EFFECT OF CREDIT RISK MANAGEMENT ON FINANCIAL PERFORMANCE OF COMMERCIAL BANKS LISTED AT THE NAIROBI SECURITIES EXCHANGE, KENYA

ONANG’O OMURWA NYABICHA

D53/5930/2003

A THESIS SUBMITTED TO THE SCHOOL OF BUSINESS IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE (FINANCE) OF KENYATTA UNIVERSITY

JULY 2017
DECLARATION

This research thesis is my original work and has not been presented for examination in any other University. No part of this thesis may be reproduced without prior permission of the author and/or Kenyatta University.

Signed __________________________ Date________________
Onang’o O. Nyabicha
D53/5930/2003

Supervisors

We confirm that the work in this thesis was done by the candidate under our approval as University Supervisors.

Signed____________________________ Date_________________
Ngaba Dominic K.
Department of Accounting and Finance,
Kenyatta University

Signed____________________________ Date_________________
Muturi James M.
Department of Accounting and Finance
Kenyatta University
DEDICATION

Dedicated to my wife (Margaret), children (Masereti, NyaboKE, Gesare and Omurwa)
ACKNOWLEDGEMENT

I am grateful to my supervisors (Mr. Dominic Ngaba and Mr. James Muturi) for showing great interest and faith in my work and working tirelessly even over weekends to ensure that this project is a success. I truly appreciate their guidance and valuable comments. My greatest gratitude also extends to Professor Judi Wakhungu who encouraged me to take up this course and approved funding for tuition for the first semester through the African Centre for Technology Studies (ACTS).

To all my former colleagues at ACTS, who encouraged me to take up this course, I say a resounding thank you. Finally, I acknowledge the great assistance and support of my family who allowed me to pursue this project, despite an already crowded and sometime overloaded work schedule and family commitments, which further limited my availability outside of normal work hours.
# TABLE OF CONTENTS

DECLARATION ........................................................................................................... ii
DEDICATION ............................................................................................................... iii
ACKNOWLEDGEMENT ............................................................................................... iv
TABLE OF CONTENTS ............................................................................................... v
OPERATIONAL DEFINITION OF TERMS ................................................................... viii
ABBREVIATION AND ACRONYMS ............................................................................. x
LIST OF TABLES .......................................................................................................... xi
LIST OF FIGURES ....................................................................................................... xii
ABSTRACT .................................................................................................................. xii

## CHAPTER ONE: INTRODUCTION ................................................................. 1

1.1 Background of the Problem ................................................................................. 1
  1.1.1 Credit Risk Management in Kenyan Banks ....................................................... 4
  1.1.2 Bank Stock Performance in Kenya ..................................................................... 6
1.2 Statement of the Problem ...................................................................................... 7
1.3 Objectives of the Study .......................................................................................... 8
  1.3.1 General Objective .............................................................................................. 8
  1.3.2 Specific objectives ............................................................................................. 8
1.4 Hypothesis of the Study ....................................................................................... 9
1.5 Significance of the Study ..................................................................................... 9
1.6 Scope of the Study ............................................................................................... 9
1.7 Limitation of the Study ....................................................................................... 10
1.8 Organization of the Study ................................................................................... 10

## CHAPTER TWO: LITERATURE REVIEW .................................................. 11

2.1 Introduction .......................................................................................................... 11
2.2 Theoretical Review .............................................................................................. 11
  2.2.1 The Financial Economic Theory ....................................................................... 11
  2.2.2 New Institutional Economists Theory ............................................................... 12
  2.2.3 Agency Theory .................................................................................................. 12
  2.2.4 Stakeholder Theory .......................................................................................... 13
  2.2.5 Portfolio Theory ............................................................................................... 13
  2.2.2 Classification of Risks ....................................................................................... 15
2.3 Empirical Review ............................................................................................... 16
  2.3.1 Capital Adequacy and Performance of Commercial Banks ......................... 20
  2.3.5 Loss Given Default and Performance of Commercial Banks ....................... 21
  2.3.6 Loan Loss Provisions and Performance of Commercial Banks ................... 22
  2.3.7 Non-Performing Loans and Performance of Commercial Banks ................ 22

v
CHAPTER THREE: RESEARCH METHODOLOGY .................................................. 28
  3.1 Introduction ....................................................................................... 28
  3.2 Research Philosophy ...................................................................... 28
  3.3 Research Design .............................................................................. 28
  3.4 Empirical Model .............................................................................. 29
    3.4.1 Operationalization and Measurement of Variables ...................... 30
    3.4.2 Variable Definitions ................................................................... 32
  3.5 Target Population ............................................................................ 32
  3.6 Sample Design ................................................................................ 32
  3.7 Data Collection Instruments ............................................................. 33
  3.8 Data Collection Procedure ............................................................... 33
  3.9 Validity ............................................................................................. 34
  3.10 Data Reliability .............................................................................. 34
  3.11 Ethical Issues .................................................................................. 34
  3.12 Data Analysis and Presentation ....................................................... 35
  3.13 Diagnostic Tests ............................................................................. 35
    3.13.1 Hausman Test ........................................................................... 35
    3.13.2 Normality Test .......................................................................... 36
    3.13.3 Stationarity Test ........................................................................ 37
    3.13.4 Panel Cointegration Test ............................................................ 37
    3.13.5 Multicollinearity Test ................................................................. 38
    3.13.6 Heteroscedasticity Test ............................................................... 39
    3.13.7 Panel Cross-Section Dependence Test ........................................ 39
    3.13.8 Serial Correlation ..................................................................... 40

CHAPTER FOUR: RESEARCH FINDINGS AND INTERPRETATIONS .................. 41
  4.1 Introduction ...................................................................................... 41
  4.2 Diagnostic and Specification Tests ................................................... 41
    4.2.1 Descriptive Statistics ................................................................ 41
    4.2.1 The Hausman Test Results .......................................................... 42
    4.2.2 The Normality Test Results ......................................................... 42
    4.2.3 Stationarity Test Results ............................................................... 43
    4.2.4 Multicollinearity Test Results ....................................................... 46
    4.2.5 Heteroscedasticity Test Results ................................................... 47
    4.2.6 Cross-section Dependence Test ................................................... 47
    4.2.7 Serial Correlation ...................................................................... 48
  4.3.1 Effect of the Capital Adequacy Ratio on performance by commercial banks in Kenya ....................................................................................................................... 49
4.3.2 Effect of Loss Given Default Ratio on performance by commercial banks in Kenya ................................................................. 49

4.3.3 Effect Loan Loss Provisions Ratio on performance by commercial banks in Kenya ........................................................................ 50

4.3.4 Effect of Non-Performing Loans Ratio on performance by commercial banks in Kenya ................................................................. 50

4.3.5 The Overall Model ............................................................................................................................... 51

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS .... 52
5.1 Introduction ...................................................................................................................................... 52

5.2 Summary ........................................................................................................................................ 52

5.3 Conclusions ..................................................................................................................................... 53

5.4 Recommendations and Policy Implications .................................................................................... 53

5.5 Areas for Further Research ............................................................................................................. 54

REFERENCES ...................................................................................................................................... 56

APPENDIX A: COVER LETTER ............................................................................................................. 61

APPENDIX B: DOCUMENT REVIEW TOOL .......................................................................................... 62

APPENDIX C: LIST OF LICENSED COMMERCIAL BANKS IN KENYA ................................................ 65

APPENDIX D: LISTED COMMERCIAL BANKS ON NAIROBI SECURITIES EXCHANGE INCLUDED IN THE SAMPLE .............................................................. 67
## OPERATIONAL DEFINITION OF TERMS

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asset Securitization</strong></td>
<td>The packaging of assets or obligations into securities for sale to third parties.</td>
</tr>
<tr>
<td><strong>Bank Performance</strong></td>
<td>Analysis of bank performance in terms of market price per share.</td>
</tr>
<tr>
<td><strong>Concentration risk</strong></td>
<td>Additional portfolio risk resulting from increased exposure to a borrower, or to a group of correlated borrowers.</td>
</tr>
<tr>
<td><strong>Credit risk management</strong></td>
<td>The practice of mitigating credit risk losses by understanding the adequacy of both a bank’s capital and loan loss reserves at any given time</td>
</tr>
<tr>
<td><strong>Credit Risk Mitigation</strong></td>
<td>A range of techniques whereby a bank can partially protect itself against counterparty default (for example, by taking guarantees or collateral, or buying a hedging instrument).</td>
</tr>
<tr>
<td><strong>Credit Risk</strong></td>
<td>The risk of loss arising from a credit event, such as default by a creditor or counterparty.</td>
</tr>
<tr>
<td><strong>Credit</strong></td>
<td>The use or possession of goods or services without immediate payment.</td>
</tr>
<tr>
<td><strong>External Credit Assessments</strong></td>
<td>Ratings issued by private or public agencies.</td>
</tr>
<tr>
<td><strong>Internal Ratings</strong></td>
<td>The result of a bank’s own measure of risk in its credit portfolio.</td>
</tr>
<tr>
<td><strong>Internal Ratings-Based Approach</strong></td>
<td>An approach to credit risk under which banks will be allowed to use their internal estimates of borrower creditworthiness to assess the credit risk in their portfolios, subject to strict methodological and disclosure standards.</td>
</tr>
<tr>
<td><strong>Loss Given Default</strong></td>
<td>The percentage loss rate suffered by a lender on a credit exposure if the obligor defaults.</td>
</tr>
<tr>
<td><strong>Pillar I</strong></td>
<td>The minimum ratio of capital to risk weighted assets</td>
</tr>
<tr>
<td><strong>Pillar II</strong></td>
<td>The supervisory review pillar, which requires supervisors to undertake a qualitative review of their bank’s capital allocation techniques and compliance with relevant standards.</td>
</tr>
</tbody>
</table>
Pillar III: The disclosure requirements, which facilitate market discipline points in time.

Risk weighted Assets: These are all assets held by the bank weighted by credit risk according to a formula determined by the Regulator (usually the country's Central Bank).

Tier 1 capital: is the core measure of a bank’s financial strength from a regulator’s point of view.

Tier 2 Capital: They include undisclosed reserves, revaluation reserves, general provisions/general loan-loss reserves and hybrid debt capital instruments and subordinated term debt of the bank.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5Cs</td>
<td>Character, Condition, Collateral, Capital and Capacity</td>
</tr>
<tr>
<td>BBK</td>
<td>Barclays Bank of Kenya</td>
</tr>
<tr>
<td>BCBS</td>
<td>Basel Committee on Banking Supervision</td>
</tr>
<tr>
<td>BIS</td>
<td>Bank for International Settlements</td>
</tr>
<tr>
<td>BLUE</td>
<td>Best Linear Unbiased Estimator</td>
</tr>
<tr>
<td>CAMELS</td>
<td>Capital adequacy, Asset quality, Management, Earnings, Liquidity, Sensitivity to market risk</td>
</tr>
<tr>
<td>CAR</td>
<td>Capital Adequacy Ratio</td>
</tr>
<tr>
<td>CFC</td>
<td>CFC-Stanbic Bank</td>
</tr>
<tr>
<td>COOP</td>
<td>Cooperative Bank of Kenya#</td>
</tr>
<tr>
<td>DTB</td>
<td>Diamond trust Bank</td>
</tr>
<tr>
<td>EQ</td>
<td>Equity Bank</td>
</tr>
<tr>
<td>FSD</td>
<td>Financial Sector Deepening</td>
</tr>
<tr>
<td>GARP</td>
<td>Global Association of Risk Management Professionals</td>
</tr>
<tr>
<td>HF</td>
<td>Housing Finance Company</td>
</tr>
<tr>
<td>IFRS</td>
<td>International Financial Reporting Standards</td>
</tr>
<tr>
<td>KCB</td>
<td>Kenya Commercial Bank</td>
</tr>
<tr>
<td>LGD</td>
<td>Loss given default</td>
</tr>
<tr>
<td>NB</td>
<td>National Bank of Kenya</td>
</tr>
<tr>
<td>NGOs</td>
<td>Non-Governmental Organizations</td>
</tr>
<tr>
<td>NIC</td>
<td>National Industrial Credit Bank</td>
</tr>
<tr>
<td>NPL</td>
<td>Non-performing Loan</td>
</tr>
<tr>
<td>NPLR</td>
<td>Non-performing loans Ratio</td>
</tr>
<tr>
<td>NSE</td>
<td>Nairobi Security Exchange</td>
</tr>
<tr>
<td>PD</td>
<td>Probability of default</td>
</tr>
<tr>
<td>RAROC</td>
<td>Risk adjusted return on capital</td>
</tr>
<tr>
<td>ROA</td>
<td>Return on Assets</td>
</tr>
<tr>
<td>ROE</td>
<td>Return on Equity</td>
</tr>
<tr>
<td>ROSCA</td>
<td>Rotating Savings and Credit Associations</td>
</tr>
<tr>
<td>RWA</td>
<td>Risk Weighted Asset</td>
</tr>
<tr>
<td>SACCO</td>
<td>Savings and Credit Cooperative Society</td>
</tr>
<tr>
<td>SCB</td>
<td>Standard Chartered Bank of Kenya</td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table 4.1: Group Descriptive Statistics ................................................................. 40
Table 4.2: Hausman Test Results .............................................................................. 41
Table 4.3: Abnormal Returns Unit Root Test Results ............................................... 42
Table 4.4: Capital Adequacy Ratio Unit Root Test Results ....................................... 43
Table 4.5: Loss Given Default Ratio Unit Root Test Results .................................... 43
Table 4.6: Loan Loss Provision Ratio Unit Root Test Results ................................... 44
Table 4.7: Non-Performing Loan Ratio Unit Test Results ....................................... 44
Table 4.8: Panel Cointegration Test Results .............................................................. 44
Table 4.9: Multicollinearity Test Results .................................................................. 45
Table 4.10: White Heteroscedasticity Test Results ................................................... 46
Table 4.11: Cross-section Dependence Test .............................................................. 46
Table 4.12: Cross-Section Dependence Test With Lag .......................................... 47
Table 4.13: Panel Regression Output ........................................................................ 47
LIST OF FIGURES

Figure 1.1 Line Graphs of Annual Stock Prices 2008-2013 .................................................. 7
Figure 2.1: Typology of Risks (adapted from Crouhy, Galai & Mark, 2014) .................. 16
Figure 2.2: Conceptual model ............................................................................................... 26
Figure 4.1: Normality Test Results.......................................................................................... 42
ABSTRACT

One of the major roles that banks in the Kenyan economy play is credit creation. Credit creation comes with risks and credit risk is the most critical risk. Credit risk needs to be management prudently as it impacts negatively on performance. It is thus important to study how various banks manage credit risk for effective policy. This main study sought to find the effect of credit risk management on the performance of commercial banks listed at the Nairobi Securities exchange in Kenya. The specific objectives were to find the effects of capital adequacy ratio, loss given default ratio, loan loss provision ratio and non-performing loans ratio on the performance of the banks. The independent variables of the study were capital adequacy ratio, loss given default ratio, loan loss provision ratio and non-performing loans ratio while dependent variable was the abnormal stock return. Relevant theoretical and empirical literature was reviewed and gaps identified to inform the study. The population of the study was the forty four licensed commercial banks in Kenya as at December 2014, as per the latest data available by the time the study was being conducted. A purposive sample of ten banks was selected based on the criteria that they were listed and had complete data for the period under study. Secondary data for the construction of the variables under study was collected from the financial statements and the Nairobi security exchange was collected the sample period. Data was diagnosed for and treated, where necessary, of the problems of panel regression. Using a longitudinal study design and a random effects model specification a panel Estimate Generalized Least Squares regression was done on the data using eviews software. Adopting a 5% non-directional test of hypothesis, the study found a statistically no significant relationship between capital adequacy ratio and bank stock performance in Kenya, a statistically no significant relationship between loss given default ratio and bank stock performance in Kenya, a statistically no significant relationship between loan loss provision ratio and bank stock performance in Kenya and a statistically significant negative relationship between non-performing loan ratio and bank stock performance in Kenya. The study concluded that, at 5% significance level, capital adequacy ratio, loss given default ratio and loan loss provision ratio had statistically no significant effect on bank stock performance while non-performing loans ratio had negative and statistically effect on bank stock performance in Kenya for the period under study. The study recommended that given the current supervisory and regulatory policy frameworks for banks, credit risk managers should be less concerned with adjustments in the ratios of capital adequacy ratio, loss given default ratio and loan loss provision ratio as the values of these ratios have no significant effects on performance but should instead be more prudent on the management of the non-performing loans ratio as it has a significant effect on performance, that the current regulatory policy requirements on capital adequacy ratios, loss given default ratios and loan loss provisions ratios should be maintained and that future studies in this area be carried out for longer study periods and more independent variables, in order to bring out the true picture of the effect of the independent variables on the dependent variables of the study.
CHAPTER ONE
INTRODUCTION

1.1 Background of the Problem

Banks play a major role in all the economic and financial activities in modern society. One of the core activities of the banking industry worldwide and, in particular Kenya, is the creation of credit to deserving and deficit units of the economy. Credit creation is the main income generating activity for the banks but this activity involves huge risks to both the lender and the borrower. Banks are subjected to a wide array of risks in the course of their operations and generally banking risks fall into three categories: financial, operational, and environmental risks (Greuning & Bratanovic, 2009). The risk of a trading partner not fulfilling his or her obligation as per the contract on due date or anytime thereafter can greatly jeopardize the smooth functioning of a bank’s business. On the other hand, a bank with high credit risk has high bankruptcy risk that puts the depositors in jeopardy. Among the risk that face banks, credit risk is one of great concern to most bank authorities and banking regulators. This is because credit risk is one risk that can easily and most likely prompts bank failure.

Credit creation calls for prudent management of the risks associated with it. According to (Chijoriga, 2011) credit risk is the most critical and expensive risk associated with financial institutions and its impact on performance is quite significant compared to any other risk associated to the banking sector as it is a direct threat to solvency of the institution.

The presence and importance of credit risk calls for its prudent measurement and management for good financial health of any financial institution. Credit risk measurement and management has evolved dramatically over the last 20 years in
response to a number of secular forces that have made it more important than ever before. Among these forces have been a worldwide structural increase in the number of bankruptcies, a trend towards disintermediation by the highest quality and largest borrowers, more competitive margins on loans, a declining value of real assets (and thus collateral) in many markets and a dramatic growth of off-balance sheet instruments with inherent default risk exposure, McKinsey (as cited in Bams and Ebrahimnejad 2010) including credit risk derivatives.

In response to these forces academics and practitioners alike have responded by developing new and more sophisticated credit risk measurement and management strategies including credit-scoring/early-warning systems, moved away from only analysing the credit risk of individual loans and securities towards developing measures of credit concentration risk (such as the measurement of portfolio risk of fixed income securities), where the assessment of credit risk plays a central role, developing new models to price credit risk (such as the- risk adjusted return on capital models (RAROC)) and developing models to measure better the credit risk of off-balance sheet instruments (Altman and Saunders, 1998).

One of the major developments in credit risk management are the so-called Basel Committee on Banking Supervision (BCBS) regulations for banks and other financial institutions. For instance, Basel I, and Basel II and Basel III represent the banking supervision accords proposed by the Basel Committee (Felix and Claudine, 2008). Basel I, also known as 1988 Basel Accord, implemented a framework for a minimum capital standard of 8% for commercial banks. This was enforced by law in the G10 countries in 1992. Basel I with focus on credit risk considers the minimum capital requirement as the main tool to prevent banks from taking excessive risk. The main reason was the belief
that a well-designed structure of incentives is more effective than structural controls. Basel I contributed to the financial stability by creating conditions for equal competition amongst banks across borders. However, several issues such as lack of risk sensitive measures of the creditworthiness and weak incentives for banks to strengthen risk management system emerged as shortcomings. These stimulated significant opportunities for regulatory arbitrage such as the increase of off balance-sheet exposure. It was revealed that Basel I was unable to provide an adequate response to the changing global context. Consequently, Basel II came into effect to better reflect banks’ underlying risk and response to financial innovation like securitization. Basel II is based on three mutually reinforcing pillars: minimum capital requirements (Pillar I), the supervisory review process (Pillar II) and market discipline (Pillar III) (Dierick, Pires, Scheicher and Spitzer, 2005).

The purpose of Basel II is to create an international standard about how much capital banks need to put aside to guard against the types of risk banks face. In practice, Basel II tries to achieve this by setting up meticulous risk and capital management requirements aimed at ensuring that a bank holds capital reserves appropriate to the risks the bank exposes itself to. These rules imply that the greater risk which bank is exposed to, the greater the amount of capital a bank needs to hold to safeguard its solvency (Jeitshko and Jeung, 2005).

Credit risk management and its implications on banking sector performance have been fraught with difficulties and challenges that ultimately results to poor banking performance that incubate tendency and leading to unfavourable banking performance with unclear balance sheet, bank failure and crisis in the financial sector leading to a systemic risk and thus have a negative functional ramification on economic growth.
The strategies for credit risk management include transferring to another party, avoiding the risk, reducing the negative effects of the risk, and accepting some or all of the consequences of a particular risk. The very nature of the banking business is so sensitive because more than 85% of their liability is deposits from depositors (Saunders & Cornett, 2008). Banks use these deposits to generate credit for their borrowers, which in fact is a revenue generating activity for most banks. This credit creation process exposes the banks to high default risk which might lead to financial distress including bankruptcy. All the same, beside other services, banks must create credit for their clients to make some money, grow and survive stiff competition at the market place.

1.1.1 Credit Risk Management in Kenyan Banks

Despite the BCBS regulations the current global financial crisis indicates that risk management of the financial institutions is not adequate enough. This leads to the failure of the banks in highly challenging financial market. The Central Bank of Kenya report (2013) has indicated that the major issues facing the banking industry include new regulations especially with the passing of the new constitution where the CBK requires financial institutions to build up their minimum core capital requirement to Kenya shillings 1 Billion, the global crisis experienced worldwide affected banking industry in Kenya and more so the mobilization of deposits and trade reduction and the declining interest margins.

Kenyan banks must devise credit risk management strategies that will enable them to meet regulatory requirements by the BCBS and CBK and yet stay in profitability. Credit risk management strategies are designed and applied both internally as an operational tool by bank management and externally by bank regulatory authorities to manage the
financial health of the banking sector. The focus of such policies are the needs for asset diversification; maintenance of balance between returns and risk, bank asset quality and ensuring safety of depositors funds. The failure of various regulatory frameworks designed by the supervisory authorities and inability of technological innovations to stem rising toxic assets in many banks constitute matters of grave concern for stakeholders in both developed and developing nations financial systems; Sinkey (1998), Saunders and Cornett (2008) and BCBS (2004) Management of bank credit risk relates to the minimization of the potential that a bank borrower or counter-party will fail to meet its obligations in accordance with agreed terms (BCBS, 2004).

In a bid to maximize profits and ensure safety of depositors funds, banks act as delegated monitors on behalf of lenders (depositors) using various innovations, technologies and procedures to enforce credit contracts. These measures notwithstanding, banking operations are still exposed to some inherent credit risks including borrowers’ outright default; unwillingness or inability to meet credit commitment due to the vagaries of business activities or other environmental dynamics (Bidani, Mitra and Kumar, 2004). Credit management frameworks therefore become imperative tools in decision-making that relates to loan-pricing, delegating lending powers, mitigating or migrating as well as managing incidences of credit risk on the bank’s overall portfolio.

Most studies on credit risk management posit that there is a positive relationship between effective credit risk management and banks’ profitability while some of these studies support the notion that there is a negative relationship between them (Alshatti, 2015). Some studies that found a positive relationship between credit risk management and bank performance include those of Hosna, Manzura and Juanjuan (2009) who found Non-performing loans indicator affects (ROE) more than capital adequacy ratio, Aruwa and
Musa (2012) who found a strong positive relationship between risk components and the banks’ financial performance, although the direction of the effect is not specified, and Boahene, Dasah and Agyei (2012) who also found a positive relationship between credit risk and bank profitability. On the other hand Musyoki and Kadubo (2012), assessing various parameters pertinent to credit risk management as it relates to banks’ financial performance, found an inverse impact of the parameters under study on banks’ financial performance. This result is duplicated by Kaaya and Pastory (2013) who showed that credit risk indicators negatively affected on the bank performance.

1.1.2 Bank Stock Performance in Kenya

All banks in Kenya, just like their counterparts in other parts of the world, are subject to the Basel Committee and the country specific monetary authorities regulations. In Kenya the monetary authority is the Central Bank of Kenya (CBK). With the implementation of Basel I, II and III and the CBK supervisory regulations, Kenyan banks are expected to have effectively managed all types of risks that face them. Basel I of 1988 initially focused on credit risk but was subsequently refined to incorporate market risk. Basel II of 2004 was designed to address financial innovation and improve the regulatory capital requirements to reflect underlying risks. It also addressed operational risk and provided a risk-based supervisory framework. Basel III of 2010 incorporated new and tougher rules for capital and liquidity in the banking sector and thus addresses both firm specific and systematic risks.

A closer look at the pattern of bank stock prices at the Nairobi Security Exchange shows that while the bank stock prices have almost a similar (Martingale) pattern over time some bank stocks have higher reactions to changes in the underlying factors at various periods than others (see figure 1.1). This begs the question as to whether these differences in reactions would be due to the various bank specific risks and the way they are
managed. Morck, Yeung and Yu (2000) posit that “stock returns reflect new market-level and firm-level information. The extent to which stock returns move together therefore depends on the relative amounts of market- and firm-level information. Other factors being equal, markets that operate in an institutionally sound environment with proper investor protection and better accounting transparency produce more firm-specific information and therefore exhibit more asynchronous price movements”

**Figure 1.1 Line Graphs of Annual Stock Prices 2008-2013**

![Line Graphs of Annual Stock Prices 2008-2013](image)

*Source: CBK Bank Supervision data*

**1.2 Statement of the Problem**

The existence of BCBS and CBK requirements imply that commercial banks in Kenya must employ various risk management techniques for them to meet the performance thresholds set by these institutions. Kenyan banks have also not been spared by the 2007 global financial crisis. The strategies and the extent to which those strategies are being used by Kenyan banks to maintain the required benchmarks and remain profitable are largely unexplored. Studies on the impact of risk management on performance of commercial banks have mixed findings (see Hosna, Manzura and Juanjuan, 2009; Aruwa and Musa, 2012; Boahene, Dasah and Agyei, 2012; Musyoki and Kadubo (2012), and Kaaya and Pastory, 2013). The literature reviewed shows that the studies done have not used the same but different measures of bank performance such as ROI, ROA and ROE,
in addition to different risk measures, thus the varied results. Most of these studies have been outside Kenya and are in the distant past.

From the foregoing it would be seen that the debate on the impact of risk management on bank performance is not conclusive. This study sought to fill the gap and empirically add to the existing literature by specifically looking at capital adequacy, loss given default, loan loss provisions and non-performing loans ratios as the independent variables and the bank stock performance as the dependent variable. The study also used more recent data. The use of stock performance, rather than the traditionally balance sheet based measures of performance was a strength for this study as it broadened the empirical literature in this area.

1.3 Objectives of the Study

1.3.1 General Objective
The general objective of the study was to determine the effect of credit risk management on financial performance of commercial banks listed on the Nairobi Securities Exchange in Kenya.

1.3.2 Specific objectives
i. Determine the effect of the Capital Adequacy Ratio on performance by commercial banks in Kenya.

ii. Establish the effect of Loss Given Default Ratio on performance by commercial banks in Kenya

iii. Determine the effect Loan Loss Provisions Ratio on performance by commercial banks in Kenya

iv. Establish the effect of Non-Performing Loans Ratio on performance by commercial banks in Kenya.
1.4 Hypothesis of the Study

The following four null hypotheses were tested in this study;

\( H_{01} \): Capital Adequacy Ratio does not have a significant effect on bank performance in Kenya.

\( H_{02} \): Loss Given Default Ratio management does not have a significant effect on bank performance in Kenya.

\( H_{03} \): Loan Loss Provision Ratio does not have a significant effect on bank performance in Kenya.

\( H_{04} \): Non-Performing Loans Ratio does not have a significant effect on bank performance in Kenya.

1.5 Significance of the Study

The findings of the study will make a contribution to the emerging body of knowledge dedicated to bringing to the fore all the pertinent issues related to commercial bank credit management. This study will be useful to commercial banks credit officers and the various regulators like the Central bank of Kenya, Capital Markets Authority. Additionally, the findings will also form a basis for debate and future research in credit risk management.

1.6 Scope of the Study

This study investigated credit risk management practices of 11 licensed commercial banks which were listed on the Nairobi Securities Exchange in Kenya for seven years from 2008 to 2014. The variables of the study were the capital adequacy ratio, loss given default ratio, loan loss provision ratio, non-performing loans ratio and performance. The study was conducted by using secondary data from published annual reports from banks, NSE and from returns submitted to Central bank of Kenya.
1.7 Limitation of the Study

The study included only commercial banks whose shares are traded on the Nairobi Securities Exchange in Kenya. Therefore, the results cannot be generalized to all the forty-four commercial banks in Kenya. KCB, Equity Bank, Barclays Bank and Standard Chartered are comparable to each other but not to other banks in the survey since they are twice as large as each of the other bank in the sample. Moreover, unlike other eight banks in the study, the Government of Kenya is a major shareholder in KCB, NBK and Co-op bank. This would introduce difficulties in comparability within the sample. In addition, this also can influence the credit risk management approach, described as more prudent than that in other banks. Also the number of independent variables could be more than three since there are other factors affecting the share price with the same prediction level. Finally, the study used quantitative approach and focused on the description of the outputs from the eviews hence ignoring qualitative aspects of credit management.

1.8 Organization of the Study

This thesis is structured as follows: the foregoing chapter one provides the research background, research objectives, significance of the study, scope, and the limitations encountered in the course of the study. Chapter two presents literature review on the effects of credit management on the financial performance of commercial banks and a conceptual framework. Chapter three deals with the methodology employed in the study; the study findings and their interpretation are presented in chapter four; while chapter five has conclusions of the study and the policy implications.
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction
This chapter explores the literature review based on the variables under study. The literature is divided into two main parts - theoretical and empirical literature review on various aspects of risk management and bank performance. This is followed a discussion on the literature gap and a presentation of the conceptual framework for this study.

2.2 Theoretical Review
Credit risk management may be defined as the combination of coordinated tasks and activities for controlling and directing risks confronted by an organization through the incorporation of key risk management tactics and processes in relation to the organization’s objectives (Nikolaidou & Vogiazas, 2014). The available literature provides many theoretical considerations to justify the adoption of risk management in banks including financial economics theory, new institutional economics theory, agency theory, stakeholder theory and Portfolio theory.

2.2.1 The Financial Economic Theory
Financial economics approach to corporate risk management builds on the Modigliani-Miller paradigm and has so far been the most prolific in terms of both theoretical model extensions and empirical research (Klimczak, 2007). This theory stipulates that hedging leads to lower volatility of cash flow and therefore lower volatility of firm value. The theory argues that the ultimate result of hedging, if it indeed is beneficial to the firm, should be higher value – a hedging premium. Jin and Jorion (2006) criticize this theory by posting that “although risk management does lead to lower variability of corporate value which is the main prerequisite for all other effects, there seems to be little proof of this being linked with benefits specified by the theory.
2.2.2 New Institutional Economists Theory

The new institutional economists shift their focus is to governance processes and socio-economic institutions that guide these processes. Williamson (1998) notes that there are no empirical studies of new institutional economics approach to risk management that have been carried out so far but the theory offers an alternative explanation of corporate behavior. Klimczak (2007) points out that the theory predicts that risk management practices may be determined by institutions or accepted practice within a market or industry. According to Williamson (1987) adds that the theory links security with specific assets purchase which implies that risk management can be important in contracts which bind two sides without allowing diversification, such as large financing contract or close cooperation within a supply chain.

2.2.3 Agency Theory

The agency theory explains a possible mismatch of interest between shareholders, management and debt holders due to asymmetries in earning distribution, which can result in the firm taking too much risk or not engaging in positive net value projects (Mayers and Smith, 1987). The Agency theory was first postulated by Jensen and Meckling in the 1976 article “Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure” and it helped establish agency theory as the dominant theoretical framework of the corporate governance literature and position shareholders as the main stakeholder (Lan and Heracleous, 2010). Smith and Stulz (1985) posit that agency issues have been shown to influence managerial attitudes toward risk taking and hedging in the field of corporate risk management. Consequently, agency theory implies that defined hedging policies can have important influence on firm value (Fite and Pfleiderer, 1995)
2.2.4 Stakeholder Theory

The stakeholder theory was initially developed by Freeman in 18984 as a managerial instrument and as since evolved into a theory of the firm with high explanatory potential (Klimczak, 2007). According to Klimczak (2007) the stakeholder theory focuses explicitly on equilibrium of stakeholder interests as the main determinant of corporate policy and that it’s most promising contribution to risk management is the extension of implicit contracts theory from employment to other contracts. Omasete (2014) posits that the stakeholder theory helps to address the importance of customer trust and financial distress costs to companies. Finally the theory suggests that smaller firms are more prone to financial problems, which should increase their interest in risk management practices (Omasete, 2014).

2.2.5 Portfolio Theory

Since the 1980s, banks have successfully applied modern portfolio theory (MPT) to market risk. Many banks are now using earnings at risk (EAR) and value at risk (VAR) models to manage their interest rate and market risk exposures. Unfortunately, however, even though credit risk remains the largest risk facing most banks, the practice of MPT to credit risk has lagged (Margrabe, 2007). Under the portfolio theory, traditionally banks have taken an asset-by-asset approach to credit risk management. While each bank’s method varies, in general this approach involves periodically evaluating the credit quality of loans and other credit exposures, applying a credit risk rating, and aggregating the results of this analysis to identify a portfolio’s expected losses (Gakure, Ngugi, Ndwigia and Waithaka, 2012). According to Gakure et al (2012) the foundation of the asset-by-asset approach is a sound loan review and internal credit risk rating system. In this approach a loan review and credit risk rating system enable management to identify
changes in individual credits, or portfolio trends in a timely manner (Gakure et al, 2012). Based on the results of its problem loan identification, loan review, and credit risk rating system management can make necessary modifications to portfolio strategies or increase the supervision of credits in a timely manner (ibid).

While the asset-by-asset approach is a critical component to managing credit risk, it does not provide a complete view of portfolio credit risk, where the term risk refers to the possibility that actual losses exceed expected losses. Therefore, to gain greater insight into credit risk, banks increasingly look to complement the asset-by-asset approach with a quantitative portfolio review using a credit model. Banks increasingly attempt to address the inability of the asset-by-asset approach to measure unexpected losses sufficiently by pursuing a portfolio approach. According to Essendi (2013) the portfolio has a basic assumption that investors often want to maximize returns from their investments for a given level of risk and provides a framework for specifying and measuring investment risk and to develop relationships between risk and expected returns. One weakness with the asset-by-asset approach is that it has difficulty identifying and measuring concentration. Concentration risk refers to additional portfolio risk resulting from increased exposure to a borrower, or to a group of correlated borrowers.

The traditional portfolio approach uses two methods, namely the expert method and the credit scoring models in the expert system, the credit decision is left in the hands of the branch lending officer. His expertise, judgment, and weighting of certain factors are the most important determinants in the decision to grant loans. The traditional approach to the assessment of credit proposition of borrowers is based on the heuristics or intuition of the loan officer. Heuristic decision making is, however, not necessary arbitrary or irrational because it is based on years of experience that enable individuals to identify solution
quickly without going through an analytical process (Rosli, 2000). The 5Cs of credit are always used by banks to assess the creditworthiness of the potential borrower. The 5Cs of credit refer to Character, Capacity, Conditions, Collateral and Capital (Dev, 2009). Character assessment is performed to determine the willingness and desire of borrowers to repay debt. Capacity is described as the borrower’s capacity to borrow and also his repayment capacity. Economic conditions will also affect the borrower’s ability to repay the loan. A bank will normally ask for collateral as security against the loan. Capital requirement of the business indicates the financial net worth of the borrower. The loan officer can examine as many points as possible but must include these five Cs in addition to interest rate.

In order to estimate default probability credit scoring models use statistical and mathematical methods (Togtokh, 2012). Some writers note that the reason for this increased use of the scoring methods is that the methods are relatively cheap, bases on historical data and simple compared to modern approaches. For example, Mester (cited in Togtokh, 2012) revealed widespread use of credit scoring models showing that 97 percent of the banks use credit scoring to approve credit card application, whereas 70 percent of the banks use credit scoring in their small business lending.

2.2.2 Classification of Risks

Another classification that is quite comprehensive though not particularly aimed at banks only is as follows (see Figure 2.1):
2.3 Empirical Review

In making lending decisions, banks consider a number of issues related to: Personality of the loan applicant, Viability of the business and the industry and Level of preparation in planning the details of the loan. The personality of the loan applicant is the personality as perceived from the bank officer's perspective. Personality of applicant (Irwin, 2010) summarizes a host of literature that has long examined a bank's loan approval relationship with the applicant. On viability of the business, aside from the higher perceived risks arising from information asymmetry problems inherent in dealing with borrower in general, the viability of the business and the industry in which the applicant operates in is important consideration. The level of preparation in planning the details of the loan is critical and will determine whether the applicant has a chance of a loan being approved by a bank's lending officer. The relative importance to the success of an applicant being able to seek external financing has to do with its attention to detail in preparing a business plan and loan proposal when applying for the loan. Additionally, it was observed that an inability to determine information disclosures by the applicant can
be regarded as signs that the management is weak or lacks financial discipline (Kao & Tan, 2001), cited in (Wattanapruttipaisan, 2003).

The credit risk management strategies are measures employed by banks to avoid or minimize the adverse effect of credit risk. A sound credit risk management framework is crucial for banks so as to enhance profitability and guarantee survival. According to (Lindergren (1987), the key principles in credit risk management process are sequenced as follows; establishment of a clear structure, allocation of responsibility, processes have to be prioritized and disciplined, responsibilities should be clearly communicated and accountability assigned. The strategies for hedging credit risk include but not limited to the following discussion.

Credit Derivatives: This provides banks with an approach which does not require them to adjust their loan portfolio. Credit derivatives provide banks with a new source of fee income and offer banks the opportunity to reduce their regulatory capital (Shao and Yeager, 2007). The commonest type of credit derivative is credit default swap whereby a seller agrees to shift the credit risk of a loan to the protection buyer. Credit derivatives encourage banks to lend more than they would, at lower rates, to riskier borrowers (Partnoy and Skeel, 2007). Recent innovations in credit derivatives markets have improved lenders’ abilities to transfer credit risk to other institutions while maintaining relationship with borrowers (Marsh, 2008).

Credit Securitization: It is the transfer of credit risk to a factor or insurance firm and this relieves the bank from monitoring the borrower and fear of the hazardous effect of classified assets. This approach insures the lending activity of banks. The growing popularity of credit risk securitization can be put down to the fact that banks typically use the instrument of securitization to diversify concentrated credit risk exposures and to
explore an alternative source of funding by realizing regulatory arbitrage and liquidity improvements when selling securitization transactions (Michalak and Uhde, 2009). A cash collateralized loan obligation is a form of securitization in which assets (bank loans) are removed from a bank’s balance sheet and packaged (tranced) into marketable securities that are sold on to investors via a special purpose vehicle (Marsh, 2008).

Compliance to Basel Accords: The Basel Accords are international principles and regulations guiding the operations of banks to ensure soundness and stability. The Accords were introduced in 1988 in Switzerland. Compliance with the Accord means being able to identify, generate, track and report on risk-related data in an integrated manner, with full auditability and transparency and creates the opportunity to improve the risk management processes of banks. The New Basel Capital Accord places explicitly the onus on banks to adopt sound internal credit risk management practices to assess their capital adequacy requirements (Chen and Pan, 2012).

Adoption of a sound internal lending policy: The lending policy guides banks in disbursing loans to customers. Strict adherence to the lending policy is by far the cheapest and easiest method of credit risk management. The lending policy should be in line with the overall bank strategy and the factors considered in designing a lending policy should include; the existing credit policy, industry norms, general economic conditions of the country and the prevailing economic climate (Kithinji, 2010).

Credit Reference Bureau: This is an institution which compiles information and sells this information to banks as regards the lending profile of a borrower. The bureau awards credit score called statistical odd to the borrower which makes it easy for banks to make
instantaneous lending decision. Example of a credit reference bureau is the Credit Reference Africa in Kenya.

Lam (2007) notes that Credit risk accounts usually for two-thirds to three-quarters of overall bank risk and is the critical focus of pillar one. Banks can opt for one of two overall approaches: a standardized approach with relatively simple arithmetic to determine capital, or one of two more risk-sensitive internal ratings based (IRB) approaches, which require banks to measure risk and manage their portfolios by breaking credit risk into its constituent elements and dealing with each in turn. These elements, embodied in a simple credit equation for the calculation of portfolio loss, are: the probability of Default - the odds that a given borrower will default, exposure at Default - the amount of credit likely to be outstanding at time of default, for example whether a borrower has drawn its full credit line before tanking, Loss Given Default - the amount of actual loss after the workout and realization of security and other guarantees and Maturity and other technical corrections - mathematical reweighing of these factors depending on items such as tenor of the credit, which may reduce or enhance risk.

Fernandez et al., (2000) and Waweru & Kalani (2009) found that most banking crises have directly led to the inadequate management of credit risk by institutions and lack of skills amongst loan officers respectively. Allan and Olomi (2003) findings indicated that all CBs were trained of how to appraise, monitor and supervise borrowers. Allan and Olomi (2003) however, concluded that banks have capacity constraints in credit and risk management. Allan and Olomi (2003) concluded that maybe the trainings obtained were not satisfactory or probably the number of staff does not tally with the number of borrower to monitor and supervise. Factors uncontrollable by CBs were court injunction
instituted when bank intends to dispose properties, low prices fetched when disposing mortgaged assets and change in policies.

2.3.1 Capital Adequacy and Performance of Commercial Banks

A strong banking infrastructure plays a major role in supporting economic activity and meeting the financial needs of all the sections of society and thus contributed in the overall growth of the country. For the smooth flow of credit in an economy, it is essential that banks should be financially sound so as to meet the various requirements of other fields. Capital adequacy ratio (CAR) is one of the measures which ensure the financial soundness of banks in absorbing a reasonable amount of loss. Capital adequacy requirements have existed for a long time, but the two most important are those specified by the Basel committee of the Bank for International Settlements (Fatima, 2014).

According to Odongo (2013) past studies have found out that the announcement of regulatory change is viewed by market participants as generally unfavorable. The objective of this study was to investigate the impact of stock price reaction to changes in capital adequacy regulation in the Kenyan banking sector. In his Study on CAR and bank performance in Kenya (Odongo, 2012) found out that capital adequacy announcement leads to underperformance of stocks in the market as they had negative cumulative abnormal return values especially in the post announcement dates.

In the study done by Djan, Frimpong, Bawuah, Halidu and Kuutol (2015) covering default rate, cost per loan assets and capital adequacy ratio, it was found that all these parameters have an inverse impact on banks’ performance; however, the default rate is the most predictor of bank financial performance.
2.3.5 Loss Given Default and Performance of Commercial Banks

LGD is usually defined as the percentage loss rate suffered by a lender on a credit exposure if the obligor defaults. Even if the counterparty fails to repay the amount owed, the lender will usually succeed in recovering some percentage of the current amount owed in the process of workout or sale of the obligor’s assets. This percentage is termed the recovery rate (RR) and this is expressed as $RR = 1 – LGD$. LGD can be estimated on the basis of historical data on realized losses.

A number of studies on Loss Given Default (LGD) can be found in Altman, Resti and Sironi’s (2001) anthology. These include Chabane, Laurent and Salomon’s credit risk assessment of stochastic LGD and correlation effects, Friedman and Sandow’s conditional probability distribution analysis of recovery rates, Laurent and Schmit’s estimation of distressed LGD on leasing contracts, DeLaurentis and Riani’s further analysis of LGD in the leasing industry, Citron and Wright’s investigation of recovery rates on distressed management buyouts and Dermine and Neto de Carvalho’s empirical investigation of recoveries’ impact on bank provisions. Schuermann provides an overview on what we know and do not know about LGD, as well, in the volume.

Gupton and Stein (2002) analyze the recovery rate on over 1800 corporate bond, loan and preferred stock defaults, from 900 companies, in order to specify and test Moody’s LossCalc® model for predicting loss given default (LGD). Their model estimates LGD at two points in time – immediately and in one year – adding a holding period dimension to the analysis. The authors find that their multifactor model, incorporating micro variables (e.g., debt type, seniority), industry and some macroeconomics factors (e.g., default rates, changes in leading indicators) outperforms traditional historic average methods in
predicting LGD. A study by Djan et al (2015) also found an inverse relationship between default rate and banks’ performance.

**2.3.6 Loan Loss Provisions and Performance of Commercial Banks**

Research on Loan Loss Provisioning (LLP) used to focus narrowly from an accounting perspective on whether provisions were used by banks to smooth earnings (Greenawalt and Sinkey, 1988). The researcher further notes that more recently, work has focused on how provisions contribute to the procyclicality of financial systems by being lower when output and credit are expanding and higher in periods of contraction. Researchers use regression analysis to explain annual provisioning expenses, usually scaled by the total stock of loans or assets of the bank (*ibid*).

Anandarajan and McCarthy (2006) examined whether and to what extent Australian banks use loan loss provisions (LLPs) for capital management, earnings management and signaling. They examined if there were changes in the use of LLPs due to the implementation of banking regulations consistent with the Basel Accord of 1988 which made loan loss reserves no longer part of Tier I capital in the numerator of the capital adequacy ratio. They found some evidence to indicate that Australian banks use LLPs for capital management, but no evidence of a change in this behaviour after the implementation of the Basel Accord. Their results indicated that banks in Australia use LLPs to manage earnings. Further, they noted that listed commercial banks engaged more aggressively in earnings management using LLPs than unlisted commercial banks.

**2.3.7 Non-Performing Loans and Performance of Commercial Banks**

NPLs reflect the health of the financial system affecting the profitability. A nonperforming loan is any obligation or loan in which interest and the principal payments
are more than 90 days overdue, more than 90 days’ worth of interest has been refinanced, capitalized or delayed by agreement or if payments are less than 90 days overdue but payments are no longer anticipated (IMF, 2009). Poor credit risk management and plain bad luck in form of external independent factors are the main reason for NPL. The inflation, deregulation and special market conditions can lead to poor credit lending decision which in turn leads to NPLs. In fact, many NPL studies are conducted in the countries with financial market recession (IMF, 2001). Ongoing financial crises suggest that Non Performing Loans amount is an indicator of increasing threat of insolvency and failure. However, the financial markets with high NPLs have to diversify their risk and create portfolios with NPLs along with Performing Loans (Ernst &Young, 2006).

Efficient credit risk management supports the fact that lower NPLR is associated with lower risk and lower deposit rate. It also implies that in the long run, relatively high deposit rate increases the deposit base in order to fund relatively high risk loans and consequently increases possibility of NPLR. Therefore, the allocation of the available fund and its risk management heavily depend on how the credit risk is handled and diversified to decrease the NPL amount. NPL is a probable loss that requires to be provided for in the profit and loss account of the banks. These non-performing loans provision reduces bank profitability. Therefore, high NPL amount increases the provision amount which in turn reduces the profit. In Kenya, commercial banks experienced NPL of 5.3 per cent of total loans of sh1.45 trillion during the period towards and after the March 2013 up from 4.4 per cent in the same period 2012. The value of gross non-performing loans (NPLs) increased from Ksh.77.3 billion in June 2013 to Ksh. 79.7 billion in September 2013 representing a growth of 3.1 percent (CBK, 2013).
Studies on the factors that cause non-performing loans in commercial banks suggest that factors controllable by CBs to be the major contributor to non-performing loans specifically, the diversification of funds and weak credit analysis. This is inconsistent with what was established in Kenya (Waweru & Kalani, 2009) who found unfavorable economic environment specifically the national economic downturn leading to the depression of business to be perceived as the most important factor that caused NPLs. The results however, are consistent with moral hazards concept explained in asymmetric information theory. Debt contracts require borrowers to pay a fixed amount to the lender and let them keep any profits above this fixed amount. This situation provides an incentive to borrowers to take on investment projects that are riskier than the lender would like due to high risk high return principal (Bester, 1994; Saunders & Connet, 2008). The situation becomes worse if the borrower is not honest and decides to hide the actual performance of the investment in order to avoid paying his/her obligations to the lender. This was also evidenced in this study where results show that some borrowers lack integrity and are not transparent. Weak credit analysis might have also been caused by unfaithful staff (though this was found out to be a minor contributing factor).

Beck, Jakubik and Piloj (2013) in a study on Non-Performing Loans (NPLs) in 75 countries argue that “Over the past decade, the credit quality of loan portfolios across most countries in the world remained relatively stable until the financial crises hit the global economy in 2007-2008. Since then, average bank asset quality deteriorated sharply due to the global economic recession. Yet the deterioration of loan performance was very uneven across countries”. Beck, Jakubik and Piloj (2013) were interested in explaining these differences in bank asset quality across countries and over time. In their findings they found no the direct impact of share prices on NPLs and posited that the impact was less obvious. They further argued that to the extent that share prices are correlated with
house prices they supposed that their findings could reflect the notion that a drop in the value of collateral for housing loans could negatively affect the loan quality of consumer loans.

Macharia (2012) in his study on “The Relationship between the Level of Non-Performing Loans (NPLs) and the Financial Performance of Commercial Banks in Kenya” found an inverse relationship between the level of Non-Performing Loans and Bank Performance as measured by ROA. Muasya (2000) studied the impact of non-performing loans on the banking sector performance in Kenya and that NPLs negatively affected banking sector profitability as measured by forecasted GPD growth factor. Shrestha (www.academia.edu) found a negative relationship between the amount of non-performing loans and stock price using data from Nepali commercial banks in India.

2.4 Summary of Literature and Research Gaps

Astute credit risk management strategies are critical for commercial banks in Kenya as they try to expand their customer base because an immeasurable number of financial decisions tend to hang critically in a bank’s ability to manage its own exposure. Research on credit risk has blossomed in the last five years (and in the new millennium) with several scholars researching and writing on various aspects of risk management.

Most studies on credit risk management have been carried outside Kenya and are in the distance past. The research on Kenyan commercial banks’ credit risk management strategies and its effect on their performance is rather limited and this study attempts to fill this research gap by examining how credit risk management strategies affects a bank’s capital profitability and lending decisions. This study expected to contribute to the
support of innovations in credit risk management strategies that might increase bank credit/loans portfolio and hence improve on their performance in Kenya.

2.5 Conceptual Framework

Banks manage credit risk for two main purposes: to enhance interest income (profitability) and to reduce loan losses (bad debts) which results from credit default (Achou & Tenguh, 2008). Therefore, it is expected that banks with better credit risk management strategies have lower loan losses (non-performing loans). Bank performance was the dependent variable and was measured in terms of the abnormal returns using market price per share of the banks under study. MPS as an important indicator to measure the performance of banks has been discussed extensively in the prior studies. The measurement of MPS connecting shareholder’s wealth which is implied in the market price of the ordinary shares is normally used to define the performance in the banks (Foong, 2008). In this study risk performance was measured by using Capitalization ratios, Asset Quality, Operating Efficiency and Liquidity ratios. In this case, the required information was available from sampled banks’ annual reports and the central bank. The study used Capital Adequacy Ratio (CAR), Loss Given Default Ratio (LGDR), Loan Loss Provision Ratio (LLPR) and Non-Performing Loans Ratio (NPLR) as indicators of credit risk management.
Independent variables               Dependent variable

Credit Risk Management

- Capital Adequacy Ratio (CAR)
- Loss Given Default Ratio (LGDR)
- Loan Loss Provision Ratio (LLPR)

Non-performing Loans Ratio (NPLR)

Performance

Abnormal Returns (AR) in share prices

Figure 2.2: Conceptual model (Source: Author 2017)
CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction
This chapter looks at the research methodology. The research methodology is the systematic, theoretical analysis of the procedures applied to a field of study (Kothari, 2004). It describes the research philosophy, research design, empirical model, target population, sample design, data collection instruments, data collection procedure, data validity, data reliability, data analysis and presentation and diagnostic tests.

3.2 Research Philosophy
The researcher adopted a positivist research philosophy in this study. According to Morris (2006) the positivist researcher maintains that it is possible to adopt a distant, detached, neutral and non-interactive position. This position enables the researcher to assume the role of an objective analyst, making detached interpretations about those data that have been collected in an apparently value-free manner. Steen and Roberts (2011) support the idea that positivism is a philosophy for quantitative research.

3.3 Research Design
This study adopted a quantitative longitudinal research design. A longitudinal study follows the same sample over time and makes repeated observations (Forgues, Bernard and Vandangeon-Derumez, 2011). Longitudinal research designs describe patterns of change and help establish the direction and magnitude of causal relationships. Measurements are taken on each variable over two or more distinct time periods. This allows the researcher to measure change in variables over time. Longitudinal research design is a type of observational study sometimes referred to as a panel study (ibid).
Hsiao (2003) defines longitudinal, or panel, data set as one that follows a given sample of individuals over time, and thus provides multiple observations on each individual in the sample.

3.4 Empirical Model

This study was based on four independent variables namely the non-performing loan ratio (NPLR), capital adequacy ratio (CAR), given loss default ratio (GLDR) and the loan loss provision (LLPR) ratio because these four are the indicators of risk management which affect the financial performance of banks as reflected in the share price performance (independent variable).

A panel generalized least squares (GLS) model with random effects was used to estimate the regression equation:

\[ AR_{it} = \alpha + \beta_1(CAR_{it}) + \beta_2(GLDR_{it}) + \beta_3(LLPR_{it}) + \beta_4(NPLR_{it}) + \mu_i + \epsilon_{it} \]  

Where;

- \(AR_{it}\) = Abnormal returns in share price during the fiscal year closing at time \(t\)
- \(NPLR_{it}\) = non-performing loans ratio at period \(t\)
- \(CAR_{it}\) = Capital adequacy ratio at period \(t\)
- \(LGDR_{it}\) = Loss given default ratio at period \(t\)
- \(LLPR_{it}\) = Loan Loss Provision Ratio at time \(t\)
- \(\alpha\) = is the intercept
- \(\beta_j\) = is the parameter of explanatory variables of NPLR, CAR, LGDR and LLPR
- \(\mu_i\) = the disturbance terms (between entities)
- \(\epsilon_{it}\) = the disturbance terms (within entities)
- \(i = 1, 2, \ldots, 10\) (Number of banks under study)
- \(j = 1, 2, \ldots, 4\) (Independent variables in the study)
\( t = 2008 – 2014 \) (Sample period)

### 3.4.1 Operationalization and Measurement of Variables

#### The dependent variable

The dependent variable of the study was bank performance. According to Ahmed (2008) the performance of a commercial bank is often described with the help of efficiency analysis. Various methods are used to measure the performance of banks and some common methods include financial ratio analysis such as return on assets, return on investments and return on equity, CAMELS analysis, the parametric and the non-parametric analysis techniques. Few studies have looked at stock performance a measure of bank performance. Thus, as a deviation from, and in order to determine if bank risk management strategies have any impact on a bank’s stock performance, this study measured bank performance by using an out of balance sheet measure, that is, abnormal stock returns. The annual abnormal stock returns were calculated using a modified formula suggested by Kaisoji (2013).

#### Independent variables

The independent variables were the credit risk management techniques of NPLR (Non-performing Loans/Total Loans, CAR ((Tier One Capital + Tier Two Capital)/Risk weighted Assets, LGDR (Total loan losses/Total exposure on default and LLPR (Loan Loss Provision/Non-performing loans).

**NPL:** A non – performing loan is any obligation or loan in which interest and the principal payments are more than 90 days, more than 90 days of worth of interest has been refinanced, capitalized or delayed by agreement or if payments are less than 90 days overdue but payments are no longer anticipated (IMF 2009).
LGD: It is the percentage loss rate suffered by a lender on a credit exposure if the obligor defaults. In other words, even if the counterparty defaults (fails to repay the amount owed), the lender will usually succeed in recovering some percentage of the current amount owed in the process of workout or sale of the obligor’s assets. This percentage is termed the recovery rate (RR), i.e. the following relation holds: \( RR = 1 - LGD \). LGD can be estimated on the basis of historical data on realised losses.

CA: Capital adequacy refers to the amount of equity capital and other securities which a bank holds as reserves against risky assets as a hedge against the probability of bank failure. In a bid to ensure capital adequacy of banks that operate internationally, the Bank of International Settlements (BIS) established a framework necessary for measuring bank capital adequacy for banks in the Group of Ten industrialized countries at a meeting in the city of Basle in Switzerland. This has come to be referred to as the Basle Capital Accord, on Capital Adequacy Standards. The Basle accord provided for a minimum bank capital adequacy ratio of 8% of risk-weighted assets for banks that operate internationally. Under the accord, bank capital was divided into two categories – namely Tier I core capital, consisting of shareholders’ equity, and retained earnings and Tier II supplemental capital, consisting of internationally recognized non-equity items such as preferred stock and subordinated bonds. Tier One Capital is deemed to have highest capacity to absorbing losses in order to allow banks continue to operate on ongoing basis.

Tier One capital is the sum fully paid common shareholder equity, disclosed Reserves and non-cumulative perpetual preferred stock. Tier Two Capital cannot exceed 100% of Tier One Capital and given by the sum of subordinated debt, undisclosed reserves, general loan loss reserves and hybrid debt equity capital instruments.
LLR – It is a percentage (%) that reflects accumulated provision expenses (minus write-offs) of current total loans. It is a rough indicator of the overall quality of the loan portfolio, and it represents the “loan loss reserve amounts maintained by a commercial bank to offset the default risk in its total outstanding loan portfolio.

3.4.2 Variable Definitions

\[ AR_{it} = \frac{P_t}{P_{t-1}} - 1, \text{ where } P_t = \text{Price of stock at time } t \text{ and } P_{t-1} = \text{Price of stock at time } t-1 \]

…………………………………………………………………………………………………………………………..(3.2)

\[ \text{NPLR}_{it} = \text{Non–Performing Loans/Total Loans} \] ………………………………………(3.3)

\[ \text{CAR}_{it} = \frac{\text{Tier One Capital + Tier Two Capital}}{\text{Risk weighted Assets}} \] ………………………………………(3.4)

\[ \text{LGDR}_{it} = \frac{\text{Total loan losses}}{\text{Total exposure on default}} \] ………………………………………(3.5)

\[ \text{LLPR}_{it} = \frac{\text{Loan Loss Provision}}{\text{Non-performing loans}} \] ………………………………………(3.6)

3.5 Target Population

Burns and Grove (2003) state that population includes all elements that meet certain criteria for inclusion in a study. The target population consists of all members of a real or hypothetical set of people, events or objectives from which a researcher wishes to make general results (Grove, 2003). The target population of this study was all the 44 commercial banks operating business in Kenya.

3.6 Sample Design

The sample size was ten out of the forth-four banks registered and doing business in Kenya. According to Cooper and Schindler (2009) a sample frame is a list of elements from which the sample is actually drawn and is closely related to the population. The study employed purposeful criterion sampling method to select the banks to be included
in the study. Criterion sampling involves searching for cases or individuals who meet a certain criteria (Plays, 2008). The criteria used to be included the banks in the sample were that the banks must have been listed at the NSE and for the entire period under study. Only ten banks met these criteria. The study used annual reports for years from 2008 to 2014 of each bank and related reports from Central Bank of Kenya to collect the panel data. The period 2008 to 2014 constituted the period with the latest data and therefore most relevant to the current study. Therefore, there were a total of 70 observations in the regression analysis. A seven-year panel data analysis of data was used to examine the relationship between bank performance and NPLR, CAR, GLDR and LLPR, which represent the credit risk management effectiveness.

3.7 Data Collection Instruments

A document review tool, in the form of a table, was used to collect secondary data on all the variables in the study (see appendix B). All the variables were constructed (according to the formulae given in section 3.4.2) using the secondary data available from the annual financial statements of the banks under study and the NSE.

3.8 Data Collection Procedure

The data source for this study was the annual reports of ten commercial banks for seven years, 2008-2014. The data was mostly available in either electronic or paper form. This study necessitated looking into credit risk management disclosure, financial statements and notes to financial statements within the annual reports of the sample banks and disclosures reports as well as data from the Central Bank of Kenya (CBK).
3.9 Validity
The wealth of background work by the banks means that the secondary data used generally had a pre-established degree of validity. In this study validity was ensured by collecting data from the right sources. Data was collected from the audited annual reports of the banks in the survey which would have been audited by authorized certified public accountants audit firms. In addition, the study made use of the capital adequacy and risk management reports of banks submitted to Central bank of Kenya, Nairobi Securities Exchange or the Capital Markets Authority. To ensure the accuracy of the results, the researcher triple checked the data collection and calculation processes.

3.10 Data Reliability
The researcher ensured reliability in the secondary data by probing the providers’ purpose of the data collected, ensuring that the data was collected within the period under study, enquiring how the data was collected and that the data was complete and accurate. The researcher also ensured that the data was obtained from its original source and not from a source where data might have been manipulated and altered.

3.11 Ethical Issues
This study used secondary data. Tripathy (2013) argues that “concerns about secondary use of data mostly revolve around potential harm to individual subjects and issue of return for consent. Secondary data vary in terms of the amount of identifying information in it. If the data has no identifying information or is completely devoid of such information or is appropriately coded so that the researcher does not have access to the codes, then it does not require a full review by the ethical board.” Tripathy (2013), further notes that if the data is freely available on the Internet, books or other public forum, permission for
further use and analysis is implied but the ownership of the original data must be acknowledged. The researcher acknowledged the sources of the secondary data.

3.12 Data Analysis and Presentation

The data collected was tested was subject to diagnostic and specification tests. The consequences of model mis-specification in regression analysis can be severe in terms of the adverse effects on the sampling properties of both estimators and tests (DeBenedictis & Giles, 1996). There are also commensurate implications for forecasts and for other inferences that may be drawn from the fitted model. Accordingly, the econometrics literature places a good deal of emphasis on procedures for interrogating the quality of a model's specification. These procedures address the assumptions that may have been made about the distribution of the model's error term, and they also focus on the structural specification of the model, in terms of its functional form, the choice of regressors and possible measurement errors (ibid).

Thus before carrying the regression analysis the tests below were carried out on the data and adjustments made accordingly to address any violations of the OLS assumptions. Using eviews software, data that had been treated of the problems of panel data was analyzed and presented using a random effects panel Estimate Generalized Least Squares Method. Regression output was interpreted and conclusions drawn based on the panel regression analysis results.

3.13 Diagnostic Tests

3.13.1 Hausman Test

To decide whether to use fixed or random effects model the researcher ran the Hausman test with the null hypothesis that the preferred model for the data was random effect
versus the alternative of a fixed effects model. According to Green (cited in Torres-Reynia, 2007) the fixed and random effects models are stated as;

\[
Y_u = X_u \beta + \alpha + \mu_u \quad \text{Fixed effects} \quad (3.2)
\]

\[
Y_u = X_u \beta + \alpha + \mu_u + \varepsilon_u \quad \text{Random effects} \quad (3.3)
\]

Where \( X_u \) = Variable vector

\( \beta \) = Coefficients vector

Random effects assume that the entity’s error term is not correlated with the predictors which allows for time-invariant variables to play a role as explanatory variables. Thus random effects model allows generalizing the inferences beyond the sample used in the model (Torres-Reynia, 2007). Torres-Reynia (2007) further notes that fixed effects models are designed to study the causes of changes within a person or an entity—a time invariant characteristic cannot cause such a change because it is constant for each entity.

The Hausman test basically tests whether the unique errors (\( \mu_i \)) are correlated with the regressors, the null hypothesis is they are not. To perform the test requires running the random effects model followed Hausman test in eviews.

3.13.2 Normality Test

The least-squares fit is based on the conditional mean. The mean is not a good measure of centre for either a highly skewed distribution or a multi-modal distribution. Non-normality does not produce bias in the coefficient estimates, but it does have two important consequences: it poses problems for efficiency—that is, the OLS standard errors are no longer the smallest, standard errors can be biased—i.e., confidence intervals and significance test may lead to wrong conclusions (Andersen, 2012). The test for normality was done using the Jaque-Bera test statistic. The Jaque-Bera test statistic tests
the null hypothesis that the data is normality distributed against the alternate that the data is not normally distributed. Data that was not normal was transformed by using the power transformation method.

### 3.13.3 Stationarity Test

Stationarity is a property of an underlying stochastic process and not the observed data such the joint distribution of a set of n consecutive random variables, in a series, is the same, regardless of where in the series it is chosen (Kendall and Stuart, 1983). A stationary series is one with a mean value which will not vary with the sampling period. In contrast, non-stationarity can simply be defined as processes that are not stationary and that have statistical properties that are deterministic functions of time (Kendall and Stuart, 1983). Non-stationary in panel data causes asymptotically biased estimated coefficients in regression analysis (Lantz and Feng, 2006) and may lead to spurious regression. A “spurious regression” is one in which the time-series variables are non-stationary and independent (Giles, 2006) and may have high R-squared values and low Durbin-Watson values. The presence of non-stationarity in data for this study was tested by using Levin, Lin & Chu t* in eviews. The data in the study was found to be stationary for all the panels and therefore no treatment for non-stationarity was required.

### 3.13.4 Panel Cointegration Test

Cointegration is a statistical property possessed by some time series data that is defined by the concepts of stationarity and the order of integration of the series. A vector time series is cointegrated if each of the series taken individually is non-stationary, with a unit root, while the linear combination of the non-stationary series in stationary. Mathematically cointegration is defined as;

\[ x_t \text{ and } y_t \text{ are said to cointegrated if there exists a parameter } \alpha \text{ such that,} \]

\[ \]
\[ \mu_t = y_t - \alpha x_t \]  \hspace{1cm} \text{(3.4)}

is a stationary process (Sørensen, 2005)

Non-cointegration in panel data leads to spurious regressions. In this study cointegration test test was done by using Kao Residual Cointegration Test available in eviews software. The panels were found to be cointegrated at level.

### 3.13.5 Multicollinearity Test

“Multicollinearity is a statistical phenomenon in which there exists a perfect or exact relationship between the predictor variables. When there is a perfect or exact relationship between the predictor variables, it is difficult to come up with reliable estimates of their individual coefficients. It will result in incorrect conclusions about the relationship between outcome variable and predictor variables” (Joshi, 2012). The Variance Inflation Factor (VIF) quantifies the severity of multicollinearity in an ordinary least-squares regression analysis and is given by:

\[ VIF = \frac{1}{1 - R^2} \]  \hspace{1cm} \text{(3.5)}

The R-squared in this equation is obtained by running a regression model of all the independent variables where each independent variable is made the dependent variable in turn.

The primary concern is that as the degree of multicollinearity increases, the regression model estimates of the coefficients become unstable and the standard errors for the coefficients can get wildly inflated. In this study multicollinearity was calculated and tested by using the VIF formula. To treat multicollinearity one needs to identify the offending variable (s) and drop it or alternatively change the form of the variable(s).
3.13.6 Heteroscedasticity Test

When the variance of the error terms is not constant then there is heteroscedasticity. In the presence of heteroscedacity the unbiased estimators obtained by the OLS do not provide the estimate with the smallest variance which leads to bias in test statistics and confidence intervals, particularly if the heteroscedasticity is severe rather than “marked”. Depending on the nature of the heteroskedasticity, significance tests can be too high or too low (Williams, 2015). In this study heteroscedasticity was tested by using the Breusch – Pagan Test for heteroskedasticity (using Eviews software). In this study there was no problem of heteroscedasticity and therefore there was no treatment for problems of heteroskedasticity.

3.13.7 Panel Cross-Section Dependence Test

A key assumption underlying the linear regression model (LRM) typically used in applied econometric studies are that of no autocorrelation (McGuirk & Spanos, 2002). Existence of positive autocorrelations, for example, leads to the OLS estimates of the standard errors being smaller than the true standard errors which would lead to the conclusion that the parameter estimates are more precise than they really are and therefore there would be a tendency to reject the null hypothesis when it should not be rejected. According to Granger and Newbold (1974) the three major consequences of auto- correlated errors in regression analysis are that: estimates of the regression coefficients are inefficient, forecasts based on the regression equations are sub-optimal and usual significance tests on the coefficients are invalid.

The Cross-dependence in panel data is the equivalent of autocorrelation in time series data. The Pesaran test of cross-section dependence was used this test. If the test statistic
for cross-sectional dependency is significant, this suggests the presence of cross-sectional dependency, which is a source of bias in the estimated standard errors and/or parameter estimates (DeHoyos and Sarafidis, 2006). The data was found to suffer from the problem of cross-section dependence. This was corrected by using a lag of 1 on the dependent variable.

3.13.8 Serial Correlation

Serial correlation is often observed in time series and in panel data. The causes of serial correlation include intrinsic serial correlation and model misspecification. In the presence of serial correlation the OLS estimates are no longer BLUE and the OLS standard errors and test statistics are no longer valid (Wooldridge, 2015). Serial correlation tests apply to macro panels with long time series. Not a problem in micro panels (with very few years), (Torres-Reyna, 2010) and thus this test was not done for this study since the number of years (7) were few.
CHAPTER FOUR

RESEARCH FINDINGS AND INTERPRETATIONS

4.1 Introduction

This chapter looks at the diagnostic tests, specification tests, research findings and discussions.

4.2 Diagnostic and Specification Tests

4.2.1 Descriptive Statistics

The descriptive statistics test was run by using eviews and the output is shown in Table 4.1:

<table>
<thead>
<tr>
<th>Source: Research data</th>
</tr>
</thead>
</table>

The Jarque-Bera test tests the null hypothesis of normality against the alternate of non-normality. From Table 4.1 the p-values for AR, LGDR, NPLR and LLPR are all zero indicating that the Jarque-Bera values are significant at all levels of significance and therefore we reject the null and conclude that AR, LGDR, NPLR and LLPR are not normally distributed. The skewness values for that AR, LGDR, NPLR and LLPR indicate that the variables have a positive skewness. The p-value for the variable CAR was greater than 0.05.
than 0.05 indicating the Jarque-Bera value was insignificant and we therefore fail to reject the null and conclude that the CAR is normally distributed.

4.2.1 The Hausman Test Results

The Hausman tests on whether the fixed or random effects model is suitable for the panel.

**Table 4.2: Hausman Test Results**

<table>
<thead>
<tr>
<th>Correlated Random Effects - Hausman Test</th>
<th>Test cross-section and period random effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Summary</td>
<td>Chi-Sq. Statistic</td>
</tr>
<tr>
<td>Cross-section random</td>
<td>3.525642</td>
</tr>
<tr>
<td>Period random</td>
<td>0.074999</td>
</tr>
<tr>
<td>Cross-section and period random</td>
<td>3.384497</td>
</tr>
</tbody>
</table>

*Source: Research data*

From Table 4.2, all the p (Chi-Square statistics) of 0.4740, 0.9993 and 0.4957 for the chi-square statistics 3.525642, 0.074999 and 3.384497 respectively are greater than 0.05 (at 5% significance level) and therefore insignificant. This means that we fail to reject the null and therefore use the random effects model in this data.

4.2.2 The Normality Test Results

The normality test of the residues from a regression model was run on eviews and the variables AR, LGDR, LLPR and NPLR were found to have p-values of zero and therefore failed the normality test at all levels of significance. To treat the non-normality problem and using power transformation with a searching algorithm, a lambda (λ) value of -0.76 gave a distribution of the residual terms that was approximately normal (see figure 4.1). Consequently, all the original data was transformed through the power transformation method to obtain a new, approximately, normally distributed data.
Figure 4.1: Normality Test Results

Source: Research data

Figure 4.1 shows the transformed data was normally distributed at 1% significance level. After this transformation the data was fit to be used in regression analysis since it didn’t violate the normality condition.

4.2.3 Stationarity Test Results

Tests for stationarity were conducted by the using the Levin, Lin & Chu t* in eviews software.

Table 4.3: Abnormal Returns Unit Root Test Results

<table>
<thead>
<tr>
<th>Method</th>
<th>Statistic</th>
<th>Prob.**</th>
<th>Cross-sections</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levin, Lin &amp; Chu t*</td>
<td>-12.1564</td>
<td>0.0000</td>
<td>10</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: Research data

From Table 4.3 the Levin, Lin & Chu t* of -12.1564 has a p-value of 0. This means that this Levin, Lin & Chu t* value is significantly less than zero (p<0.01) and therefore we
reject the null hypothesis of a unit root in AR1 panel in favour of the alternative that the panel is stationary at level.

**Table 4.4: Capital Adequacy Ratio Unit Root Test Results**

<table>
<thead>
<tr>
<th>Method</th>
<th>Statistic</th>
<th>Prob.**</th>
<th>Cross-sections</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levin, Lin &amp; Chu t*</td>
<td>-0.77671</td>
<td>0.0218</td>
<td>10</td>
<td>50</td>
</tr>
</tbody>
</table>

*Source: Research data*

Table 4.4 shows a Levin, Lin & Chu t* value of -0.77671 has a p-value of 0.0218. This means that the Levin, Lin & Chu t* value is significantly less than zero (p<0.05) and therefore we reject the null hypothesis of a unit root in CAR1 panel in favour of the alternative that the panel is stationary at level.

**Table 4.5: Loss Given Default Ratio Unit Root Test Results**

<table>
<thead>
<tr>
<th>Method</th>
<th>Statistic</th>
<th>Prob.**</th>
<th>Cross-sections</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levin, Lin &amp; Chu t*</td>
<td>-15.4553</td>
<td>0.0000</td>
<td>10</td>
<td>50</td>
</tr>
</tbody>
</table>

*Source: Research data*

From Table 4.5, the Levin, Lin & Chu t* value of -15.4553 has a p-value of 0. This means the Levin, Lin & Chu t* value is significantly less than zero (p<0.01) and therefore we reject the null hypothesis of a unit root in LGDR panel in favour of the alternative that the panel is stationary at level.
Table 4.6: Loan Loss Provision Ratio Unit Root Test Results

Panel unit root test: Summary
Series: LLPR1

<table>
<thead>
<tr>
<th>Method</th>
<th>Statistic</th>
<th>Prob.**</th>
<th>Cross-sections</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null: Unit root (assumes common unit root process)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levin, Lin &amp; Chu t*</td>
<td>-11.1156</td>
<td>0.0000</td>
<td>10</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: Research data

The Levin, Lin & Chu t* of -11.1156 (see Table 4.6) has a p-value of 0. This means the Levin, Lin & Chu t* value is significantly less than zero (p<0.01) and therefore we reject the null hypothesis of a unit root in LLPR1 panel in favour of the alternative that the panel is stationary at level.

Table 4.7: Non-Performing Loan Ratio Unit Test Results

Panel unit root test: Summary
Series: NPLR1

<table>
<thead>
<tr>
<th>Method</th>
<th>Statistic</th>
<th>Prob.**</th>
<th>Cross-sections</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null: Unit root (assumes common unit root process)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levin, Lin &amp; Chu t*</td>
<td>-9.54404</td>
<td>0.0000</td>
<td>10</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: Research data

The Levin, Lin & Chu t* of -9.54404 (see Table 4.7) has a p-value of 0. This means that the Levin, Lin & Chu t* value is significantly less than zero (p<0.01) and therefore we reject the null hypothesis of a unit root in LLPR1 panel in favour of the alternative that the panel is stationary at level.

From the unit root tests (Table 4.3 to Table 4.7) all the panels were found to be stationary at level. This means that in specifying the model, no adjustments due to non-stationarity problems would be made to the model.

Table 4.8: Panel Cointegration Test Results

Kao Residual Cointegration Test
Series: AR1 CAR1 LGDR1 LLPR1 NPLR1
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
From Table 4.8, the t-value of -4.627838 is significantly less than zero (p<0.05) and we reject the null of no cointegration and no deterministic trend assumption in favour of cointegration and a deterministic trend in the panels.

### 4.2.4 Multicollinearity Test Results

Multicollinearity was tested by using the variance inflation factor (VIF) method shown in equation 3.5. To find the R-Squared a regression analysis of each independent variable was done using the particular independent variable as a dependent variable and regressing it on all the other independent variables.

<table>
<thead>
<tr>
<th>“Dependent” Variable</th>
<th>Independent Variable</th>
<th>VIF (Critical value = 4)</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR1</td>
<td>LGDR1, LLPR1, NPLR1</td>
<td>0.039223*</td>
<td>1.04</td>
</tr>
<tr>
<td></td>
<td>CAR1, LLPR1, NPLR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAR1, LGDR1, NPLR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAR1, LGDR1, LLPR1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LGDR1</td>
<td></td>
<td>0.307161*</td>
<td>1.44</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLPR1</td>
<td></td>
<td>-0.017547*</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPLR1</td>
<td></td>
<td>0.302555*</td>
<td>1.43</td>
</tr>
</tbody>
</table>

Where (*) indicate the adjusted R-Squared values of the “Dependent” Variables

**Source: Research data**

From Table 4.9 it is evident that no variable suffered from excessive multicollinearity and therefore there wasn’t any treatment for multicollinearity of the data in this study.
4.2.5 Heteroscedasticity Test Results
The White Heteroscedasticity test in eviews was used to test for heteroscedasticity. It tests the null of homoscedasticity and if we fail to reject the null then there is heteroscedasticity.

Table 4.10: White Heteroscedasticity Test Results
Heteroskedasticity Test: White

<table>
<thead>
<tr>
<th></th>
<th>Statistic</th>
<th>Prob.</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>0.446482</td>
<td>0.9506</td>
<td>0.9506</td>
</tr>
<tr>
<td>Obs*R-squared</td>
<td>7.158444</td>
<td>0.9284</td>
<td>0.9284</td>
</tr>
<tr>
<td>Scaled explained SS</td>
<td>14.01636</td>
<td>0.4485</td>
<td>0.4485</td>
</tr>
</tbody>
</table>

Source: Research data

From Table 4.10, the F-statistic p-value of 0.9506 is higher than the 5% (p>0.05) significance level and we therefore fail to reject the null and conclude that there is no heteroscedasticity in the data. Thus no treatment was required for heteroscedasticity for the data in this study.

4.2.6 Cross-section Dependence Test
Panel serial correlation was tested by using the Pesaran CD test in eviews. The Pesaran CD test tests the null of no panel serial correlation and if we reject the null then we conclude there is serial correlation in the panel data.

Table 4.11: Cross-section Dependence Test
Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals

<table>
<thead>
<tr>
<th></th>
<th>Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pesaran CD</td>
<td>2.478809</td>
<td>0.0132</td>
</tr>
</tbody>
</table>

Source: Research data

From Table 4.11, the p-value of 0.0132 less than 0.05 (5% significant level) and therefore the t-statistic of 2.278809 is significantly different from zero. The null hypothesis of no correlation is rejected and the conclusion is that the data suffered from panel serial correlation. To correct for cross-section dependence, the dependent variable was lagged
with a lag of 1 and the test repeated. The result showed that the effect of cross-dependence was eliminated (see Table 4.11)

**Table 4.12: Cross-Section Dependence Test With Lag**

<table>
<thead>
<tr>
<th>Test</th>
<th>Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pesaran CD</td>
<td>-0.829060</td>
<td>0.4071</td>
</tr>
</tbody>
</table>

*Source: Research data*

From Table 4.12, the p-value of 0.4071 is more than 0.05 (5% significant level) and therefore the t-statistic of -0.829060 is not significant and we therefore fail to reject the null and conclude that the data suffers no cross-section dependence.

**4.2.7 Serial Correlation**

Due to the small number of years (seven years) for this study, which considered small, serial correlation was considered not to be a problem and thus this test was not done.

**4.3 Research Findings and Discussion**

After the diagnostic and specifications tests and the subsequent adjustments and transformations in the data and model, the following output was obtained by using eview software.

**Table 4.13: Panel Regression Output**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.701784</td>
<td>0.069665</td>
<td>10.07376</td>
<td>0.0000</td>
</tr>
<tr>
<td>CAR1</td>
<td>0.008900</td>
<td>0.026731</td>
<td>0.332943</td>
<td>0.7406</td>
</tr>
<tr>
<td>LGDR1</td>
<td>0.000480</td>
<td>0.000588</td>
<td>0.816087</td>
<td>0.4183</td>
</tr>
<tr>
<td>LLPR1</td>
<td>-0.004532</td>
<td>0.007256</td>
<td>-0.624541</td>
<td>0.5351</td>
</tr>
<tr>
<td>NPLR1</td>
<td>-0.007758</td>
<td>0.003012</td>
<td>-2.575570</td>
<td>0.0130</td>
</tr>
</tbody>
</table>
In this study, the hypothesis testing is non-directional and therefore a two tail test of hypothesis is done. The study adopted 0.05 significance level in interpreting the results. From the results (Table 4.13) the constant (C) was significant (p<0.05) 5% significance level. The rest of the coefficients are explained below according to the study objectives.

4.3.1 Effect of the Capital Adequacy Ratio on performance by commercial banks in Kenya

The first objective sought to determine the effect of capital adequacy ratio on performance by commercial banks in Kenya. From the findings the t-test statistic of 0.0089 for CAR had a probability (p) value of 0.7406 (> 0.05) and therefore not significant at 5% significance level. Thus the study found a positive non-significant relationship between CAR and bank stock performance in Kenya. This result deviates from that of Odongo (2013) who found that stock performance reacted negatively to CAR announcements. The difference in these results may be attributed to the differences in the actual variables used in the studies.

4.3.2 Effect of Loss Given Default Ratio on performance by commercial banks in Kenya

The second objective sought to determine the effect of loss given default ratio on performance by commercial banks in Kenya. From the findings the t-test statistic of 0.00048 for LGDR is insignificant at 5% (p>0.05) significant level. Thus the study found

---

**Weighted Statistics**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.276130</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.145834</td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>0.115554</td>
</tr>
<tr>
<td>F-statistic</td>
<td>2.119245</td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.045111</td>
</tr>
<tr>
<td>Mean dependent var</td>
<td>0.624548</td>
</tr>
<tr>
<td>S.D. dependent var</td>
<td>0.125029</td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>0.667632</td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
<td>2.535297</td>
</tr>
</tbody>
</table>

*Source: Research data*
a positive insignificant relationship between LGDR and bank stock performance in Kenya. Studies on the effect of LGDR on bank stock performance were limited. The result from this differ from that of Djan et al (2015) who found an inverse relationship between default rate and banks’ performance.

4.3.3 Effect Loan Loss Provisions Ratio on performance by commercial banks in Kenya

The third objective sought to determine the effect of loan loss provision ratio on performance by commercial banks in Kenya. From the findings the t-test statistic of -0.004532 for LLPR is insignificant at 5% (p>0.05) significant level. Thus the study found a negative and insignificant relationship between LLPR and bank stock performance in Kenya. There are few studies on loan loss provision ratio and bank stock performance. One of the studied by Bushman and Williams (2011) only mention that Loan loss provisioning is a key accounting choice that directly influences the volatility and cyclicality of bank earnings, as well as the information properties of banks’ financial reports with respect to reflecting changes in the risk attributes of loan portfolio but they don’t show how LLPR exactly affects stock performance.

4.3.4 Effect of Non-Performing Loans Ratio on performance by commercial banks in Kenya

The fourth and last objective sought to determine the effect of non-performing loans ratio on performance by commercial banks in Kenya. From the findings the t-test statistic of -0.007758 for NPLR is significant at 5% (p<0.05) significant level. Thus the study found a negative significant relationship between NPLR and bank stock performance in Kenya. This result agrees with that of Beck, Jakubik and Piloï (2013), Macharia (2012) and Muasya (2000), who a significant negative relationship between the non-performing loans and bank performance.
4.3.5 The Overall Model

The model had $R^2$ off 14.58%. The interpretation of the low adjusted R-squared value is that the model had low predictive power in using the independent variables to explain the dependent variable under this study. This implies that more or different predictor variables need to be used in the study. The F-statistic for the model was 2.119245 and the $p$ (F-statistic) of 0.045111 (less than 0.05) shows that the F-statistic was significant and therefore the model as a whole was significant in predicting bank performance.
CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter deals with the summary of findings, conclusions, recommendations and limitations of the study and suggested areas for further study.

5.2 Summary

The main objective this study was to find the effect of credit risk management on the performance of commercial banks listed at the Nairobi Securities exchange in Kenya. The specific objectives were to find the effects of capital adequacy ratio, loss given default ratio, loan loss provision ratio and non-performing loans ratio on the performance of the banks. The independent variables of the study were capital adequacy ratio, loss given default ratio, loan loss provision ratio and non-performing loans ratio while dependent variable was the abnormal stock return. Relevant theoretical and empirical literature was reviewed and gaps identified to inform the study. The population of the study was the forty four licensed commercial banks in Kenya as at December 2014, as per the latest data available by the time the study was being conducted. A purposive sample of ten banks was selected based on the criteria that they were listed and had complete data for the period under study. Secondary data for the construction of the variables under study was collected from the financial statements and the Nairobi security exchange was collected the sample period. Data was diagnosed for and treated, where necessary, of the problems of panel regression. Using a longitudinal study design and a random effects model specification a panel Estimate Generalized Least Squares regression was done on the data using eviews software. Adopting a 5% non-directional test of hypothesis, the study found a statistically no significant relationship between capital adequacy ratio and bank stock
performance in Kenya, a statistically no significant relationship between loss given default ratio and bank stock performance in Kenya, a statistically no significant relationship between loan loss provision ratio and bank stock performance in Kenya and a statistically significant negative relationship between non-performing loan ratio and bank stock performance in Kenya.

5.3 Conclusions
Concerning the first objective of the study which was to determine the effect of capital adequacy ratio on performance by commercial banks in Kenya, the study concluded that, at 5% significance level, capital adequacy ratio has statistically no significant effect on bank stock performance in Kenya. On the second objective which was to establish the effect of loss given default ratio on performance by commercial banks in Kenya, the study concluded that, at 5% significance level, loss given default ratio has statistically no significant effect on bank stock performance in Kenya. For the third objective which was to determine the effect of loan loss provision ratio on performance by commercial banks in Kenya, the study concluded that, at 5% significance level, loan loss provision ratio has statistically no significant effect on bank stock performance in Kenya. On the last objective which sought to determine the effect of non-performing loans ratio on performance by commercial banks in Kenya, the study concluded that, at 5% significance level, non-performing loans ratio has a negative and statistically effect on bank stock performance in Kenya.

5.4 Recommendations and Policy Implications
From the findings, capital adequacy ratio, loss given default ratio and loan loss provision ratio did not affect bank stock performance in Kenya while non-performing loan ratio had a negative effect bank stock performance in Kenya for the period under study. Thus this
study makes the following recommendations: Given the current supervisory and regulatory policy frameworks for banks, credit risk managers should be less concerned with adjustments in the ratios of capital adequacy ratio, loss given default ratio and loan loss provision ratio as the values of these ratios have no significant effects on performance but should instead be more prudent on the management of the non-performing loans ratio as it has a significant effect on performance; From a regulatory point of view and according to the study findings, it is recommended that the current regulatory policy requirements on capital adequacy ratios, loss given default ratios and loan loss provisions ratios should be maintained as their results are uniform across the sample while the regulatory non-performing loans ratios should be adjusted in order to mitigate the negative effects; For researchers and academicians and in relation to the study findings, it is recommended that future studies in this area be carried out for longer study periods in order to bring out the true picture of the effect of the independent variables on the dependent variables of the study. It is also recommended that more independent variables be considered for study.

5.5 Areas for Further Research

There was a limitation on the number of independent variables used in this study as only four were considered. Future research in the area would focus on more independent variables to the regression model in order to develop concrete literature in this study area. The study was also limited on the number of years under study due to unavailable of data for a longer period. Future research should consider longer study periods for generalising the results.

The researcher suggests the following areas for further research as they are closely related to the outcome of the current study: The size effect of banks on loan portfolio
performance in Kenya; Micro-prudential regulation and performance of commercial in Kenya.
REFERENCES


Foong, K. K. (2008). Return-on-equity ratio can show how efficient banks are. Malaysian Institute of Economic Research


Rouse, Margaret (2008). Basel II, available at searchsecurity.techtarget.co.uk


Shao, Y. and Yeager, T.J. (2007). The Effects of Credit Derivatives on U.S. Bank
Risk and Return, Capital and Lending Structure, Draft, Sam M. Walton
College of Business, Arkansas


APPENDIX A: COVER LETTER

I am a postgraduate student in the school of business, Kenyatta University pursuing Master of Science in Finance. As part of the partial fulfilment of the course, I am conducting a project research on **effects of credit risk management on financial performance of commercial banks listed at the Nairobi Securities Exchange, Kenya.**

For this reason, I would appreciate if you would kindly avail the documents he requires to gather the data.

The information obtained from you will be treated with confidentiality and will only be used for academic purposes.

Thank you in advance.

Onang’o Omurwa Nyabicha
D53/5930/2003
APPENDIX B: DOCUMENT REVIEW TOOL

Table:

Name of bank: 
……………………………….

Data collected will be in millions of Kenya Shillings

<table>
<thead>
<tr>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1. Core Capital (Tier 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.1 Paid-up ordinary share capital/Assigned Capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.2 Non-repayable share premium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.3 Retained earnings/Accumulated losses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.4 Net After tax profits, current year to-date (50% only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.5 Non-cumulative irredeemable preference shares</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.6 Other reserves</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.7 Sub-Total (1.1.1 to 1.1.6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less Deductions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.8 Investments in shares of unconsolidated subsidiary institutions and equity instruments of other institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.9 Goodwill</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.10 Deferred Tax Asset</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.11 Other Intangible Assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.12 Total Deductions (1.1.8 to 1.1.11)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.13 CORE CAPITAL (1.1.7 Less 1.1.12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2 Supplementary Capital (Tier 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.1 Revaluation reserves</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.2 Cumulative irredeemable preference shares</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.3 Convertible notes and similar capital investments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.4 Perpetual subordinated debt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.5 Limited life redeemable preference shares</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.6 Term subordinated debt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.7 Statutory Loan Loss Reserve</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.8 Total supplementary capital (1.2.1 to 1.2.7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.9 Supplementary Capital/Core Capital (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3 TOTAL CAPITAL (1.1.12 + 1.2.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 On – Balance Sheet Assets – amount (shs’000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk Weight Risk Adjusted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asset Value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Cash (including foreign notes and coins)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2 Balances with Central Bank of Kenya</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3 Kenya Government Treasury Bills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4 Kenya Government Treasury Bonds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>Lending fully secured by cash</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.6</td>
<td>Loans guaranteed by the Government of Kenya and OECD Central Governments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.7</td>
<td>Loans guaranteed by the Governments of other EAC Member states</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.8</td>
<td>Deposits and balances due from local institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.9</td>
<td>Deposits and balances due from foreign institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.10</td>
<td>Foreign Treasury Bills and bonds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.11</td>
<td>Claims guaranteed by Multi-Lateral Development banks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.12</td>
<td>Mortgage Loans secured by residential property</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.13</td>
<td>Other Loans and advances (net of provisions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.14</td>
<td>Other investments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.15</td>
<td>Fixed Assets (net of Depreciation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.16</td>
<td>Amounts due from group companies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.17</td>
<td>Other assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2.18 TOTAL (2.1 to 2.17)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Off-Balance Sheet Assets

| 3.1 | Total Risk Adjusted off-balance sheet Assets |

## Adjusted Credit Risk Weighted Assets

| 4.1 | Total Risk Weighted Assets for on and off balance sheet items (2.17 + 3.1) |
| 4.2 | Market Risk qualifying Assets included in 4.1 above Trading book |
| 4.3 | Adjusted Credit Risk Weighted Assets (4.1 less 4.2) |

## Total Market Risk Weighted Assets Equivalent

| 5 | Total Market Risk Weighted Assets Equivalent |

## Operational Risk Equivalent Assets

| 6 | Operational Risk Equivalent Assets |

## Capital Ratio Calculations

| 7 | Capital Ratio Calculations |
| 7.1 | Core Capital as per 1.1.12 above |
| 7.2 | Total Capital as per 1.3 above |
| 7.3 | Adjusted Credit Risk Weighted Assets as per 4.3 above |
| 7.4 | Total Market Risk Weighted Assets Equivalent |
| 7.5 | Total Risk Weighted assets Equivalent for Operations Risk as per 6 above |
| 7.6 | Total Risk Weighted Assets (7.3 + 7.4 + 7.5) |
| 7.7 | Total Deposits |

**Financial years**

<table>
<thead>
<tr>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
</table>

Name of bank: 

……………………………….

Data collected will be in millions of Kenya Shillings
Name of bank: 
……………………………….

Data collected will be in millions of Kenya Shillings

<table>
<thead>
<tr>
<th>Financial years</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.8 Core capital to Total Risk Weighted assets ratio (7.1/7.6)%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.9 Minimum core capital to Total Risk Weighted assets requirement 10.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Excess/(Deficiency) 7.8 less 7.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.1 Core capital to Deposit ratio (7.1/7.7)%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.2 Minimum core capital to deposits requirement 8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.3 Excess/(Deficiency) (8.1 less 8.2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.4 Total capital to Total Risk Weighted assets ratio (7.2/7.6)%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Rate of recovery of loans in default (RR)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Market price of ordinary shares on the last day of trading at NSE in each year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Central Bank of Kenya, 2016
### APPENDIX C: LIST OF LICENSED COMMERCIAL BANKS IN KENYA

<table>
<thead>
<tr>
<th>No.</th>
<th>Bank of bank</th>
<th>Number of branches</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>African Banking Corporation Ltd</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>Bank of Africa Kenya Ltd</td>
<td>18</td>
</tr>
<tr>
<td>3.</td>
<td>Bank of Baroda Kenya Ltd</td>
<td>11</td>
</tr>
<tr>
<td>4.</td>
<td>Bank of India Ltd</td>
<td>5</td>
</tr>
<tr>
<td>5.</td>
<td>Barclays Bank of Kenya Ltd</td>
<td>115</td>
</tr>
<tr>
<td>6.</td>
<td>CFC Bank Ltd</td>
<td>20</td>
</tr>
<tr>
<td>7.</td>
<td>Charterhouse Bank (K) Ltd (Under Statutory Management)</td>
<td>18</td>
</tr>
<tr>
<td>8.</td>
<td>Chase Bank Kenya Ltd</td>
<td>10</td>
</tr>
<tr>
<td>9.</td>
<td>Citibank N.A</td>
<td>4</td>
</tr>
<tr>
<td>10.</td>
<td>Commercial Bank of Africa Ltd</td>
<td>20</td>
</tr>
<tr>
<td>11.</td>
<td>Consolidated of Kenya Ltd</td>
<td>14</td>
</tr>
<tr>
<td>12.</td>
<td>Co-operative Bank of Kenya Ltd</td>
<td>87</td>
</tr>
<tr>
<td>13.</td>
<td>Credit Bank Ltd</td>
<td>7</td>
</tr>
<tr>
<td>15.</td>
<td>Diamond Trust Bank of Kenya Ltd</td>
<td>36</td>
</tr>
<tr>
<td>16.</td>
<td>Dubai Bank Ltd</td>
<td>5</td>
</tr>
<tr>
<td>17.</td>
<td>Ecobank Kenya Ltd</td>
<td>20</td>
</tr>
<tr>
<td>18.</td>
<td>Equatorial Commercial Bank Ltd</td>
<td>12</td>
</tr>
<tr>
<td>19.</td>
<td>Equity Bank</td>
<td>123</td>
</tr>
<tr>
<td>20.</td>
<td>Family Finance Bank</td>
<td>52</td>
</tr>
<tr>
<td>21.</td>
<td>Fidelity Commercial Bank Ltd</td>
<td>7</td>
</tr>
<tr>
<td>22.</td>
<td>Fina Bank Ltd</td>
<td>15</td>
</tr>
<tr>
<td>23.</td>
<td>First Community Bank Ltd</td>
<td>18</td>
</tr>
<tr>
<td>24.</td>
<td>Giro Commercial Bank Ltd</td>
<td>7</td>
</tr>
<tr>
<td>25.</td>
<td>Guardian Bank Ltd</td>
<td>7</td>
</tr>
<tr>
<td>27.</td>
<td>Habib Bank A.G. Zurich</td>
<td>5</td>
</tr>
<tr>
<td>28.</td>
<td>Habib Bank Ltd</td>
<td>4</td>
</tr>
<tr>
<td>29.</td>
<td>Housing Finance</td>
<td>11</td>
</tr>
<tr>
<td>No.</td>
<td>Bank of bank</td>
<td>Number of branches</td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>30.</td>
<td>I&amp;M Bank Ltd</td>
<td>19</td>
</tr>
<tr>
<td>31.</td>
<td>Imperial Bank Ltd</td>
<td>16</td>
</tr>
<tr>
<td>32.</td>
<td>Jamii Bora Bank Ltd</td>
<td>1</td>
</tr>
<tr>
<td>33.</td>
<td>Kenya Commercial Bank Ltd</td>
<td>165</td>
</tr>
<tr>
<td>34.</td>
<td>K-Rep Bank Ltd</td>
<td>31</td>
</tr>
<tr>
<td>35.</td>
<td>Middle East Bank Kenya Ltd</td>
<td>3</td>
</tr>
<tr>
<td>36.</td>
<td>National Bank of Kenya Ltd</td>
<td>54</td>
</tr>
<tr>
<td>37.</td>
<td>NIC Bank Ltd</td>
<td>16</td>
</tr>
<tr>
<td>38.</td>
<td>Oriental Commercial Bank Ltd</td>
<td>6</td>
</tr>
<tr>
<td>39.</td>
<td>Paramount Universal Bank Ltd</td>
<td>6</td>
</tr>
<tr>
<td>40.</td>
<td>Prime Bank Ltd</td>
<td>14</td>
</tr>
<tr>
<td>41.</td>
<td>Standard Chartered Bank Kenya Ltd</td>
<td>33</td>
</tr>
<tr>
<td>42.</td>
<td>Trans – National Bank Ltd</td>
<td>18</td>
</tr>
<tr>
<td>43.</td>
<td>UBA Kenya Bank Limited</td>
<td>4</td>
</tr>
<tr>
<td>44.</td>
<td>Victoria Commercial Bank Ltd</td>
<td>3</td>
</tr>
</tbody>
</table>

*Source: Nairobi Securities Exchange, 2016*
APPENDIX D: LISTED COMMERCIAL BANKS ON NAIROBI SECURITIES EXCHANGE INCLUDED IN THE SAMPLE

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of Bank</th>
<th>Number of branches</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Barclays Bank of Kenya Ltd</td>
<td>115</td>
</tr>
<tr>
<td>2.</td>
<td>CFC Bank Ltd</td>
<td>20</td>
</tr>
<tr>
<td>3.</td>
<td>Co-operative Bank of Kenya Ltd</td>
<td>87</td>
</tr>
<tr>
<td>4.</td>
<td>Diamond Trust Bank of Kenya Ltd</td>
<td>36</td>
</tr>
<tr>
<td>5.</td>
<td>Equity Bank</td>
<td>123</td>
</tr>
<tr>
<td>6.</td>
<td>Housing Finance</td>
<td>11</td>
</tr>
<tr>
<td>7.</td>
<td>Kenya Commercial Bank Ltd</td>
<td>165</td>
</tr>
<tr>
<td>8.</td>
<td>National Bank of Kenya Ltd</td>
<td>54</td>
</tr>
<tr>
<td>9.</td>
<td>NIC Bank Ltd</td>
<td>16</td>
</tr>
<tr>
<td>10.</td>
<td>Standard Chartered Bank Kenya Ltd</td>
<td>33</td>
</tr>
</tbody>
</table>