019). Similarly, in the Kenyan context, most scholars have praised the raising of capital requirement for banks by the CBK. Banks that increased credit with minimal capital faced the financial pollution occasioned by NPLs (Muthitu, 2020). Increased capital adequacy made some of the Kenyan banks profitable

and reduced the dangerous trend of bankruptcy and collapse of some of the commercial banks (Mathuva, 2009).

In Tanzania, Malimi (2017) found that capital adequacy and profitability had an insignificant influence on NPLs. An empirical study on Kenyan banks carried out by Karugu, Achoki and Kiriri (2018) found out that the use of CAR for regulation is very significant since it does predict the exposure to what they term as financial distress in the banking sector. Abunda and Oloko (2022) observed that due to the financial crisis of 2007/2008, the CBK maintained the regulatory frameworks, prompting banks to find mechanisms of raising more capital for operation to avoid debt distress. Ngungu and Abdul (2020) found that capital adequacy had a significant effect on NPLs in Kenya. These studies on the capital adequacy as a determinant of bank NPLs have conflicting findings a gap which this study sought to fill.

2.3.4 Liquidity and Non-Performing Loans

According to Fernando (2009), dealing with liquidity risk is more challenging than any other risk since liquidity is as a result of all the operations of a bank. He describes liquidity and insolvency as "heavenly twins" of banking because of the difficulty in distinguishing them particularly during times of crisis. Minimum requirements on liquidity are critical since they weigh in on the estimated liquid assets and the liquid liabilities of a lending institution. Regulators require banks to have more liquid assets to cushion them against the pressure of loans at least for a thirty (30) day period in times of financial distress (Tesfai, 2015).

Banks therefore must make prudent decisions, while combining numerous elements like diversification of the loan books, reducing cost of operations, limitation on the investments and many other activities to be within the regulatory frameworks. Kenyan banks, especially private banks, have put most of these elements into play thus making them have a hold of the market locally and regionally (Ngungu & Abdul, 2020). The ability of a bank to withstand NPLs can therefore be regulated using the liquidity ratio, since the banks must have a debt

leverage. The liquidity ratio helps to monitor the exposure of bank loan activities. In the event that there is exposure to bad debt, internal supervisory measures are normally taken to have corrective action done (BCBS, 2021).

Makri et al. (2014) examined the predictive factors of NPL levels in Europe before the 2008 financial crisis and found a significant connection between liquidity and NPLs. Klein (2013) studied the determinants of NPLs using liquidity as an indicator and found that profitable banks have lower non-performing loans due to high interest incomes. Jouini and Messai (2013) found that liquidity has a negative effect on NPLs in Italy, Greece and Spain. Awuor (2015) studied liquidity as a variable in assessing NPLs in Kenya for the period 2010 to 2014 using multiple regression analysis and found a positive impact on levels of NPLs. Ngungu and Abdul (2020) studied banks that operated in the period 2013 to 2017 and found that liquidity had an insignificant effect on NPLs. The findings on the effect of liquidity and NPLs are conflicting, a concern this study seeks to address. The study adopted the use of loans to deposit to measure bank liquidity as determinant of NPLs.

2.3.3 Bank Stability and Non-Performing Loans

In the United States, banks that had proper auditing mechanisms were found to be free from the risk of bad loans. The studies found that some of the leading auditing firms like PWC and Deloitte upon being granted the opportunity to audit some of the banks, resulted in good decision making and limited the possibility of exposure to financial distress (Abdullah, 2006). The internal systems and control within a bank could therefore influence the risk of bad loans and magnitude of NPLs. Besides other regulatory frameworks, it emerged that the internal operations within a bank are very important and can contribute to the performance of its loan book. The governance structures and frameworks in place that will ensure operational efficiency are critical to effective risk management practices. Banks in Kenya have at some point been found by scholars to be poor in asset utilization and hence exposing them to NPLs.

Some of the bank specific factors like operation efficiency have a direct impact on NPLs and which is an advantage some of the private commercial banks have mastered in the Kenyan market (Onyango & Olando, 2020).

Ozili (2018) studied factors that influence bank stability utilizing NPLs as one of the indicators of stability. He examined data from forty-eight (48) European countries and found bank efficiency as one of the significant predictors of NPLs. He also found that higher government effectiveness, competition and strong legal systems reduced the persistence of NPLs after the 2008 financial crisis period. Beck et al. (2010) studied the stability, efficiency and outreach of the Kenyan banking system and found that bank asset quality and liquidity had improved in part due to reduction of overhead costs by foreign banks. Large private banks were more efficient as reflected in their overhead costs. While size had an effect on financial intermediation, bank ownership also played as important a role in explaining efficiency. This study sought to examine bank stability and NPLs in Kenya, a gap in existing studies. The stability of banks at individual level was measured using the z score. It is a useful tool for assessing bank stability as it takes into account a bank's profitability, asset quality and leverage, a value add to the existing literature on NPLs.

2.4 Summary of the Literature

The literature review on the key research variables has provided a clear understanding of the nature and approaches to prudential regulation in managing NPLs. The empirical data on some countries in Europe, Asia and Africa and the challenges they have experienced have in relation to core capital, capital adequacy, liquidity and bank stability on NPLs have been clearly elucidated. The reviews have also been able to capture the Kenyan context and identified research gaps that need to be addressed. What is evident is that the impact of NPLs on the soundness of the banking system is enormous. Therefore, study of the incidence of NPLs in the country was of huge significance.

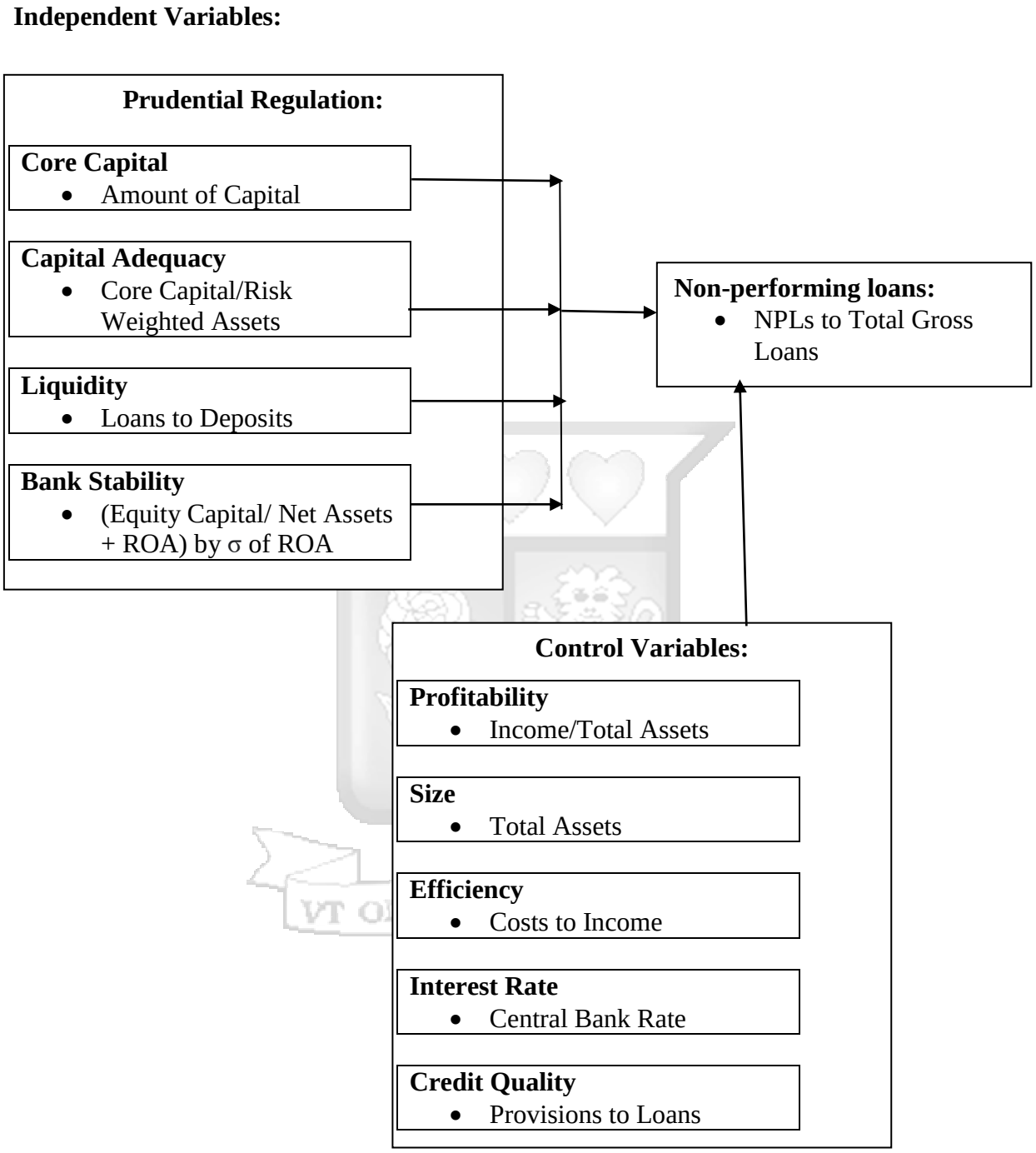
2.5 Research Gaps

The literature reviewed has captured aspects on regulation specifically core capital, capital adequacy, liquidity and bank stability. Despite reports on bank prudential management being released, some of the reports and even studies fail to give details on the efficacy of the prudential regulation environment in managing NPLs in Kenya. Studies in Kenya on bank specific determinants on NPLs have given conflicting findings. The existing studies deployed use of multiple regression analysis to examine the determinants of NPLs. They assume that coefficients are constant in space and time but asymmetries could identify heterogeneity in the data. The study covered these gaps and build on knowledge of the patterns and trends in prudential regulation and NPLs within the banking sector and specifically identify some of the changes in the specific variables within the study period. The efficacy of core capital on NPLs in Kenya has not been explored empirically. The effect of bank stability on NPLs measured by the z-score has also not been reviewed. Whereas general reporting and analysis to NPLs has been applied by previous studies, some of which have been reviewed in this section, the empirical aspects on the efficacy of prudential regulation meant to curb NPLs was conflicting.

2.6 Conceptual Framework

The following conceptual framework is a visual presentation that explains the variables of the study and the presumed relationships among them. In this study, the independent variable was prudential regulation assessed by core capital, capital adequacy, liquidity and bank stability whereas the dependent variable was NPLs.

Figure 2.1: Conceptual Framework



2.7 Operationalization of the Study Variables

The dependent variable for the study was NPLs in banks which was measured by the percentage of a bank's NPL to GTL (CBK, 2021). The independent variable for the study was prudential regulation assessed by core capital as highlighted in the studies by Budhijono (2021), Kimunio (2021), and Couaillier et al. (2022). Capital adequacy as an aspect of

prudential regulation was utilized as highlighted in the studies of Mathuva (2009), Malimi (2017), Achoki & Kiriri (2018), Chege, Omagwa & Abdul (2019), Muthit (2020) and Abunda & Oloko (2022) whereas liquidity made reference to the study by Kelin (2013), Makri et al. (2013), Jouini and Messai (2013), Awuor (2015) and Ngungu and Abdul (2020). The study also utilized the z-score to measure bank stability as highlighted by the World Bank (2020). The other variables which were largely control variables were bank profitability as referenced in the studies by Mutuku (2016) and Muthitu (2020), bank size as assessed by Ngungu and Abdul (2020), bank efficiency as highlighted in the studies by Abdullah, (2006), Kubai (2016), Ozili (2018) and Onyango and Olando (2020), interest rate as referenced in the studies by Sheefani (2016), Kihara (2017), Ngungu and Abdul (2020) and Robert and Koori (2022) and, credit quality as highlighted in the studies by Boudriga et al. (2009) and Ozili (2018). Table 2.1 below summarizes the indicators and measures of the study variables:

Table 2.1: Summary of the Indicators and Measures of the Study Variables

Variable	Type	Indicator	Supporting Literature	Data Source
Core Capital	Independent Variable	Amount of Capital	Mwangi (2018), Budhijono (2021), Kimunio (2021), and Couaillier et al. (2022)	Bank Annual Reports, CBK Bank Supervision Reports
Capital Adequacy	Independent Variable	Core Capital by Risk Weighted Assets	Malimi (2017), Achoki & Kiriri (2018), Chege, Omagwa and Abdul (2019), Muthitu (2020) and Abunda & Oloko (2022)	Bank Annual Reports, CBK Bank Supervision Reports
Liquidity	Independent Variable	Loans to Deposits	Jouini and Messai (2013), Kelin (2013), Makri et al. (2013), Awuor (2015) and	Bank Annual Reports, CBK Bank Supervision Reports

			Ngungu and Abdul (2020)	
Bank Stability	Independent Variable	Z-score/	World Bank (2020)	Bank Annual Reports, CBK Bank Supervision Reports
NPLs	Dependent Variable	NPL to Total Gross Loans	Ngungu and Abdul (2020)	Bank Annual Reports, CBK Bank Supervision Reports
Size	Control Variable	Percentage Market Share	Ngungu and Abdul (2020)	CBK Bank Supervision Reports
Profitability	Control Variable	Profit Before Tax (PBT)/ Total Assets	Mutuku (2016) and Muthitu (2020)	Bank Annual Reports, CBK Bank Supervision Reports
Bank Efficiency	Control Variable	Cost to Income	Abdullah (2006), Kubai (2016), Ozili (2018) and Onyango and Olando (2020)	Bank Annual Reports, CBK Bank Supervision Reports
Interest Rate	Control Variable	Central Bank Rate	Sheefani (2016), Kihara (2017), Ngungu and Abdul (2020) and Robert and Koori (2022)	CBK Bank Supervision Reports
Credit Quality	Control Variable	Provisions to Loans	Boudriga et al. (2009) and Ozili (2018)	Bank Annual Reports, CBK Bank Supervision Reports

Source: Author (2022)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the research methodology employed for analysing the study variables is presented. This encompasses the underlying philosophy behind the study, the chosen research design and the methods used for determining the study's population. The chapter delves into details of data collection and analysis of the study variables. Significantly, the chapter serves as a critical road map outlining the process and approach undertaken in conducting the study.

3.2 Research Philosophy

Research philosophies guide the research process by their fundamental beliefs and assumptions. There are existing competing viewpoints on research philosophies. The study used the positivist research philosophy. The positivist research philosophy emphasizes on the use of empirical evidence for knowledge generation. Crossan (2013) argues that the distinctive aspect of positivist philosophy is its reliance on quantitative approaches in investigating phenomena. Park, Konge and Artino (2020) indicate that positivism verifies held assumptions or hypothetical positions through operationalizing variables and other measures. The positivist philosophy is viewed as a direct antithesis to the interpretivist philosophy. The study examined the effect of prudential regulation on core capital, capital adequacy, liquidity and bank stability and the effect they have on NPLs in commercial banks in Kenya. In the study, the positivist research philosophy guided the collection of data for each bank for each variable from bank annual reports and CBK supervision reports through observation, measurement and analysis using multiple regression. The fact that the data was purely be on measures made the positivist philosophy the most ideal for the study.

3.3 Research Design

Dulock (1993) elaborates a research design as the blueprint that guides the researcher into answering the research questions and attain the object and intent of the study. Consequently, a research design helps the researcher manipulate the variables with the possibility of controlling the variance (Erickson, 2017). The study employed descriptive correlational research design because of its ability to describe the characteristics and relationships between phenomena with accuracy. Descriptive correlational research design research was appropriate for the study as it allowed description of the relationships between core capital, capital adequacy, liquidity, bank stability on NPLs and identify patterns and trends amongst them. Descriptive correlational research design was useful in identifying whether they were associated with higher levels of NPLs. It was therefore the most appropriate research design to be used for the study.

3.4 Population and Sampling

3.4.1 Target Population

The population of a study refers to the total number of units wherefrom data will be collected (Grove, 2012). The study focused on thirty-five (35) commercial banks operating in Kenya between 2011 and 2021. According to CBK bank supervision reports for the period, there were fourty six (46) commercial banks in operation. However, the period saw the merger of three commercial banks while four banks put under statutory administration. Four other banks were in operation but not for the entire period of the study. The study therefore targeted thirty-five (35) commercial banks that were in operation during the study period with data on all the research variables.

3.4.2 Sampling Design

The study used deliberate sampling. Campbell, Greenwood and Prior (2020) consider sampling a good technique because it matches the samples with the specific objectives of the

study. The banks sampled were selected purposively because of availability of data on the research variables during the period of the study. The sample size was thirty-five (35) commercial banks representing 74.46% of the population of banks in operation during the study period. The sample still drew valid findings because the reports they provided were critical. The study was able to identify key data on specific variables like core capital, capital adequacy, liquidity and bank stability in relation to NPLs. Categories were created based on bank tiering to give a clear picture of the objectives of the study. Appendix I provides the list of banks that were studied and demonstrates how the study sample was achieved through deliberate sampling.

3.5 Data Collection

Data on the research variables was collected from secondary sources and interpreted through statistical analysis. Due consideration was accorded to the nature of research, the scope and objectives of the study and financial resources. The data collection method was document review. Commercial banks and the CBK publish annual reports which include financial statements. Data on core capital, capital adequacy, liquidity and bank stability and NPLs was available from these published annual reports. Collection of data involved 380 observations for each variable from thirty-five (35) banks in a period of ten (10) years.

The study based its data on the period between 2011 and 2021. The period was crucial since it experienced a lot of growth in the banking sector, the promulgation of a new constitution, revised Central Bank Prudential Regulations in 2013 and 2016 and the implementation of IFRS 9 which required banks to provide for expected losses. These policy measures were aimed at strengthening the regulatory frameworks which govern the banking sector with the objective of maintaining stability of the banking system.

3.6 Data Analysis

3.6.1 Model Specification and Variable Definition

The study deployed use of panel regression analysis to demonstrate the relationship between core capital, capital adequacy, liquidity and bank stability and their effects on NPLs (Gonzalez et al., 2005; Lee & Chiu, 2013). Panel regression analysis allows for relationships between independent and dependent variables to be established. It was the appropriate model use for the panel study. The following econometric model was applied:

$$Y_{it} = \alpha + \beta_1 X1_{it} + \beta_2 X2_{it} + \beta_3 X3_{it} + \beta_4 X4it + \beta_5 Z1_{it} + \beta_5 Z2_{it} + \beta_5 Z3_{it} + \beta_5 Z4_{it} + \beta_5 Z5_{it} + \beta_6 DCovid19_{it} + \boldsymbol{\varepsilon i}$$

Where:

Yit = NPLs (% of Non-Performing Loans to Total Gross Loans) for bank i in year t

X1 = Core Capital (Amount of Capital) for bank i in year t

X2 = Capital Adequacy (Core Capital/ Risk Weighted Assets) for bank i in year t

X3 = Liquidity (Loans to Deposit Ratio) for bank i in year t

X4 = Bank Stability (z score) for bank i in year t

Z1 = Profitability (Income/Total Assets) for bank i in year t

Z2 = Size (Market Share) for bank i in year t

Z3 = Efficiency (Costs to Income) for bank i in year t

Z4 = Interest Rate (Central Bank Rate) for bank i in year t

Z5 = Credit Quality (Provisions to Loans) for bank i in year t

Yit is the dependent variable for observation **i** at time **t**, α is the intercept/constant term, **β1....βn** = regression coefficient/effect of the independent variable on **Yit**, **Xit** is the independent variable**, Z** is the vector of control variables and **εi** is the random error term. $\mathbf{DCovid19_{it}}$ is introduced as a dummy variable to account for the effect of the COVID 19 pandemic on NPLs. It takes the value of 1 if COVID 19 is present and 0 if it is not. By

estimating the coefficient β_6, the specific impact of the pandemic on NPLs is quantified while accounting for effects of the independent variables and the control variables.

The Hausman Test was used to determine the appropriate model was between the fixed effects model and the random effects model. The null hypothesis (H_0) was that the random effects model was the preferred model while the alternative hypothesis (Ha) posited that the fixed effects model was preferred.

The following formulas for the research variables were used:

Core Capital = Amount of Capital

Capital Adequacy = Core Capital: Total Risk Weighted Assets

Liquidity (ratio) = Gross Loans: Total Deposits

$$\text{Stability (Z-score)} = \frac{(\text{Equity Capital/Total Assets}) + \text{ROA}}{\text{Standard Deviation of ROA}}$$

$$\text{NPL (\%)} = \frac{\text{Gross NPLs}}{\text{Gross Loans and Advances}}$$

Size = % of Market Share

Profitability (ratio) = Income (PBT): Total Assets

Efficiency (ratio) = Costs: Income (PBT)

Credit Quality (ratio) = Provisions: Gross Loans & Advances

Regression coefficients were utilized to assess the effect of each independent variable. The t-test was adopted as the test statistic to compare the observed sample statistic and the hypothesized population parameter in unit of standard error.

3.6.2 Diagnostic Tests

Where a study seeks to predict relationships between variables through regression and correlation analysis, diagnostic tests are necessary to establish and validate the predictive relationships. In the study, the following diagnostic tests were conducted:

3.6.2.1 Normality Tests

In linear regression analysis, it is assumed that the error term must be distributed normally (Gujarati, 2004). The error term is used to capture other factors which affect the variables but are not contemplated in the model. This study used the normality histogram to test for normality. The test was used to asses if the research data followed a normal distribution. To support the visual inspection of the normality histogram, the Shapiro-Wilk W Test for normality was applied to assess normality of residuals distribution. The null hypothesis of the Shapiro-Wilk W Test is that the data in the residuals is normally distributed. The significance threshold of 0.05 was applied.

3.6.2.2 Heteroscedasticity Tests

Heteroscedasticity happens when the variance of error term in the regression model is dependent on the independent variables. The variance of error terms should remain constant if the regression model is to hold (Crowther & Lancaster, 2008). The study used the Breusch-Pagan/Cook-Weisberg Test to test for heteroscedasticity. The test follows an asymptomatic chi-square distribution under the null hypothesis of no heteroscedasticity. Computation was based on a coefficient of determination using a significance level of 0.05.

3.6.2.3 Autocorrelation Tests

In regression, autocorrelation applies if consecutive error terms in the analysis are related. For the regression model to hold, it is assumed that residuals should not be correlated across time. The study used the Woolridge Test to test for autocorrelation. The test follows an asymptomatic chi-square distribution under the null hypothesis of no autocorrelation. The critical values for the test depends on the desired level and degrees of freedom. In the study, a significance level of 0.05 was applied.

3.6.2.4 Multicollinearity Tests

Multicollinearity is the liner correlation among variables. With regression, multicollinearity causes an increase in the standard error of co-efficient thus raising concerns on reliability. Multicollinearity tests were performed in the study on the different variables and their possible correlation. Because the test has the challenge of inflating the standard error of the regression co-efficient, the study used Variance Inflation Factors (VIF) to determine the level of collinearity that could be tolerated without distorting the regression analysis. The study applied the threshold of less than 10 to imply that there is no multicollinearity (Dao & Pham (2014).

3.6.2.5 Stationarity Tests

Stationarity in research data refers to the property of a time series where its statistical properties remain constant over time. It is an important assumption in statistical models and analysis because the relationships between multiple variables and the patterns observed in the data tend to be more stable and predictable. The study involved observations of data on multiple banks over time. The Augmented Dickey – Fuller (ADF) test by Fuller (1981) was performed to check for presence of unit root in the data. The null hypothesis was the existence of unit root in the data while and the alternative hypothesis was non-existence of unit root in the data. In the study, the significance threshold level of 0.05 was applied.

3.6.2.6 The Hausman Specification Test

The Hausman Test was used to test whether a fixed effects model or a random effects model was more appropriate. The test estimates the consistency of an estimator against the alternative estimate (Hasman & Taylor, 1981). According to Pace and Lasage (2008), the difference between the two models is if within the regression model, the unnoticed individual effect was representative of the fundamentals that are related to the independent variable. The

Hausman Test null hypothesis is that the random effects model is the preferred model while the alternative hypothesis (Ha) is that the fixed effects model is preferred. In the study, the significance threshold level of 0.05 was applied.

3.7 Research Quality

The researcher adopted use of triangulation to strengthen the validity and reliability of data. Data for the study variables was retrieved from individual bank annual reports and CBK bank supervisor reports by several data collectors whereupon comparisons were made to ensure consistency. The study also relied on reports that have been approved and published by the CBK, the regulator of the banking sector in Kenya. The researcher also used quality score for real time data quality checks before errors could pile up and affect the quality of the data. Quality checks are standard procedures that are applied in all research studies for purposes of validating research. The study relied on the capital buffer theory, the credit creation theory of banking and the financial repression theory to guide analysis and interpretation of the data. The literature that was reviewed was of high quality with sources duly cite and acknowledged.

3.8 Ethical Considerations

While undertaking the study, it was not necessary to seek approvals for data collection. The data was readily accessible through annual reports of individual banks and CBK bank supervision reports. These reports are published and are available to the general public. On data collection, the researcher took steps to ensure integrity of the data. The researcher notified CBK of the study and the data to be collected. The objectives and findings of the study will be published online and will be readily accessible.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

In this chapter, the analysis of data pertaining to the research variables is presented to identify patterns, relationships and to draw findings and conclusions. The chapter encompasses descriptive statistics on the data of the study variables, diagnostic tests, correlation analysis, model selection and the application of multiple regression models. The results obtained from the analysis are discussed in relation to the effect of core capital, capital adequacy, liquidity and bank stability as the prudential regulatory factors on NPLs. Additionally, the chapter explores the controlling effect of profitability, size, efficiency, interest rate and credit quality on NPLs.

4.2 Descriptive Statistics

Table 4.1 below summarizes the main characteristics of the research variables. It provides insights into central tendencies, variability, distribution and provides a basis for further analysis and testing. The dependent variable was NPLs measured as a percentage of NPLs to gross total loans. The independent variable was prudential regulation assessed through core capital, capital adequacy, liquidity and bank stability. The variables; profitability, bank size, efficiency, interest rate and credit quality were included as control variables.

Table 4.1 Descriptive Tests Summary

Variable	Mean	Standard Deviation	Min	Max
Gross NPL (millions)	564,359	974,738	-	92,193.00
Core Capital (millions)	2,897,653	1.08E+07	(1,412,110.00)	9.02E+07
Capital Adequacy (ratio)	2.19	27.49	(0.62)	403.10
Liquidity (ratio)	0.85	0.81	-	15.01
Stability (ratio)	0.47	1.00	(7.17)	2.71
Size (percentage)	2.49	3.36	-	15.00
Efficiency (ratio)	19.26	136.15	(526.13)	2,270.59
Interest Rate (percentage)	9.91	2.91	7.00	18.00

Credit Quality (ratio)	0.03	0.07	-	0.84

Source: Author Computation, 2023

Data output in Table 4.1 above shows that the average gross NPL was Kenya Shillings 564,359 million with a relatively high standard deviation of 97,478 million. The values indicate the magnitude and variability of NPLs across the Kenyan banking sector. The average core capital was Kenya Shillings 2,897,653 million with a considerable standard deviation of 10.800. The core capital values reflect the total amount of capital available to banks to absorb potential losses. The standard deviation shows the variability in core capital levels amongst banks. The mean capital adequacy was 2.19 indicating that on average, banks have a capital buffer that is twice the prudential requirements. The standard deviation of 27.49 suggests significant variation in capital adequacy across banks. The average liquidity of 0.85 implies that banks had a relatively stable level of liquidity. The standard deviation of 0.81 indicates some variation in liquidity levels amongst the banks. The mean stability value of 0.47 indicates that banks had a moderate level of stability with the standard deviation of 1.00 suggesting some variability across banks. The overall mean efficiency was 19.26 suggesting that on average, banks had lower proportion of loans to deposits. High efficiency values point towards better utilization of resources and cost effectiveness. The overall mean interest rate was 9.91 with a standard deviation of 2.91. The minimum interest rate was 7.00 whereas the maximum was 18.00. Interest rate is a crucial indicator as it is vital to banks' lending and borrowing activities.

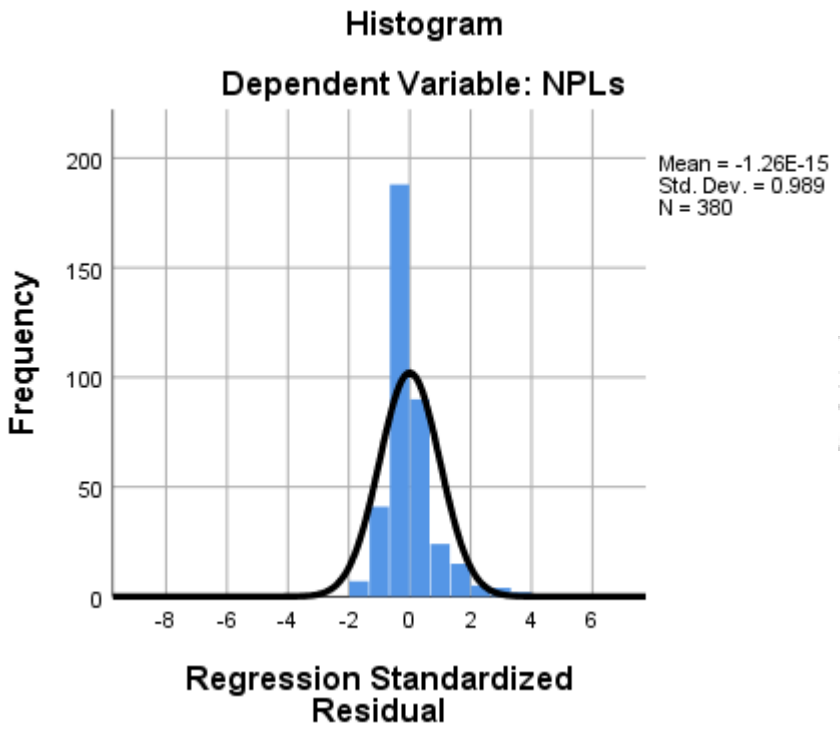
4.3 Diagnostic Testing

The study deployed use of diagnostic tests on the data before commencing analysis of the relationships and patterns between the study variables. The tests that were performed in the study are the normality test, heteroscedasticity test, test for autocorrelation, test for multicollinearity and stationarity test as shown in the ensuing subsections.

4.3.1 Test for Normality

A normality histogram was used to check for normality. A normality histogram test is used to assess whether a given set of data follows a normal distribution. Figure 4.1 below is a graphical illustration from creation of a histogram with data on core capital, capital adequacy, liquidity and banks stability plotted in intervals. If the histogram is well covered by the probability density curve (bell curve), it implies the data is normal. From Figure 4.1 below, the histogram is well curved with the density curve but we have a leptokurtic curve which raises doubt of normality. It indicates higher concentration around the mean indicating presence of outliers.

Figure 4.1: Histogram Test for Normality



The presence of a leptokurtic curve led to performance of a further normality test. The Shapiro-Wilk test was used to assess the normality of data distribution. The null hypothesis is that the data in the residuals is normally distributed. The results are depicted in Table 4.2 below:

Table 4.2: Shapiro-Wilk Test for Normality

Shapiro–Wilk W Test for Normality

Variable	Obs	W	V	z	Prob>z
resid	380	0.78501	56.398	9.571	0.00000

Source: Author Computation, 2023

The test result suggests evidence against the null hypothesis of normality. To address the normality issue, transformations were applied to the data using logs and square roots to stabilize variance in the data. The data was also segmented into bank tiers and analyzed separately to help address the issues that may arise from non-normality.

4.3.2 Test for Heteroscedasticity

In regression analysis, it is assumed that the residuals (or errors) exhibit homoscedasticity meaning that they have a consonant variance. The Breusch - Pagan test was used to test for homoscedasticity. The test regresses the residuals on the fitted values or predictors and checks whether they can explain any of the residual variance. It follows a chi-squared distribution with k degrees of freedom. The null hypothesis is that the residual variance is constant while the alternative hypothesis is a no constant. Heteroscedasticity is assumed for significance level below 0.05.

Table 4.3: Breusch - Pagan Test for Heteroscedasticity

Breusch–Pagan/Cook–Weisberg Test for Heteroscedasticity

Assumption: Normal error terms

Variable: Fitted values of NPL

H0: Constant variance

chi2(1) = 617.84

Prob > chi2 = 0.0000

Source: Author Computation, 2023

Based on the findings of the Breusch–Pagan/Cook–Weisberg Test for heteroscedasticity in Table 4.3 above, the chi-squared value is 617.84 with 1 degree of freedom. Since the p-value is less than the significance level of 0.05, the null hypothesis is rejected and that variance is not consonant is concluded. This suggest there is evidence of heteroscedasticity. This was corrected by transformation of the variables using logs to stabilize the variance (Satchell, 2003; Woolridge, 2015).

4.3.3 Test for Autocorrelation

Regression analysis assumes that residuals should not be correlated across time since this may result in biased estimates of the parameters of regression. Autocorrelation is the problem that exists if the disturbance terms are not equal to zero, that is, $cov(u_i,u_j) = 0$ (Brooks, McCoy & Bolker 2013; Wooldridge, 2015). The presence of autocorrelation could lead to incorrect standard errors (Brooks McCoy & Bolker, 2013). The Woolridge Test for autocorrelation by Woolridge (2002) was used to establish whether there was first-order autocorrelation. The null hypothesis is that there is no first-order autocorrelation present. The results from the Wooldridge's Test of autocorrelation are shown in Table 4.4 below:

Table 4.4: Wooldridge's Test of Autocorrelation

Wooldridge Test for Autocorrelation in Panel Data
H0: no first-order autocorrelation
F(1, 34) = 7.373
Prob > F = 0.0103

Source: Author Computation, 2023

In the results, the test statistic is F (1,34) = 7.373 and the associated p-value is 0.0103. Since the p-value is less than the significance level of 0.05, the null hypothesis of no first-order correlation is rejected, hence presence of serial correlation. This was corrected by addition of control variables in the model and variables transformation.

4.3.4 Test for Multicollinearity

Multicollinearity has been defined as the problem that arises when two or more independent variables are highly correlated (Brooks, 2012). Multicollinearity inflates the predictor variable error of coefficients. Tests were conducted using the Variance Inflation Factor (VIF) by calculating a statistic value that could be tolerated without distorting the regression analysis. Prior studies show that where VIF is less than ten, it implies that there is no multicollinearity (Dao & Pham, 2014). Table 4.5 below shows the VIF values for the study variables:

Table: 4.5 Variance Inflation Factor (VIF) Test for Multicollinearity

Variable	VIF	Tolerance
Size	2.0400	0.4898
Profitability	1.6300	0.6147
Interest Rate	1.4600	0.6833
Core Capital	1.4500	0.6913
Stability	1.3600	0.7329
Credit Quality	1.1600	0.8599
Liquidity	1.0700	0.9377
Capital Adequacy	1.0400	0.9650
Efficiency	1.0200	0.9811
Covid_19	1.3600	0.7329
Mean VIF	1.4300	

Source: Author Computation, 2023

According to the findings in Table 4.5 above, the VIF values for core capital, capital adequacy, liquidity and bank stability (the independent variables) ranged between 1.02 and 2.05 indicating that there is no significant multicollinearity present. Generally, VIF values below 10 are considered acceptable (Brooks, 2012; Dao & Pham, 2014). Values of above 10 indicate the presence of multicollinearity. The controlling variable profitability was removed

from the analysis because it had a high VIF of 63.24. The mean VIF across all variables was 1.4300 indicating that multicollinearity was not a concern.

4.3.5 Stationarity Tests

Stationarity of a series (variable) implies that its mean, variance and covariance are constant over time. That is, these do not vary systematically over time. In order words, they are time invariant. To check whether the variables were stationary, the Augmented Dickey–Fuller (ADF) test by Dickey and Fuller (1981) was used to test the presence of unit root in the data set. The null hypothesis (Ho) was existence of unit root in the data while the alternative hypothesis (Ha) was non-existence of unit root in the data. The level of significance level used was 5%. The results are summarized in the Table 4.6 below.

Table 4.6: Unit Root Test for Stationarity

Variable	Statistic	Value	P-value
Core Capital	Inverse chi-squared(70) P	74.8648	0.3235
	Inverse normal Z	-2.3557	0.0092
	Inverse logit t(179) L*	-2.0987	0.0186
	Modified inv. chi-squared Pm	0.4112	0.3405
Capital Adequacy	Inverse chi-squared(70) P	149.9063	0.0000
	Inverse normal Z	-4.6474	0.0000
	Inverse logit t(179) L*	-5.1266	0.0000
	Modified inv. chi-squared Pm	6.7533	0.0000
Liquidity	Inverse chi-squared(70) P	193.1343	0.0000
	Inverse normal Z	-4.7414	0.0000
	Inverse logit t(179) L*	-6.9397	0.0000
	Modified inv. chi-squared Pm	10.4067	0.0000
Bank Stability	Inverse chi-squared(70) P	140.1563	0.0000
	Inverse normal Z	-3.8561	0.0001
	Inverse logit t(179) L*	-4.4342	0.0000
	Modified inv. chi-squared Pm	5.9293	0.0000
Size	Inverse chi-squared(70) P	54.5216	0.9134
	Inverse normal Z	1.6638	0.9519
	Inverse logit t(179) L*	1.7893	0.9624
	Modified inv. chi-squared Pm	-1.3082	0.9046
Bank Efficiency	Inverse chi-squared(70) P	219.4679	0.0000
	Inverse normal Z	-6.8476	0.0000
	Inverse logit t(179) L*	-8.3187	0.0000

	Modified inv. chi-squared Pm	12.6323	0.0000
Interest Rate	Inverse chi-squared(70) P	723.0414	0.0000
	Inverse normal Z	-23.621	0.0000
	Inverse logit t(179) L*	-33.7856	0.0000
	Modified inv. chi-squared Pm	55.1921	0.0000
Credit Quality	Inverse chi-squared(70) P	129.2781	0.0000
	Inverse normal Z	-3.0638	0.0011
	Inverse logit t(179) L*	-3.2746	0.0006
	Modified inv. chi-squared Pm	5.0099	0.0000

Source: Author Computation, 2023

It is evident from Table 4.6 above that all variables were stationary since the p value = 0.00 was less than 0.05. This implies that the test result was statistically significant hence the null hypothesis that was existence of unit root in the data is rejected. The p value for size = 0.91 indicated presence of unit root data but it became stationary at first difference. Since the data was found to be stationary, there was no need to conduct integration tests.

4.4 Correlation Analysis

Spearman's rank correlation coefficient was used for the study. This is a non-parametric rank statistic that measures the strength of the relationship between two variables (Piovani, 2008). Unlike Pearson's correlation coefficient, Spearman's correlation coefficient does not require the assumption that variables are linear. It measures the monotonic relationship between variables (Piovani, 2008). It is also suitable for analyzing ordinal data and is not as sensitive to the premise of outliers given the outcome of the diagnostics. Table 4.7 below shows the correlation matrix results:

Table 4.7: Spearman's Rho Correlations Matrix

		NPLs	Core Capital	Capital Adequacy	Liquidity	Stability	Interest Rate	Size	Profitability	Efficiency	Credit Quality	Covid_19
NPLs	r	1.000	-0.067	-.203**	0.072	-.607**	-.257**	-.358**	-.604**	.163**	.225**	.244**
	P value		0.191	0.000	0.160	0.000	0.000	0.000	0.000	0.001	0.000	0.000
Core Capital	r	-0.067	1.000	-0.051	-.169**	.377**	-.211**	.619**	.377**	-0.081	0.063	-0.042
	P value	0.191		0.317	0.001	0.000	0.000	0.000	0.000	0.117	0.218	0.418
Capital Adequacy	r	-.203**	-0.051	1.000	-.260**	.223**	.100*	-.248**	.207**	.196**	-.249**	-.128*
	P value	0.000	0.317		0.000	0.000	0.049	0.000	0.000	0.000	0.000	0.012
Liquidity	r	0.072	-.169**	-.260**	1.000	-.130*	.198**	-.198**	-.130*	-0.019	0.095	-.161**
	P value	0.160	0.001	0.000		0.011	0.000	0.000	0.011	0.713	0.063	0.001
Stability	r	-.607**	.377**	.223**	-.130*	1.000	.125*	.639**	.997**	-.229**	-.164**	-.151**
	P value	0.000	0.000	0.000	0.011		0.014	0.000	0.000	0.000	0.001	0.003
Interest Rates	r	-.257**	-.211**	.100*	.198**	.125*	1.000	0.015	.120*	-.120*	-0.026	-.677**
	P value	0.000	0.000	0.049	0.000	0.014		0.763	0.018	0.018	0.616	0.000
Size	r	-.358**	.619**	-.248**	-.198**	.639**	0.015	1.000	.645**	-.268**	.153**	-0.030
	P value	0.000	0.000	0.000	0.000	0.000	0.763		0.000	0.000	0.003	0.556
Profitability	r	-.604**	.377**	.207**	-.130*	.997**	.120*	.645**	1.000	-.234**	-.156**	-.146**
	P value	0.000	0.000	0.000	0.011	0.000	0.018	0.000		0.000	0.002	0.004
Efficiency	r	.163**	-0.081	.196**	-0.019	-.229**	-.120*	-.268**	-.234**	1.000	-.164**	.156**
	P value	0.001	0.117	0.000	0.713	0.000	0.018	0.000	0.000		0.001	0.002
Credit Quality	r	.225**	0.063	-.249**	0.095	-.164**	-0.026	.153**	-.156**	-.164**	1.000	0.036
	P value	0.000	0.218	0.000	0.063	0.001	0.616	0.003	0.002	0.001		0.487
Covid_19	r	.244**	-0.042	-.128*	-.161**	-.151**	-.677**	-0.030	-.146**	.156**	0.036	1.000
	P value	0.000	0.418	0.012	0.001	0.003	0.000	0.556	0.004	0.002	0.487	

Source: Author Computation, 2023

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The results in Table 4.7 above show that NPLs have a negative correlation with core capital, capital adequacy, liquidity, interest rate, size, profitability, efficiency and credit quality. This implies that as these variables increase, NPLs tend to decrease. Stability has a strong negative correlation with NPLs at *(r (385) = -0.607, p < 0.05)* as with capital adequacy indicating that higher stability and capital positions are associated with lower NPLs. The findings show that the correlation coefficients between capital adequacy and NPLs was negative and significant *(r (385) = -0.203, p < 0.05).* This implies that the relationship between capital adequacy and NPLs was weak and inversely related. The findings show that the correlation coefficients between stability and NPLs was negative and significant *(r (385) = -0.607, p < 0.05).* This implies that the relationship was moderate and inversely related. That is, an increase in bank stability is associated with a reduction in NPLs.

Core capital and capital adequacy have positive correlations with size and profitability at *(r (385) = -0.619, p < 0.05)* and *(r (385) = -0.520, p < 0.05)* respectively suggesting that larger and more profitable banks tend to have higher core capital and capital adequacy ratios. Interest rate has a negative correlation with stability at *(r (385) = -0.125, p < 0.05)* implying that higher stability is associated with lower interest rates. Profitability has a strong positive correlation with stability indicating that profitable banks tend to have higher stability. Credit quality has a positive correlation with stability at *(r (385) = -0.164, p < 0.05)* indicating that higher stability is associated with better credit quality. Efficiency has a positive correlation with stability at *(r (385) = -0.229, p < 0.05),* profitability at *(r (385) = -0.234, p < 0.05)* and credit quality at *(r (385) = -0.164, p < 0.05)* implying that higher stability, profitability and credit quality are associated with higher efficiency. COVID 19 had a weak positive relationship with NPLs at *(r (385) = 0.244, p < 0.05).*

It is important to note that the correlations reported in Table 4.7 above indicate statistic correlations between the variables but they do not establish causation.

4.5 Panel Regression Model

The Hausman Test is used to ascertain the optimal model between the fixed effects model and random effects model. The test is used to determine which model provides more reliable and efficient estimates. The Hausman test calculates the difference between the coefficients estimated by the models and compares it to the standard errors of the difference. If the difference is statistically significant, the fixed effects model is applied. The null hypothesis (H_0) is that the random effects model was the preferred model while the alternative hypothesis (Ha) posits that the fixed effects model was preferred. Table 4.8 below presents the results of the Hausman Test:

Table 4.8: Hausman Test Effects Model

---- Coefficients ----	(b) Fixed	(B) Random	(b-B) Difference	sqrt(diag(V_b-V_B)) Std. error
Core Capital	599.2902	578.7782	20.512	28.78471
Capital Adequacy	-7.91862	-9.50044	1.581825	4.568784
Liquidity	492.8677	441.5073	51.36046	202.5794
Stability	-1280.86	-1474.82	193.9558	335.6829
Size	2342.227	2118.204	224.0234	588.7146
Efficiency	-1.88757	-1.89413	0.0065661	0.6190418
Interest Rate	-265.177	-264.397	-0.7795173	18.53233
Credit Quality	3456.305	5105.693	-1649.388	1910.466
Covid_19	3995.146	3944.748	50.39798	92.94462

Source: Author Computation, 2023

b = Consistent under H_0 and Ha; obtained from xtreg
B = Inconsistent under Ha, efficient under H_0; obtained from xtreg
Test of H_0: Difference in coefficients s not systematic

Table 4.9: Chi-statistic

chi2(9) = (b-B)'[(V b -V_B)^(-1)](b-B)
= 3.06
Prob > chi2 = 0.9618

Source: Author Computation, 2023

Table 4.8 above provides the coefficients estimated for each variable under the models and the difference between them. The results of the Hausman test indicate that the chi-statistic is

3.06. The probability (Prob > chi2) associated with the chi-square statistic is 0.9618. Since the probability is greater than the significance level of 0.05, the null hypothesis which assumed that the random effects model was preferred could not be rejected in favour of the alternative hypothesis. Thus, the random effects model was the more suitable choice due to its efficiency.

The study estimated a Chow Test to deterring the significance of the fixed effects present in the data set. The null hypothesis that is the presence of significant fixed/individual effects. The significance level of 0.05 was used. The results are shown in Table 4.10 below:

Table 4.10: F Test Pooled Vs Fixed Effect Results

F test that all fixed effects = 0:	F(2, 366) = 442.48	Prob > F = 0.000

Source: Author Computation, 2023

Based on pooled vs fixed effects on the F-Statistic and the P-value provided above, the null hypothesis that there are significant fixed/individual effects is rejected. This implies that a fixed effects model would have been preferred instead of pooled OLS model which accounts for individual effects. However, based on the results of the Hausman Test in Table 4.8 above, the study applied the random effects model.

4.5.1 Random Effects Model

A regression analysis using the random effects model was conducted to explore the correlation between the independent variables; core capital, capital adequacy, liquidity and bank stability and the dependent variable NPL. The outcomes are presented in Table 4.10 below:

Table 4.11: Random Effects Model Results

	Dependent Variable Gross NPL	
Independent Variables	Model 1	Model 2

Core Capital	737.76***	578.78***
	(133.09)	(123.33)
Capital Adequacy	-14.23	-9.50
	(14.82)	(11.95)
Liquidity	-166.56	441.51
	(519.09)	(418.58)
Stability	-788.97	-1,474.82***
	(596.27)	(512.63)
Size		2,118.20***
		(163.20)
Efficiency		-1.89
		(2.35)
Interest rates		-264.40**
		(130.03)
Credit quality		5,105.69
		(6,062.72)
		(650.37)
Covid_19	3,920.94***	2,657.01***
Constant	-980.40	-9,581.70***
	(1,653.95)	(3,111.19)
Observations	380	380
Number of Company	35	35
Overall R-squared	0.117	0.606
Chi square test	33.43	418.1
p value	0.0000	0.0000
RMSE	7276	6097
N	380	380
IV	Yes	Yes
Control variables	No	Yes
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Source: Author Computation, 2023

From the results in Table 4.10 above, the constant of the model was -980.40, P>|z| = 0.000<.05 indicating there was a significant negative effect on gross NPL. The R-squared values provide useful information about the overall explanatory power of the model. The coefficient of determination R squared was .117, suggesting that the independent variables core capital, capital adequacy, liquidity and bank stability could explain 11.7% of the variation in gross NPL. By introducing control variables into the model, the R squared valued improved to 0.606 indicating that the independent variables core capital, capital adequacy,

liquidity and bank stability and the control variables could explain 60% of the variation on NPL with the remaining 40% likely influenced by other factors. Overall, the model was statistically significant with a Wald chi2 test statistic of 418.1 with a p-value (Prob > chi2) of 0.000 which is less than the significance level of 0.05. This confirms the significance of the model in explaining the relationships between the independent variables core capital, capital adequacy, liquidity and bank stability and NPLs.

The study also sought to estimate the random effects model based on bank tiers to explore if the correlation between the independent and dependent variables would yield different results. The outcomes are presented in Table 4.11 below:

Table 4.12: Random Effects Model Results for Bank Tiers:

	Random Effects Model		
	Tier 1	**Tier 2**	**Tier 3**
Independent Variables	**Gross NPL**	**Gross NPL**	**Gross NPL**
Core Capital	1,315.14***	307.62***	364.50***
	(316.38)	(105.27)	(104.80)
Capital Adequacy	7,217.50	-2.96	-5,554.93
	(14,488.58)	(4.78)	(3,393.55)
Liquidity	16,750.39**	4,148.64***	468.39
	(7,488.80)	(1,169.80)	(338.81)
Stability	-1,691.76	-1,916.50***	-157.09
	(3,691.04)	(391.89)	(442.14)
Size	1,835.09***	1,098.25***	1,850.10***
	(368.52)	(411.43)	(471.04)
Efficiency	2,297.33**	-1.30	-0.69
	(1,096.11)	(1.74)	(1.64)
Interest Rates	-416.80	-180.07*	-110.65
	(315.86)	(98.24)	(113.70)
Credit Quality	20,448.29*	3,315.00	14,292.35**
	(11,996.54)	(10,142.15)	(6,757.60)
Covid_19	1,399.40***	356.14***	346.05***
Constant	-45,661.00***	-3,751.13*	-1,565.04
	(14,468.23)	(2,167.23)	(2,238.08)
Observations	110	88	181
Number of	10	8	17

Company			
Overall R-squared	0.728	0.541	0.429
Chi square test	208.9	92.04	56.13
p value	0.0000	0.0000	0.0000
RMSE	7711	2197	3580
N	110	88	181

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author Computation, 2023

From the results in Table 4.11 above, the coefficient of determination R squared for Tier 1, 2 and 3 was .728, .541 and .429, respectively suggesting that 72.8%, 54.1% and 42.6% respectively of the variation in gross NPL could be explained by core capital, capital adequacy, liquidity and bank stability. By introducing control variables into the model, the R squared valued improved significantly for all tiers confirming that the variation on NPL could be explained by core capital, capital adequacy, liquidity and bank stability and the control variables. The effect of Covid 19 on NPLs was negligible.

4.5.2 Effect of Prudential Regulation on NPLs

4.5.2.1 Effect of Core Capital on NPLs

According to the findings in Table 4.11 above, core capital was found to have a significant effect on NPLs in the two models; Model 1*: (*β = 737.76, *p <0.05)* and Model 2*: (*β = 578.78, *p <0.05).* The effect of core capital on gross NPL was positive which means that an increase in core capital is associated with an increase in gross NPL by 737.76 holding other factors constant. In the presence of control variables, core capital remains significant and positively associated with NPLs it decreases to 578.78. The results imply that banks with higher levels of core capital tend to have higher levels of NPLs. The results were the same when the data was analyzed for the respective bank tiers. Core capital remained positively associated with NPLs in all tiers implying that high levels of core capital lead to higher levels of NPLs.

4.5.2.2 Effect of Capital Adequacy on NPLs

According to the findings in Table 4.11 above, capital adequacy was found not to be significant in the two models; Model 1*: (*β = -14.23, *p > 0.05)* and Model 2*: (*β = -9.58, *p > 0.05)* even though the effect was negative. This implies that there is no clear relationship between capital adequacy and NPLs even with the addition of control variables. The results were the same when data was analyzed for the respective bank tiers. The relationship between capital adequacy and NPLs was statistically insignificant in all the three tiers implying that capital adequacy has no significant influence on the level of NPLs.

4.5.2.3 Effect of Liquidity on NPLs

According to the findings in Table 4.11 above, the effect of liquidity on gross NPL was found not to be significant in Model 1*: (*β = -166.56, *p > 0.05)* and Model 2*: (*β = 441.51, *p > 0.05).* This implies that there is no clear relationship between liquidity and NPLs. However, when data was analyzed for bank tiers liquidity became statistically significant for Tier 1 and 2 implying that an increase liquidity is associated with an increase in NPLs in these banks. For Tier 3 banks, the associated was p>0.05 implying that that there is no clear relationship between liquidity and NPLs in those banks.

4.5.2.4 Effect of Bank Stability on NPLs

The findings in Table 4.11 above show that bank stability was found not to be significant in Model 1*: (*β = -788.97, *p > 0.05).* However, it becomes significant with the addition of control variables in Model 2: *(*β = -1474.82, *p <0.05)* implying a strong relationship between bank stability and NPLs. This means that a unit increase in bank stability will result in reduction in gross NPL by 1474.82 holding other factors constant. The effect of bank stability on gross NPLs was negative. The results imply that banks with higher levels of stability tend to have lower levels of NPLs. However, when data was analyzed for bank tiers, bank stability

remained statistically significant for Tier 1 and 2 but with a very weak negative relationship in Tier 1. This implies that an increase stability is associated with a decrease in NPLs for Tier 1 and 2 banks. For Tier 3 banks, the associated was $p>0.05$ implying that that there is no clear relationship between stability and NPLs in those banks.

4.6 Chapter Summary

This study aimed to answer three research questions; the effect of core capital on NPLs, the effect of capital adequacy on NPLs, the effect of liquidity on NPLs and the effect of bank stability on NPLs. Core capital, capital adequacy, liquidity and bank stability were the aspects of prudential regulation that were used in the study. This chapter showed how data analysis was performed and the diagnostic tests carried out. Correlation analysis was performed to establish and validate predicative relationships. The results show that capital adequacy, stability, interest rate, size, profitability, credit quality variables have significant correlation with NPLs. Moreover, all the significant variables had a positive correlation with NPLs except credit quality.

Panel regression was applied and the results showed that core capital had a significant positive effect on gross NPLs. This means that an increase in core capital is associated with an increase in gross NPL holding other factors constant. In the presence of control variables, core capital remained significant and positively associated with NPLs. The results imply that banks with higher levels of core capital tend to have higher levels of NPLs. Capital adequacy was found not to have a significant effect on NPL even though the effect was negative. This implies that there is no clear relationship between capital adequacy and NPLs even with the addition of control variables.

The effect of liquidity on gross NPL was found not to be significant. This implied that there is no clear relationship between liquidity and NPLs. The effect of bank stability on gross

NPLs was negative. This means that a unit increase in bank stability will result in reduction in gross NPL holding other factors constant. In the presence of control variables, bank stability remained significant and positively associated with NPLs. The results imply that banks with higher levels of stability tend to have lower levels of NPLs. The effect of Covid 19 on NPLs was negligible and not statistically significant.

The next chapter concludes the study by discussing the research findings in the context of the study. It provides explanations for the results in light of contrary findings in previous studies.

CHAPTER FIVE

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter begins by discussing the findings of the study with respect to each research objective. In addressing the objectives of the study, a comparison is made with findings and the literature discussed in empirical review. The chapter then delves into conclusions drawn from the findings and policy recommendations. It concludes by presenting the limitations of the study and presents suggestions of areas for further research.

5.2 Discussion of Findings

The study sought to determine the effect of prudential regulation on NPLs among Kenya banks as the general objective of the study. The aspects for prudential regulation that were used to examine the effect on NPLs were core capital, capital adequacy liquidity and bank stability. NPL was measured as a percentage] of NPLs to TGL. The findings with respect to each aspect of prudential regulation is discussed below.

5.2.1 Effect of Core Capital on NPLs

The first objective of the study was to examine the effect of core capital on NPLs. Core capital is the highest form of capital used to measure a bank's financial strength and provides cushions for banks to absorb losses in times of financial distress. CBK prudential regulations require banks to hold a minimum core capital level of Kenya Shillings 1 billion. The regression results revealed that core capital has a significant effect on NPLs. The coefficient associated with core capital was found to be positive implying that an increase in core capital is associated with an increase in NPLs. This suggest that a higher level of core capital may lead to an increase in NPLs. This could be explained by banks with higher levels of core capital feeling financially secure and inclined to increase lending or take on risker lending.

The findings are counterintuitive to the capital buffer theory in the sense that banks with higher levels of capital are expected to be more resilient. However, high capital buffers could give banks a false sense of security leading them to engage in risker lending practices. This would result in an increase in NPLs.

The findings of the study contradict with the findings of Couiller et al. (2021) who found that banks in USA that had higher levels of core capital had strong loan buffers. Couiller et al. (2021) attributed the reduction in NPLs in the United States to stringent regulatory standards. In Indonesia, Budhijino (2020) studied the relationship between profitability and core capital on NPLs and found that there was no significant effect. The findings of the study do concur with Mwangi (2018) who studied the effect of core capital on bank performance in Ethiopia and found that higher levels of core capital led to excessive lending and an increase in debt stress due to defaults. These studies were conducted in foreign jurisdictions and their findings do not necessarily apply to the Kenya context. From the above, it can be concluded that the prevailing regulatory framework could significantly influence the relationship between core capital and NPLs.

5.2.2 Effect of Capital Adequacy on NPLs

The second objective of the study was to ascertain the influence of capital adequacy on NPLs Capital adequacy requirements are an important component of regulation in the Kenyan banking sector. Capital adequacy ensures banks have sufficient capital to absorb potential losses from risks in their operations and activities. CBK prudential regulations require banks to hold a minimum amount of capital as a percentage of their overall risk weighted assets. The CBK prudential threshold for capital adequacy is 10%. In the study capital adequacy was measured by dividing a bank's capital by its overall risk weighted assets. The results showed that capital adequacy does not have a statistically significant effect on NPLs. This suggests that changes in the level of capital adequacy may not have a substantial impact on

the occurrence and magnitude of NPLs and the impact of policy restriction postulated in the financial repression theory was in this instance negligible.

The findings of the study concur with the findings of Malimi (2017) who studied the impact of capital adequacy, profitability and loan growth on NPLs in Tanzania. He found that capital adequacy had an insignificant influence on NPLs. On the contrary, Chege, Omwaga and Abdul (2019) found that capital adequacy had a positive relationship with NPLs in Kenya. They advocated for stricter capital adequacy regulations. Karagu, Achoki and Kariri (2018) found the use of capital adequacy significant in predicting NPL exposure as did Ngungu and Abdul (2022) who found that capital adequacy had a significant influence on NPL. Muthitu (2020) found that increased credit with minimal capital caused financial pollution brought about by NPLs. It is important to note that the divergent findings could be as a result of the threshold effect deployed in this study where the impact of capital adequacy was nonlinear. Unlike previous studies where the study periods were less than six years, this study analysed data for a period of ten years from 2011 to 2021. The extended period captured a full range of variations in capital adequacy and NPLs thereby providing a more comprehensive assessment and findings.

5.2.3 Effect of Liquidity on NPLs

The third objective of the study was to evaluate the effect of liquidity on NPLs. Liquidity is the ability of a bank to meets its obligations as and when they fall due. Liquidity risk is the probability that a bank may not be able to meet its short term obligations for lack of available funds or because it is unable to liquidate its assets fast enough to meet the obligations. CBK prudential regulations require banks to maintain a minimum liquidity ratio of 20%. Liquidity standards are aimed at ensuring banks have sufficient liquidity buffers to withstand short term funding stresses. In the study liquidity was measured using the ratio of a bank's liquid assets to its total assets. The results showed that liquidity does not have a statistically significant

effect on NPLs. This suggests that changes in the level of liquidity may not have a substantial impact on the occurrence and magnitude of NPLs. When the analysis was done for bank tiers, liquidity was found to have a positive influence on NPLs in Tier 1 and 2 banks but the results remained the same for Tier 3 banks. These findings seem to agree with the credit creation theory which postulates that banks can create a credible lending portfolio though accounting systems and without taking deposits or observing regulatory minimums.

The findings of the study concur with the findings of Ngungu and Abdul (2020) who also studied liquidity and NPLs during the period 2013 to 2017 and found that liquidity did not have a significant relationship with NPLs. On the contrary, Awuor (2015) studied liquidity and NPLs for the period 2010 to 2014 and found that liquidity had a positive influence on NPLs. Makri et al. (2014) examined the predictors of NPLs in Europe and found a significant connection between liquidity and NPLs. Klein (2013) studied liquidity as a determinant of NPLs and found that liquid banks have lower NPLs due to high interest incomes. Jouini and Messai (2013) found that liquidity has a negative effect on NPLs in Italy, Greece and Spain. The contradictory findings could be explained by the different measures of liquidity used in the studies. The impact of liquidity could also be overshadowed by other stronger indicators such as higher levels of core capital, stability and interest rates. It could also mean that changes in liquidity may not immediately manifest in NPLs as could be suggested by the results in this study for Tier 1 and 2 banks where liquidity was found to have a positive influence on NPLs.

5.2.4 Effect of Bank Stability on NPLs

The fourth objective of the study was to establish the effect of bank stability on NPLs. The World Bank adopts use of the z-score as one of the financial ratios to assess the financial stability of banks. The z-score is a useful tool as it takes into account a bank's asset quality, leverage and profitability. It is calculated by taking a bank's EBIT and dividing it by total

assets and adjusting for equity and provisions for bad loans. High z-scores are associated with more financially stable banks while low scores indicate the probability of financial distress. The relationship between bank stability and NPLs was measured using the z-score. The regression results showed that banks stability has a significant effect on NPLs. The coefficient associated with bank stability was found to be negative, indicating that greater stability is associated with lower NPLs. This highlights the importance of promoting and maintaining individual bank stability to mitigate the risk of NPLs. The findings augur with the credit creation theory in the sense that credible loan portfolios are built through overall strong bank stability.

The findings of the study concur with the findings of Ozili (2018) who studied the factors influencing NPLs in 48 European countries and found efficiency and stability as significant predictors. Previously, Beck et al. (2010) had studied stability, efficiency and outreach in Kenyan banks and found that large private banks were more stable due to asset quality and improved liquidity and improved overhead costs. This study analysed the Kenyan context with a measure that took into account equity, EBIT and loan provisions thereby providing a wider perspective on the effect of stability on NPLs. From the above, it could be concluded that stable banks are associated with lower NPLs they have better asset quality, sound liquidity management, capital adequacy and overall performance. This could explain why the results showed that in Tier 3 banks, stability did not have a significant influence on NPLs.

5.3 Conclusions

In the final analysis, the study led to the conclusion that the levels of core capital appear to have a positive impact on NPLs. This suggests that banks with higher amounts of capital lend more and therefore tend to have higher levels of NPLs. It is important for banks to carefully manage their capital allocation and risk management to mitigate the potential impact of NPLs on their financial health. Improved bank stability was linked to a decrease in NPLs. Banks

with higher stability may be regulatory compliant and have more effective risk management practices thus lower levels of NPLs. Enhancing stability through prudent lending practices, effective risk monitoring and better asset quality and liquidity management could be crucial for reducing NPLs. The effect of Covid 19 was insignificant likely due to the very short period of analysis from its inception in 2020 and end of the study period in 2021. Overall, the prevailing regulatory framework could significantly influence the relationship between core capital, bank stability and NPLs. The study has highlighted the importance of core capital and bank stability in the Kenyan banking sector to mitigate the incidence of NPLs. The findings addressed the research objectives on the relationships between these aspects of prudential regulation and NPLs. The study provided empirical evidence and aided in understanding the factors that contribute to the magnitude of NPLs in the Kenyan banking sector.

5.4 Recommendations

Banks are inherently risky institutions due to the nature of their lending business. Based on the findings, the study recommends a proactive risk based approach to supervision. This calls for strengthening of the supervisory system capabilities by investing in skilled personnel and advanced technology for risk based supervision. Potential weaknesses that could lead to rising NPLs require a more proactive rather than reactive approach. The regulator might want to consider introducing stricter criteria for what qualifies as high quality capital to ensure that the necessary buffers are reserved for managing crises. Additionally, policies that support prudent lending practices could contribute to maintaining a healthy banking system with manageable levels of NPLs. Efficient and effective loan recovery mechanisms should be fostered by policy makers to facilitate resolution of NPLs such as special tribunals, streamlining legal processes and entrenching alternative dispute resolution mechanisms. Finally, it is recommended that policy makers should establish mechanisms to monitor and evaluate the effectiveness of policy interventions aimed at addressing NPLs. Regular

assessments of the impact of policy could provide valuable insights and guide policymakers in refining existing policies or introducing new measures to effectively manage NPLs. These recommended policy interventions could promote the reduction of NPLs and ultimately support the resilience of the Kenyan banking sector.

5.5 Limitations of the Study

The quality of reporting of data on the research variables in the individual bank annual reports varied over the study period with improvements noted with time. Sampling was deliberate to get data on all research variables thereby limiting the scope. The research did not factor qualitative information that could be obtained from interviews with stakeholders and did not account for relationships not included in the secondary data. The analysis of this study was also restricted to commercial banks in Kenya yet there are major lenders of debt in the financial system such as micro finance institutions, development finance institutions and mobile/digital lenders who together represent the majority lenders (CBK, 2021).

5.6 Suggestions for Further Research

The study recommends further research on an extended period beyond ten years to provide insights into the cyclical nature of NPLs. The effect of Covid 19 on bank specific factors also needs further investigation. Sector specific analysis to investigate the determinants of NPLs in critical sectors in the Kenyan economy such as agriculture, manufacturing and real estate is required. This might help identity and design targeted policies to address NPL challenges within those sectors that are significant contributors to the growth of the Kenyan economy. It might be useful to undertake research using dynamic modelling to capture interdependencies and feedback effects between NPLs and various factors to enhance the understanding of NPLs in Kenya.

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APPENDICES

Appendix I

LIST OF COMMERCIAL BANKS IN KENYA (2011 -2021)

	Bank	Years in Operation											
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1.	ABC Bank (Kenya)	√	√	√	√	√	√	√	√	√	√	√	√
2.	Absa Bank (formerly Barclays Bank)	√	√	√	√	√	√	√	√	√	√	√	√
3.	Access Bank Kenya Plc (formerly Transnational Bank Kenya Plc)	√	√	√	√	√	√	√	√	√	√	√	√
4.	Bank of Africa Kenya Limited	√	√	√	√	√	√	√	√	√	√	√	√
5.	Bank of Baroda (Kenya) Limited	√	√	√	√	√	√	√	√	√	√	√	√
6.	Bank of India (Kenya)	√	√	√	√	√	√	√	√	√	√	√	√
7.	Consolidated Bank of Kenya	√	√	√	√	√	√	√	√	√	√	√	√
8.	Citibank	√	√	√	√	√	√	√	√	√	√	√	√
9.	Cooperative Bank of Kenya Limited	√	√	√	√	√	√	√	√	√	√	√	√
10.	Credit Bank Limited	√	√	√	√	√	√	√	√	√	√	√	√
11.	Development Bank of Kenya Limited	√	√	√	√	√	√	√	√	√	√	√	√
12.	Diamond Trust Group (DTB Group)	√	√	√	√	√	√	√	√	√	√	√	√
13.	Ecobank Kenya	√	√	√	√	√	√	√	√	√	√	√	√
14.	Equity Bank Kenya	√	√	√	√	√	√	√	√	√	√	√	√
15.	First Community Bank	√	√	√	√	√	√	√	√	√	√	√	√
16.	Family Bank Limited	√	√	√	√	√	√	√	√	√	√	√	√
17.	Guardian Bank Limited	√	√	√	√	√	√	√	√	√	√	√	√
18.	Guaranty Trust Bank (Kenya) Ltd (formerly Fina Bank Kenya)	√	√	√	√	√	√	√	√	√	√	√	√
19.	Gulf African Bank Limited	√	√	√	√	√	√	√	√	√	√	√	√
20.	Habib Bank AG Zurich	√	√	√	√	√	√	√	√	√	√	√	√
21.	I & M Bank Kenya Limited	√	√	√	√	√	√	√	√	√	√	√	√

22.	KCB Bank Kenya Limited	√	√	√	√	√	√	√	√	√	√	√	√
23.	Kingdom Bank Ltd (formerly Jamii Bora Bank)	√	√	√	√	√	√	√	√	√	√	√	√
24.	Middle East Bank Limited	√	√	√	√	√	√	√	√	√	√	√	√
25.	M Oriental Bank (formerly Oriental Commercial Bank Limited)	√	√	√	√	√	√	√	√	√	√	√	√
26.	National Bank of Kenya	√	√	√	√	√	√	√	√	√	√	KCB	KCB
27.	Paramount Universal Bank	√	√	√	√	√	√	√	√	√	√	√	√
28.	Prime Bank Kenya Limited	√	√	√	√	√	√	√	√	√	√	√	√
29.	SBM Bank (Kenya) Limited (formerly Fidelity Commercial Bank Limited)	√	√	√	√	√	√	√	√	√	√	√	√
30.	Sidian Bank (formerly K-Rep Bank)	√	√	√	√	√	√	√	√	√	√	√	√
31.	Spire Bank (formerly Equatorial Commercial Bank)	√	√	√	√	√	√	√	√	√	√	√	√
32.	Stanbic Holdings Plc (formerly Cfc Stanbic Holdings Limited)	√	√	√	√	√	√	√	√	√	√	√	√
33.	Standard Chartered Bank Kenya Limited (Stanchart Limited)	√	√	√	√	√	√	√	√	√	√	√	√
34.	United Bank for Africa Kenya Limited (UBA Kenya)	√	√	√	√	√	√	√	√	√	√	√	√
35.	Victoria Commercial Bank (VCB)	√	√	√	√	√	√	√	√	√	√	√	√
36.	Commercial Bank of Africa	√	√	√	√	√	√	√	√	√	NCBA	NCBA	NCBA
37.	NIC Bank	√	√	√	√	√	√	√	√	√	NCBA	NCBA	NCBA
38.	Dubai Islamic Bank (DIB)	*	*	*	*	*	*	*	√	√	√	√	√
39.	Giro Commercial Bank	√	√	√	√	√	√	√	I&M	I&M	I&M	I&M	I&M
40.	Habib Bank Limited	√	√	√	√	√	√	√	*	*	*	*	*
41.	HCF Kenya Limited	*	*	*	*	*	*	√	√	√	√	√	√

42.	Mayfair CIB Bank Limited	*	*	*	*	*	*	*	√	√	√	√	√
43.	NCBA Bank Kenya Plc	*	*	*	*	*	*	*	*	*	√	√	√
44.	Charter House Bank	√	**	**	**	**	**	**	**	**	**	**	**
45.	Chase Bank	√	√	√	√	√	**	**	**	**	**	**	**
46.	Imperial Bank Limited	√	√	√	√	√	**	**	**	**	**	**	**
47.	Dubai Bank Kenya Limited	√	√	√	√	√	**	**	**	**	**	**	**

√ In operation

* Not in operation

** In receivership/ statutory administration/liquidation

Appendix II

BANK TIERS

NO.	BANK		
1.	Equity Bank Kenya Ltd	Family Bank Ltd	Diamond Trust Bank Kenya Ltd
2.	KCB Bank Kenya Ltd	Prime Bank Ltd	National Bank of Kenya Ltd
3.	Co-operative Bank of Kenya Ltd	Guaranty Trust Bank	Sidian Bank Limited
4.	Absa Bank Kenya Plc	First Community Bank	Kingdom Bank Ltd
5.	Standard Chartered Bank Kenya Ltd	Habib AG Zurich	SBM Bank Kenya Ltd
6.	I&M Bank Ltd	Gulf African Bank Ltd	Credit Bank Ltd
7.	Stanbic Bank Kenya Ltd	Ecobank Kenya Ltd	Paramount Bank Ltd
8.	Bank of Baroda (Kenya) Limited	Bank of Africa (K) Ltd	Middle East Bank (K) Ltd
9.	Citibank N.A. Kenya		Guardian Bank Ltd
10.	Bank of India		African Banking Corporation Ltd
11.			Access Bank Plc
12.			M-Oriental Commercial Bank Ltd
13.			Development Bank of Kenya
14.			Consolidated Bank of Kenya
15.			Spire Bank Limited
16.			UBA Kenya Bank Ltd
17.			Victoria Commercial Bank Limited

Appendix III

ETHICAL APPROVAL

Strathmore UNIVERSITY

11th April 2023

Ms Lunani Barbara Khakasa,
barbara.lunani@strathmore.edu

Dear Ms Lunani,

RE: The Effect of Prudential Regulations on Non-Performing Loans among Kenyan Banks

This is to inform you that SU-ISERC has reviewed and approved your above SU- master's research proposal. Your application reference number is SU-ISERC1679/23. The approval period is from **11th April 2023 to 10th April 2024.**

This approval is subject to compliance with the following requirements:

i. Only approved documents including (informed consents, study instruments, and MTA) will be used
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-ISERC.
iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-ISERC within 48 hours of notification
iv. Any changes, anticipated or otherwise, that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-ISERC within 48 hours
v. Clearance for the export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to the expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days of completion of the study to SU-ISERC.

Before commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) https://research-portal.nacosti.go.ke/ and obtain other clearances needed.

Yours sincerely,

for. **Dr Ben Ngoye,**
Secretary; SU-ISERC

Cc: Mr Ambrose Rachier,
Chairperson; SU-ISERC

STRATHMORE UNIVERSITY INSTITUTIONAL SCIENTIFIC AND ETHICAL REVIEW COMMITTEE
(SU-ISERC)
12-Apr-2023
P.O BOX 59857-00200
NAIROBI-KENYA

Appendix IV

NACOSTI PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 980809

Date of Issue: 05/April/2023

RESEARCH LICENSE

This is to Certify that Ms.. Barbara Khakasa Lonani of Strathmore University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: The Effect of Prudential Regulation on Non-Performing Loans among Kenyan Banks for the period ending : 05/April/2024.

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THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013 (Rev. 2014)
Legal Notice No. 108: The Science, Technology and Innovation (Research Licensing) Regulations, 2014

The National Commission for Science, Technology and Innovation, hereafter refereed to as the Commission, was the established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advice the Government in matters related thereto.

CONDITIONS OF THE RESEARCH LICENSE

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
    i. Endanger national security
    ii. Adversely affect the lives of Kenyans
    iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
    iv. Result in exploitation of intellectual property rights of communities in Kenya
    v. Adversely affect the environment
    vi. Adversely affect the rights of communities
    vii. Endanger public safety and national cohesion
    viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
4. The license any rights thereunder are non-transferable
5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
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11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

National Commission for Science, Technology and Innovation(NACOSTI),
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