

**THE DETERMINANTS OF CREDIT RISK IN COMMERCIAL  
BANKS IN KENYA**

**BY**

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## DECLARATION

I declare that this research project is my original work and has not been presented anywhere else in any university.

ISAAC G. MWAURAH      Sign.....Date.....

D63/72917/2012

This research project has been submitted with my approval as the university supervisor

MR. MIRIE MWANGI      Sign.....Date.....

University Supervisor

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## **DEDICATION**

This research work is dedicated to my family: - my wife Esther Waithera and children Jobroy Mwaurah and Janetrix Wambui who took interest and sacrificed themselves for my education. Special to my Mum and whole family for their love and support both morally and materially. Were it not for then I would not have been able to complete this work within the stipulated time.

## **ABSTRACT**

The global financial crisis and increasing vulnerability of commercial banks has of late sparked interest on the analysis of the problems banking crisis can have over an economy. Of great interest has been the determinants of that could trigger a crisis in the financial sector. The main objective of the study therefore was to establish macroeconomic and microeconomic variables that influence credit risk in commercial banks in Kenya.

A descriptive research design was used to describe data and there characteristics. The data collected was analyzed using the quantitative methods to obtain descriptive statistics. The study was conducted using correlation and regression techniques in analysis of data on factors affecting credit risk on commercial banks in Kenya upon which statistical inference were made.

The study findings revealed that credit risk in commercial banks was significantly influenced by GDP, inflation, interest rates, unemployment, stock performance and management efficiency when all the variable are working simultaneously. Analysis on individual determinants established that only management efficiency significantly influenced credit risk where as other factors held a relationship on credit risk though not significant at 5% significant level. The model findings will help the management of commercial banks and the regulators such as central bank in setting credit policies and make projections of credit risk and taking necessary actions to avoid the adverse effects of credit risk on the banks and financial industry performance.

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## ABBREVIATIONS

CBK	Central Bank of Kenya
CI	Cost Income Ratio
DW	Durbin Watson
ESOP	Employee Share Ownership Scheme
GDP	Gross Domestic Product
I.R	Interest Rate
M.E	Management Efficiency
MPT	Modern Portfolio Theory
NPA	Non-Performing Asset
NPL	Non- Performing Loans
NPV	Net Present Value
UNEMP	Unemployment
VIF	Variance Inflation Factor

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# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the Study**

The credit risk in commercial banks has been on the limelight with regards to problems facing global financial institutions today. A look around on the causes of global financial crisis, the Euro zone crisis and the fall of world greatest institutions such as Enron boils down to the question of how best is credit risk being managed. The magnitude of the financial crisis clearly demonstrates how critical commercial banks have been interconnected to the world economy (Agenello and Sousa, 2011).

The realization of commercial banks being an enigma of the world economic pillar has sparked industry players to re-examine the causes that are likely to trigger banking crisis (De Grauwe, 2008). Economist and financial think tanks attributes the success of financial industry to the mystery of financial intermediation. The health of a financial system especially in developing economies is directly correlated to the health of an economy (King and Levine, 1993; Levine and Zervos, 1998; Aghion, Howitt and Faulkes, 2005). Therefore, it is on this premise that this study sought to explore the factors affecting credit risk in commercial banks.

The main identified sources of uncertainty in banks credit portfolio is considered by greater extent to be the macroeconomic factors (Llewellyn, 2002) with emphasis on economic growth rate where adverse trend increases the credit risk, Inflation, interest and

high unemployment rates taking a center stage on banking credit crisis. The trend of stock market index also is a key indicator on how well the economy is performing to cushion on credit risk. However, these assertions do not rule out the interaction between structural weakness and macroeconomic variables. However, financial crisis was preceded by adverse trends in economic environment.

Credit risk in banks may also arise due to internal weaknesses in a financial institution such as management inefficiency. This was measured by the efficiency ratios (Total cost as a ratio of total revenue). Management deficiency affects liquidity causing an increase in nonperforming loans. The trickledown effect on poor balance sheet affects the credit rating, limiting sources of cheap capital to leverage risk on a diversified credit portfolio.

Several empirical studies have been carried out relating poor financial systems with inadequate macroeconomic policies. Inadequate Regulatory frameworks in emerging economies especially in Africa and Asia has accelerated rapid growth of credit portfolio without elaborate mechanism of managing credit risk.

### **1.1.1 Credit Risk in Commercial Banks**

Credit risk is the current or prospective risk to earnings and capital arising from an obligor's failure to meet the terms of any contract with the financial institution or if an obligor otherwise fails to perform as agreed. Credit risk one of the major risks in commercial banks and the ability to manage it effectively determines banks' stability. When executing financial decisions, banks use a credit risk assessment tool that helps to estimate the probability that the potential borrowers will default on their loan obligations.

During appraisal process, credit risk analysis is meant to minimize the potential loss to acceptable risk levels (Derelioglu and Gurgun, 2011).

To reduce the likelihood of lose due to eminent credit risk; governments have introduced prudential guidelines making financial industry one of the most highly regulated. Basel committee of banking supervision (1999) established capital risk provisions to enhance monitoring of this sensitive industry (Ioannidis, Pasiouras and Zopounidis, 2010).

The non performing loan (NPL) in the balance sheet of a financial institution represents the ratio of aggregate non performing loans and the total gross loan. In this research, non performing loans will be considered as a measure of credit risk. Historical evidence shows that most banks crisis relates with the inadequate management of credit risk (Thiagarajan, Ayyappan and Ramachandran, 2011).

### **1.1.2 Factors Affecting Credit Risk**

Banks performance with regards to credit risk depends on various internal and external factors. Internal factors are bank specific determinants and the external factors are the determinants related to economic environment (Naceur and Omran, 2011).

Macroeconomic determinants are perceived to bear the greatest impact on firms' creditworthiness. According to Figlewski, Frydman and Liang, (2012) macroeconomic determinants are categorized into three. The first being general macroeconomic determinants such as inflation and unemployment rates, second being directional

determinants such as GDP and thirdly, market conditions determinants such as interest rates and stock market index. Favorable macroeconomic conditions relate to reducing non performing loans in banks hence lower credit risk. During economic recessions, probability of default increase thus increasing the level of nonperforming loans.

GDP growth rate is a macro determinant of banks performance. On economic booms, incomes are high and port folio at risk is minimal. On recession's times, income is constraints and borrowers priorities on basic expenses at the expense of their credit obligations. There exist an inverse relationship between GDP and NPL (Vazquez, Tabak and Sauto, 2012).

Conversely, to the above exposition on GDP, researches show a positive relationship of inflation, unemployment and interest rate on NPL. High tendencies of credit risk go along with high inflation, unemployment and interest rates. These variables frustrate the borrower's ability to borrow and at the same time increase the cost of borrowing (Derbali, 2011).

Stock market index is another key determinant of credit risk in commercial banks. The rise and fall of the stock index reflect correlates to the levels of disposable income available for investing. Similar to growth domestic product, stock index determinant carries an inverse relationship to the quality of loan portfolio. Where stock return rises it implies ability to pay debt obligations is boosted thus reducing credit risk (Wong, Wong, and Leung, 2010).

Internal credit risk determinants relates to management inefficiencies within the commercial banks. Poor credit management practices are mainly characterized agency conflict on insider lending, unbalanced sectarian lending, speculative lending among others. This has been a phenomenon in major countries such as Mexico, Venezuela, Zimbabwe and Kenya especially in the late 1990s. Management inefficiencies in as a factor affecting credit risk in financial institution is measured on efficiency ratio on banks (ration of total cost to total revenue). The higher the ratio the higher the credit risk and vice versa.

### **1.1.3 Credit Risk in Commercial Banks in Kenya**

The banking sector is the backbone of the Kenyan economy and it is a critical vehicle that Links the Kenyan economy to the rest of the world. Over the last few years, the banking industry in Kenya recorded a remarkable growth in assets, liabilities and most importantly profitability. Similarly, the competition between the payers has been fierce leading to world class innovative products which has seen commercial banks in Kenya record enormous profits.

Growth in Kenyan banks has not come on a silver plate. It's worth noting that Kenyan banking system underwent a severe credit crisis in mid 1980 due to improper regulatory framework and political interference (Gil-Diaz, 1994).It was as a result of this problem that the Kenyan banking sector was liberalized in 1995 and exchange controls uplifted. The regulatory framework was also enhancing by the central bank adoption of Basel accord in its prudential guidelines which serves as the hallmark of Kenyan banks.

Global financial crisis, Euro zone crisis poses a major threat to Kenyans banking sector. It's on this basis that this study seeks to analysis factors affecting credit risk in commercial banks in Kenya. This will help to safeguard crucial economies that base their infrastructure on Kenyans economy such as East African countries and even African countries at large.

## **1.2 Research Problem**

A great deal of researchers has confirmed an existing relationship between macroeconomic and microeconomic factors on credits risk. Aver (2008) in his empirical study of credit risk factors in Slovenia Banking sectors among others concludes that GDP, unemployment rate , inflation rate, interest rate and stock market index are factors influencing the quality of credit portfolio. Consequently, Das and Ghosh (2007) analyzed the determinants of credit risk in Indian state-owned banks and affirmed a strong relationship on how banks microeconomic factors affect credit risk.

The global phenomenon, has it that credit risk is the dominant source if risk in banks. It's for this reason that the Bank of International settlement proposed strict regulatory reforms under the new Basel accord. The need for stricter regulation was due to global financial crisis which had catalyzed credit risk in banks. Majority of banks in Unites States of America, United Kingdom and Euro Zone countries have been surviving on government's bailouts .Besides the credit crunch on global financial industry, civilians are now threatening to protest for the spiraling state debts.

To safeguard the banking sector in Kenya, banks should incorporate efficient mechanism of credit risk management to manage credit risk exposures to acceptable levels (Derelioglu and Gurgen, 2011). Poor quality of credit risk was evidenced by near collapse of key banks in Kenya due to political interference at mid 1990s. Among them were state owned National Bank of Kenya, Consolidated bank of Kenya and Kenya Commercial Bank. This crumble of key banks called for strict regulation of Kenya banking system and privatization of key public institutions. Currently, the central bank through its risk management guidelines requires that banks conduct stress testing scenario to ascertain all inherent risks are at bare minimum and ensure allocation of risk capital.

In developed economies, most studies have been done to predict credit risk on banks such as Aver, (2008) on his study of credit risk factor on Slovenian banking system; Das and Ghosh (2007) in their study on determinants of credit risk in state-owned banks in India. These studies have been conducted under unique regulatory and economic environments where the level of market efficiency is advance compared to those of emerging and developing countries like Kenya. Local studies that have been done credit risk have concentrated largely on effects of credit risk management on performance of commercial banks in Kenya. This includes: Kithinji (2011) in her study on credit risk management and profitability of commercial banks in Kenya. Musyoki (2011) and Ogilo (2012) separately conducted an empirical study on the impact of credit risk management on financial performance of Kenyan banks. Ngetich (2011) also analyzed the effects of interest rates spread on the level of non-performing assets on commercial banks in Kenya.

Despite these profound studies on credit risk, a review of empirical studies revealed no research had been done to analyze the determinants of credit risk on commercial banks in Kenya and this is the gap this study intended to fill. The concern of this study therefore was to identify the macro economic factors and micro economic factors affecting credit risk in commercial banks in Kenya. The study was sought to answer the question. To what extent does the macroeconomic and micro economic determinants affects credit risk on commercial banks in Kenya?

### **1.3 Research Objectives**

The study objective was to analyze the determinants of credit risk in commercial banks in Kenya.

### **1.4 Value of the Study**

These research findings will help in addressing the existing knowledge gap in literature of credit risk management in Kenya. It will also be a valuable addition to the existing knowledge and provide a platform for further research which will be useful to academicians and scholars.

The study will be of great benefit to oversight boards, senior management and investors of financial institutions in Kenya. The managers in all commercial banks targeted in the study will clearly understand more on determinants of credit risks in commercial banks in Kenya. They will have the advantage of applying the recommendations made on the study and engage the relevant stakeholder to determine whether to avoid risk, transfer

risks (insurance), risk reduction (mitigating risk) or retain the risk in a bid to maximize returns.

The study will also have great benefit to the government and regulatory bodies. It will help the regulators to understand the scope to credit risk management and how to strengthen the financial industry in terms of policies such as stress testing provisions to determine the adequacy of the risk capital provided for by the regulator.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter covered the literature review on credit risk. It encompasses the theoretical framework on credit risk; evaluate what other researchers have written on credit risk and its determinants both macroeconomic and microeconomic. It concluded on empirical review on credit risk and its determinants highlighting the knowledge gap.

#### **2.2 Theoretical Review**

There have been several theoretical studies on credit risk and determinant of credit risk. Majority of this theoretical frameworks relating to credit risk emphasize on risk concept, macroeconomic policies as well as structural and governance failures. Highlighted below are Modern Portfolio Theory, Agency Theory and Routine Activity Theory.

##### **2.2.1 Modern Portfolio Theory**

Modern portfolio theory (MPT) was developed by Harry Markowitz in 1952. The theory posits that an investor would theoretically be able to maximize his expected return while minimizing the variability of returns by investing in a diversified portfolio of assets that had different price movements in a given market. Most importantly, for the first time, portfolio risk could be summarized into a number that could then be measured and tracked. MPT breaks risk into two parts: systematic risk and unsystematic risk. Systematic risk is the risk inherent in the market. Unsystematic risk is the idiosyncratic risk that

exists with the investment of a particular security. An important conclusion of MPT is that one can minimize the unsystematic risk through diversification.

Studies have shown that you only need a minimum of 20 securities to substantially diversify a portfolio. According to MPT, whether credit risk is diversifiable or not, it's all depends with its determinants. This implies that governance structure of commercial banks cannot eliminate credit risk determined by macroeconomic variable by diversifying the portfolio within the country. Consequently, risk attributable by the unsystematic factors which in this study are also referred to a microeconomic factors can be well be diversified through sector lending.

### **2.2.2 Agency Theory**

Agency theory sometime referred to as principal-agent theory explains the conflict of interest the shareholders hereby referred to as the principals and the managers and debt holders here referred to as the agents (Jensen and Mecling, 1976). The theory defines agency relationship as a contract that the principal engages the agent to perform some duties on their behalf; similarly, the principal from time to time may delegate some duties to the agent.

On this premise of the agency relationship, agency conflict may arise because the agent in executing the duties of the principal may also affected by his own welfare interest which impair him from acting at the best interest of the principal. Once banks managers are well remunerated by the shareholders, they are left in loft and do not seek any diligence since they have gotten all that was need to have them work prudently. They

may engage in activities that depart from shareholder value maximization. To ensure their social power, loans approvals are done without proper vetting and credit scoring. It's for this reason they may approve projects with negative NPV (Rajan, 1994).

However, theoretical and empirical studies have established that agency conflict in commercial banks is largely attributed by moral hazard, earnings retention, risk aversion and time horizon. The factors therefore determine the extent to which credit quality is likely to be affected as a result of agency conflict. Effective governance structure is therefore imperative in commercial banks to institute balance performance incentives to the managers. ESOPs scheme are good pointers of encouraging the employees serve as part owners to minimize principal-agents conflicts (Fenn and Liang, 2001)

### **2.2.3 Liquidity Preference Theory**

The third theory that guided the study was liquidity preference theory proposed by United Kingdom economist John Maynard Keynes. Keynes observed that all factors held constant, people prefer to hold cash (liquidity) rather than any other form of assets and they will demand a premium for investing in illiquid assets such as bonds, stocks and real estates. The theory continues to contend that the compensation demanded for parting with liquidity increases as the period of getting liquidity back increases.

Liquidity preference theory continue to dominate the central concepts in economic and finance in its application on the theory of demand for money. With regards to Keynes theory, central banks set the rate of interest in order to control the price of assets though the demand for money. On emphasis on why people will at all times prefer holding cash,

the economist explained these to the existence of three motives: the motive to keep cash of daily transactional need, the motive to keep cash for precautionary tendencies and finally the speculative motive so as to take advantage on opportunities (Bibow, 1995).

The analogy of Keynes theory is imperative on the assets and liabilities functions of a commercial bank. The theory explains why banks will undertake to compensate for liabilities and also provides essence of why banks will seek compensation for their assets. This compensation describes the interest rate factor which is a risk factor affecting credit risk in commercial banks. Therefore, banks will charge higher interest rates where possibility of default is higher hence liquidity preference theory.

### **2.3.1 Macro Economic Factors**

Empirical studies suggest that for every banks crisis there are some macro economic variables relating bank crisis to the economic performance. GDP growth rate forms a prominent measure of economic activity. Whenever GDP growth rate improves household's salaries and wages increases which cyclically improves the quality of loans portfolios in banks. Conversely, when economic growth rate declines; household cash flows are reduced and therefore households priorities their expenditures on consumptions rather than on meeting their debt obligations. Therefore, favorable economic environment relates with better capacity of honoring debt obligations hence the ratio of nonperforming loans to total loans is significantly reduced (Hamerle, Dartsch, Jobst and Plank, 2011).

GDP growth rate is considered as the most significant macro determinant of credit risk, offering a foundational relationship to all other macro factors affecting credit risk.

However, GDP growth rate depicts a pronounced inverse relationship with NPLs. The econometric findings indicates disparities of persistence NPLs across credit sectors; consumers sector proving to be most sensitive to economic activity (Vazquez, Tabak and Sauto, 2012).

Interest rates form the basis of financial intermediation. Banks facilitate mobilizations of deposits by offering depositors a price on their savings. These pooled funds are thereafter diversified by sector lending as a means to mitigate risk of loan defaults (Ngugi, 2001). Long term interest rates on lending affect the price borrowers pay on their financial obligations. The higher the price on interest the more likely the borrower will be unable to fully satisfy his obligations to service debt. Interest rate being macroeconomic variable is influenced by the regulatory authority such as central banks on its fiscal and monetary policy formulation. Its carries and direct relationship to credit risk. The higher the price the more likely the loan will be defaulted and vice versa (Aver, 2008).

Research study links the effect of credit risk to inflation rate. Studies contends that inflation rate is directly related to credit risk and its does not matter whether the banking regime is conventional or Islamic as the case was found even with the Iranian Islamic banking (Makiyan, 2003).Where an economy is characterized by reduced purchasing power due to increased inflation, banks performance on profitability reduces due to increased portfolio at risk.

The unemployment rate provides additional macroeconomic variable affecting credit risk. An increase in unemployment rate carries a negative influence to the household's income and therefore frustrating their ability to service their debt obligations. Unemployment also affects firms through drop of effective demand of their production. This combined effect of joblessness on firms and households directly affects economic activity and similarly the credit portfolio.

Studies reveal that the stock market index is a good indicator of the general financial condition of an economy and that the stock market index carries an inverse relationship to the quality of bank loans. An increase in the index shows that the companies represented by the stocks are performing well to attract investors. Also, an increasing index also indicated an able and willing market. This means that the market is liquid enough to resort to stock investments. It is this liquidity that has a relationship with how debt obligations are financed (Bonfim, 2009).

### **2.3.2 Micro Economic Factors**

The literature spells out principal-agent relationship as a primary factor influencing the risk appetite of a financial institution. Moral hazard, ownership structure, regulatory framework and governance mechanism forms the theoretical micro determinants of credit risk. These factors form the basis of measuring credit growth, operating efficiency and solvency (Kwan and Eisenbis, 1997).

In this study, the focus of literature review zeroed to managerial efficiency as a microeconomic determinant of credit risk. Commercial banks crisis arises mostly due to

inadequate management capabilities (Tay, 1991). Competency and management responsibility play a crucial role in deciding the risk appetite of a financial institution. Poor credit management practices lead to bad lending which give rise to a bloated portfolio of unpaid loans.

According to Central Bank of Kenya risk management guideline (2013) Sound Bank management need to establish an elaborate system to monitor quality of loans on a day to day basis. Credit policy on lending should explicitly outline procedures on credit appraisal, approval, monitoring and recovery. The quality of Management and in a financial institution bears an inversely relationship to credit risk. Inadequate governance structures lead to increased risk on loan quality. Management inadequacy can be measured by analyzing the efficiency ratio of commercial banks over a period of time. The measure of the efficiency ratio amounts to total cost over total revenue of financial institution.

## **2.4 Empirical Evidence**

There have been numerous studies to the literature on of failure of commercial banks, but empirical studies focusing exclusively on the factors affecting credit risk on commercial banks have been scanty. In their study, Das and Ghosh (2007) analyzed the determinants of credit risk in Indian state-owned banks.

The paper sought to analyze the loans problems of state owned banks in India for the period 1995-2005. The analysis of the study concluded that, although credit risk was influenced by macro economic variables; the quality of loans was significantly

determined by the single bank individual variables. The was concluded after realizing that despite controlling the macroeconomic factors still credit risk was highly affected by micro factors. Evidence from the study indicated that excessive growth of loan book outstrips banks capacity to monitor the portfolio. Also bigger banks proved to have problems with managing loans than small banks creating the need of applying monitored speed limit during lending (Honohan, 1997). The study concluded that excessive loan growth and institution expansion capacity need to grow along with impeccable managerial skill relevant to strategize and manage institutions risk appetite to avert unforeseen risk.

In another study, Aver (2008) conducted an empirical analysis of credit risk factors affecting Slovenian banking system. The research result established certain macro economic factors exert notable influence on credit risk. Literature on study affirms that unemployment rate, interest rates and stock market index were pivotal in influencing credit risk in Slovenian banking system. No sufficient linkage of inflation rate, GDP growth rate, exchange rate or growth of import-export trade was noted to affect credit risk.

In Kenya, the banking industry has recorded remarkable growth in both assets liabilities. These developments took shape after the liberalization of the Kenyan banking industry in 1992 marking the beginning of fierce competition among commercial banks. Liberalization saw banks lend huge credit size to increase profitability but this went at the expense of credit risk. Kithinji, (2010) analyses this phenomenon in a study to analyze

the relationship between credit risk management and profitability of commercial bank in Kenya. The study sought to find out how banks profitability was affected by the non performing loans and growth of credit portfolio in a study conducted between 2004-2008. The study revealed a decline in credit level and improvement in the quality of loans. This improvement was attributed with the compliance by commercial banks to Basle II provision. However, the regression analysis did not reveal any relationship between profits, credit level and non performing loans suggesting that other variable apart from credit level and non performing loans affects profits.

In another study Musyoki (2011) investigated the impact of credit risk management on financial performance of banks in Kenya between years 2000 to 2006. The found out that default rate (credit risk) was a major predictor of banks success carrying a strong inverse relationship to banks financial perform ace. The study concluded that although banks performance is also affected by other environmental factors, credit risk management is pivotal for the Kenyan banks to stand the test of time.

Ngetich (2011) examined the effects of interest rate spread on the level of non-performing assets in commercial banks in Kenya. The study results found a strong relationship between interest spread and the ration of N.P.A. The study concluded that I.R spread affects N.P.A in banks because it increased the cost loaded on principle amount calling for stern regulatory framework in credit risk management.

## **2.5 Conclusion**

Kenya financial industry has been in the recent past the key driver of the economy. The sector had been singled out as a key pillar to the attainment of Kenya vision 2030. Indeed, major banks have adopted financial inclusive products and services which has revolutionalised economic activities thus improving standard of living of Kenyans of whom majority lie slightly above the poverty line.

Research studies have shown that despite the importance of commercial banks in an economy, Banks are still collapsing due to high levels of nonperforming loans. Das and Ghosh (2007) related non performing loans to firm related factors after controlling macro economic variables in their study of determinants of credit risk in India state owned banks. Aver (2008) in his study on empirical analysis of credit risk factors affecting Slovenian banking system related credit risk to selected macroeconomic factors. A further study conducted by Kithinji (2010) on credit risk management and profitability of commercial banks in Kenya found no relationship between credit risk and profitability. Her findings emphasized that presence of other factors rather than credit risk affected profitability of banks.

Although studies on determinants of credit risk on banks have been done in developed markets, empirical studies reveal no local research has been done in Kenya. Therefore this study will seek to analyze the determinants of credit risk in commercial banks in Kenya. It's worth noting that Kenya is a developing country to with different setting, market efficiency, regulations, industry players and political influence and therefore these

factors makes the findings unique to the study environment. The study will seek to analyze how GDP, Inflation rate, interest rates, Unemployment, Stock market index and Management efficiency affects credit risk on banking sector in Kenya on how to safeguard against the detriments of credit risk on this converted banking industry in Kenya.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter described the procedure that was to be followed in carrying out the study. It contains the research design, the population, data collection and data analysis techniques.

#### **3.2 Research Design**

Descriptive research design will be used in the study. Descriptive research design describes data and characteristics about the phenomena as they exist. Descriptive studies generally take data and summarize it in a useable form. According to Mugenda and Mugenda (2003), the method will appropriately enable the researcher to analyze the objectives tentatively and also the validity and reliability of the results will be increased. The study will use dependent and independent variables. The Independent part is that which the researcher will use for experimentation, these changes or enacts in order to do the experiment. The dependent variable is that which will change when the independent variable changes - the dependent variable will depend on the outcome of the independent variable.

#### **3.3 Population**

Target population in the study included all commercial banks in Kenya. There were 43 commercial banks in Kenya as of December 2012. This is the population that was used as the source of information.

### **3.4 Sample Design**

The study applied both scientific and non scientific sampling designs. Judgmental and stratified random sampling designs were used in selection of the samples based on the judgment of the researcher as to which subjects best fitted the criteria of the study.

The study used a sample of 20 out of 43 commercial banks to be analyzed for the period 2003-2012 classified according to their asset base. The period of study was chosen relevant to the period under which banking sector experienced tremendous growth, challenging and competitive environment. Similarly, the period of study was chosen recent enough to ensure data was readily available and reliable for the study.

Banking survey 2013 report classified banks into 4 tiers based on their asset based. This tier classification technique was used to conduct a stratified random sampling design to randomly select 5 banks from each of 4 tier classification. The combination of these sampling designs was aimed to incorporate the effect of small and big banks in the study.

### **3.5 Data Collection**

The study used secondary data sources to gather information on annual basis in order to realize research objectives. The data was collected from Kenya National Bureau of Statistics, Central Bank of Kenya reports on macroeconomic indicators, annual financial statements commercial banks, and Nairobi securities exchange reports among other sources. It is this secondary data sourced on annual interval that was used as inputs in the analysis of the data.

### 3.6 Data Analysis

The data collected was analyzed using the quantitative methods to obtain descriptive statistics such as frequency, percentages, mode, median and standard deviation.

The factors affecting credit risk in a range of commercial banks in Kenya were examined with the help of Statistical Package for Social Science (SPSS) and specific statistical method: Multiple Linear regression analysis was used to conduct the test of statistical significance and explanatory power using data analysis techniques such as Pearson Correlation, R-squared, ANOVA and F-test. Below is the multiple regression models that will guided the study.

$$NPL = \beta_0 + \beta_1 GDP + \beta_2 Inflation + \beta_3 I.R + \beta_4 Unemployment + \beta_5 Stock\ index + \beta_6 M.E + \varepsilon$$

NPL : Non- performing loans (%). Nonperforming loans/ total loans

GDP : Market Size of the economy captured by Gross Domestic Product (%)

Inflation : Consumer good prices (%)

I.R : Commercial Banks Lending rate (%)

Unemployment: Prevalence of Joblessness. Unemployed/ Labor force (%)

Stock Index : Nairobi securities exchanges all share Index.

M.E : Management efficiency (%). Total Cost / Total Revenue. Or Cost Income ratio

Multiple regressions helped to establish how a set of independent variables explained a proportion of the variance of a dependent variable to a significant level through

significance test of statistic and explanatory power. It also helped to explain the relative predictive importance of independent variables by comparing the beta weights.

## **CHAPTER FOUR**

### **DATA ANALYSIS AND FINDINGS**

#### **4.1 Introduction**

This chapter involved analysis of data collected and discussion of the results obtained.

#### **4.2 Data Analysis, Results and Discussion**

In this section data was collected for ten years (2003-2012) from the twenty commercial banks categorized in four tiers on the basis of their value of assets where five banks were randomly selected from each tier. According to Banking survey 2013, tier one consisted of commercial banks with asset based above 150 billion and these were five banks, tier two are banks with asset base more than 50 billion but less than 150 billion and these consisted of seven banks, tier three were banks with asset base above 15 billion but less than 50 billion which comprised of 12 banks and finally tier four consisting of banks with asset base of less than 15 billion having 19 banks. This is summarized in table 4.1.

**Table 4.1: Tier Groups of Commercial Banks**

Tier Group	Asset Base	Number of banks
1	Above 150 billions	5
2	Between 150-50 billions	7
3	Between 50-15 billion	12
4	Below 15 billion	19

Source: Research Data

As shown in table 4.2, the ten years under the study (2003-2012) commercial banks in Kenya had an average credit risk of 8.662%; the country grew at average growth rate of 4.63% with an average inflation rate averaged 11.0%. Lending rate charged by commercial banks averaged 14% p.a within the period. Unemployment averaged 35.2% where cost income ratio on commercial banks averaged 59.93% and finally the stock performance averaged an index of 3699.8 for the ten years.

**Table 4.2: Descriptive Statistics**

	Mean	Std. Deviation	N
NPA	8.662	4.3124	10
GDP	4.6300	1.76953	10
INF	11.0200	3.37369	10
IR	14.6640	2.08595	10
UNEMP	35.2000	3.52136	10
CI	56.9260	8.96214	10
SI	3699.8160	1044.83589	10

Source: Research Data

### 4.2.1 Regression Analysis

As a Key assumption of the regression model, the analysis sought to establish whether there was linearity between the dependent variables against the dependent variable. The dataset comprised of values for ten years (2003-2012) and the results were as par the table 4.2 below

**Table 4.3: Pearson Correlations**

		NPA	GDP	INF	IR	UEMP	CI	SI
	NPA	1.000	.038	.114	-.444	-.253	.851	-.541
	GDP	.038	1.000	-.367	-.284	-.793	.054	.394
	INF	.114	-.367	1.000	-.194	.065	.177	.100
	IR	-.444	-.284	-.194	1.000	.019	-.544	-.147
	UNEMP	-.253	-.793	0.65	.019	1.000	-.166	-.205
	CI	.851	.054	.177	-0.544	-.166	1.000	-.549
	SI	-.541	.394	.100	-.147	-.205	-.549	1.000

Source: Research Data.

Pearson correlation was used to analyze the correlations between the variables and the non performing assets. The results in table 4.2 showed that GDP had a correlation coefficient of 0.038 at p-value of .078 indicating a relationship of GDP against NPA which was not significant with a p-value higher than 0.05. Inflation indicated a correlation coefficient of 0.114 with NPA at a p-value of 0.111 implying existing relationship which was insignificant. Lending rate revealed a correlation of -0.444 with NPA at a p=0.359 indicating a relationship which was insignificant. Unemployment rate correlated with NPA with a coefficient of -0.253 at p=0.074 indicating the insignificant relationship. Cost income ratio had a correlation coefficient of 0.851 with NPA at p=.023 indicating a significant relationship and finally Stock performance had a correlation coefficient of -0.541 with NPA at p=.582 indicating insignificant relationship.

**Table 4.4: Model Summary (b)**

Model	R	R Square	Adjusted R Square	Std. Error	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. Change	
1	.988(a)	.976	.928	1.1569	.976	20.343	6	3	.016	2.534

a) Predictors: (Constant), SI, INF, UNEMP, IR, CI, GDP

b) Dependent Variable: NPA

Source: Research Data

Table 4.4 illustrates that the strength of the relationship between credit risk and its determinants (growth rate, inflation, interest rates, unemployment, stock performance and management efficiency). The correlation results depicted a strong linear relationship with R value of .988. R-squared indicates that 97.6% of credit risk is explained by the GDP, inflation, interest rates, unemployment, stock performance and management performance.

The research findings also used Durbin Watson (DW) to ascertain that the residuals of the model were not auto correlated since the residuals influences the regression analysis. The study found a DW statistic of 2.534 which is close to 2 indicating that there was no autocorrelation.

**Table 4.5: Multicollinearity Test**

	Tolerance	VIF
GD	.11	9.999
Inflation	.377	2.651
I.R	.215	4.658
Unemployment	.136	7.346
C.I	.186	5.379
S.I	.255	3.915

Source: Research Data

With the finding son table 4.5, the study conducted a multicollinearity test on tolerance and variance inflation factor (VIF). On tolerance there were no less than 0.1 values where as on VIF there were no values greater than 10 implying no multicollinearity was detected.

**Table 4.6: ANOVA (b)**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	163.36	6	27.23	20.34	.016(a)
	Residual	4.015	3	1.338		
	Total	167.37	9			

a) Predictors: (Constant), SI, INF, UNEMP, IR, CI, GDP

b) Dependent Variable: NPA

Source: Research Data

Table 4.6 show a significant ANOVA F- statistic of 20.343 greater than a p-value of 0.05. The regression model  $NPA = \beta_0 + \beta_1 GDP + \beta_2 Inflation + \beta_3 I.R + \beta_4 Unemployment + \beta_5 Stock\ index + \beta_6 M.E + \epsilon$  is significant with a p- value 0.016. This implies that a significant relationship exists between credit risk and GDP, Inflation, I.R,

Unemployment, stock performance and management efficiency measured as cost income ratio and therefore these variables jointly effectively predicts credits risk.

**Table 4.7: Regression Coefficients**

Model	Unstandardized Coefficients		Std Coefficients	t	Sig.	Correlations		
	B	Std. Error	Beta			Zero-order	Partial	Part
(Constant)	30.178	23.446		1.287	.288			
GDP	-1.824	.693	-.748	-2.633	.078	.038	-.835	-.235
INF	-.417	.186	-.326	-2.241	.111	.114	-.791	-.200
IR	-.432	.399	-.209	-1.082	.359	-.444	-.530	-.097
UNEMP	-.798	.297	-.652	-2.690	.074	-.253	-.841	-.241
CI	.427	.100	.887	4.277	.023	.951	.927	.382
SI	.005	.001	.109	.615	.582	-.541	.334	.055

Source: Research Data

The established regression equation for the study:

$$NPA = 30.178 - 1.824 * GDP - 0.417 * Inflation - 0.432 * I.R - 0.798 * UNEMP + 0.427 * CI + 0.005 * SI + \epsilon$$

The model depicts that holding the independent variables constants (GDP, Inflation, IR, unemployment, S.I, and CI); credit risk will be at 30.178 billion. This implies even if commercial banks do not give loans; they will still experience some credit risk exposure. GDP coefficient is -1.824 indicating that as economic performance improves the level of credit risk declines. Inflation had a negative coefficient of -0.417 to imply that positive (increase) inflation reduced credit risk. I.R had a negative coefficient of -0.432 implying that as the cost of borrowing increased credit reduced. This fact could be related to banks extorting borrowers who are committed to meet their credit obligations and therefore, however much credit increase they still struggled to meet their debt claims.

The model also shows a negative unemployment coefficient of -0.798 which is an inverse relationship to credit risk. This can be related to the notion that the population on debt is not falling jobless and therefore what could be raising unemployment is not related to population under debt. Cost income ratio has a positive relation to credit risk with a coefficient of 0.427. This means as banks improved on operational efficiency, credit risk reduced and vice versa. Finally the stock performance holds a positive relation to credit risk though at a marginal level with a coefficient of 0.005. As stock performance improves credit risk increased. This could be assimilated to tough economic times where the borrowers struggle to meet obligations especially by disposing their stocks which at this difficult time the stocks are usually underpriced.

### **4.3 Summary of Findings and Interpretations**

The objective of the study was to analyze the determinants of credit risk in commercial banks in Kenya. Credit risk was established as the dependent variable measured with non performing asset as a percentage of total loans while the independent variables were taken as the macroeconomic and micro economic factors of credit risk namely: GDP, inflation, unemployment, interest rates (lending rates), stock performance and the management efficiency.

A multiple regression analysis conducted established a linear relationship with a coefficient of determination of 97.6%. This implies that the chosen macroeconomic and micro economic determinants of credit risk influenced credit risk in Kenya banks during year 2003-2012 by 97.6% and only 2.4% of credit risk was associated with other

unexplained factors. The regression results also indicated that the relationship between GDP, Inflation, unemployment, interest rates, stock performance and management efficiency against credit risk is significant at 0.05 level of significance levels with a p-value of 0.016. These findings conform to the findings of Das and Ghosh (2007) in their study of determinants of credit risk in Indian state owned banks.

The study also found out that holding all the independent variables constants the Kenyan banks still could have experienced credit risk during the period of 30.178 billion. Management efficiency measured as a ratio of cost to income depicted a significant relation with a p-value of 0.023 which conforms to the financial theoretical expectation. This finding also conforms to that found out by Ahmad and Ahmad (2003) in their case of factors influencing conventional banks credits risk in Malaysia. All the other determinants depicted insignificant relationship with p-values greater than 0.05.

As found out by Aver(2012) in his study of analysis of credit risk of Slovenia banking system, Inflation, unemployment and interest rate(lending rates) depicts an illogical relationship from that of theoretical expectation. These variables reduced as credit risk increased. Stock performance depicted a positive relationship to credit risk but marginally. On interest rate, the findings contradicts with the finding of Ngetich(2011) that increase of lending rates increase the cost of borrowing hence affecting credit risk in commercial banks in Kenya.

## **CHAPTER FIVE**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1 Introduction**

In this chapter, conclusion, recommendations, limitation of the study and areas of further study were established.

#### **5.2 Conclusion**

The study investigated the analysis of determinants of credit risk in commercial banks in Kenya. The unique nature of the banking system and its role in global financial system provides an insightful intuition that one would seek to identify the determinants credit risk in the banking sector in Kenya.

The findings from this study support the intuition from empirical evidence and theoretical framework that credit risk in commercial banks is determined by macroeconomic and microeconomic factors. This means that credit risk in commercial banks in Kenya is determined by GDP ,Inflation, interest rates, unemployment, stock performance and management efficiency when all working simultaneously. Hence the study model was significant. When the variable operate independently, we can conclude that GDP, inflation, interest rates, unemployment and stock performance held a relationship with credit risk but one which is insignificant. Management efficiency is concluded as the variable that influenced credit risk supporting the findings of Das and Ghosh (2007) that microeconomic determinant affects credit risk in commercial banks holding other macro

variables constant.

### **5.3 Recommendations**

While there have been a number of studies on credit risk, studies on determinants of credits risk in commercial banks have been limited and therefore this study sought to address this gap where industry players especially in Kenya will be able to predict the credit risk which we find is highly influenced by internal bank level variables.

Policy implications can be gained from this study where evidence suggests banks with lower capital base experience difficulties in managing credit risk than those with higher capital base. The regulatory authority should monitor these banks to safeguard from the dire implications of credit risk. Secondly, it's evident in the study that during the period 2003-2012, increased inflation lead to a decrease in credit risk accustomed also to improving growth rate. This observation may help the macroeconomic policy makers establish that not always will low inflation be undesirable to tame credit risk.

Thirdly, moreover, from the study, the regulator should establish that as the economy grew banks charged borrowers higher rates implying the benefits of economic growth is all leading to the balance sheet to banks and take corrective policy measures. Finally, central banks may establish how management efficiency significantly determines credit risk; they should tighten the governance structures in the banking industry to promote compliance, accountability and transparency to enhance a strong and sound banking system

## **5.4 Limitations of Study**

Although this study has achieved its objectives, there were bound to some limitations.

The study findings are limited to generalize the observations on wider economic integrations such as the due to the challenge of comparable aggregate data. The macroeconomic variables are influenced by cross border effects; this limits the usability of the study findings.

The Political environment which is a major influence of especially macroeconomic determinants was not adequately represented in the model .This due to due to the fact that emerging economies macro economic variables as they operate on markets forces are highly affected by political factors. Limitations of efficient and objective financial reporting and time constraints were also not well addressed in the model.

## **5.5 Suggestions for Further Research**

From the analysis of this study, there are interesting avenues of future research. Such as; it would be interesting to extend the research of determinants of credit risk to other East African countries though there may be a challenge of comparable aggregate data of credit risk.

In emerging economies such as Kenya, political influence affects macroeconomic determinants of credits risk. It is on this account that further research may include measurements of political influence on the model to establish to what extent macroeconomic variables affects credit risk devoid of political influences.

## REFERENCES

- Aghion, P., Howitt, P., & Mayer-Faulkes, D. (2005): The Effect of Financial Development on Convergence: *Theory and Evidence*, *Quarterly Journal of Economics*, 120, 173-222.
- Ahmad, H., & Ahmad, N. (2003). Key Factors Influencing Credit Risk of Islamic Bank: A Malaysian Case. University of Utara, Malaysia.
- Agnello, L., & Sousa, R. (2011). How do Banking Crisis Impact on Income Inequality? *NIFE Working Papers*, WP 30/2011. University of Minho.
- Aver, B. (2008). An Empirical Analysis of Credit Risk Factors of the Slovenian Banking System. *Managing Global Transitions*. 6(3), 317-334.
- Basel committee, (1999): Principles for Management of Credit Risk. Basel committee on banking supervision.
- Bibow, J. (1995). "Some Reflections on Keynes Finance Motive for the Demand for Money. *Cambridge Journal of Economics* 19(5), 647-66.
- Bonfim, D. (2009). Credit Risk Drivers: Evaluating the Contribution of a Firm Level of Information and Macroeconomic Dynamics. *Journal of Banking and Finance*, 33(2), 281-299.

- Boudriga, A., Boulila, N., & Jellouli, S. (2009). Does Bank Supervision Impact Nonperforming Loans: Cross Country Determinants Using Aggregate Data. *Journal of Banking & Finance*, 25(1), 47-95.
- CBK, (2013): Risk Management Guidelines. Central Bank of Kenya Reports.
- Das, A., & Ghosh, S. (2007). Determinants of Credit Risk in Indian State Owned Banks: An Empirical Investigation. Reserve Bank of India.
- De Grauwe, P. (2008). The Banking Crisis: Causes, Consequences and Remedies. University of Leuven and CEsifo. Mimeo.
- Derbali, A. (2011). Determinants of Banking Profitability, Before and During the Financial Crisis of 2007: The Case of Tunisian Banks. *Interdisciplinary Journal of Contemporary Research in Business* (3), 1256-1269.
- Derelioglu, G., & Gurgun, F. (2011). Knowledge Discovery Using Neutral Approach for SME's Credit risk Analysis Problem in Turkey. *Expert System with Applications* (38), 9313-9318.
- Fenn, G. W., & Liang, N. (2001). Corporate Payout Policy and Managerial Stock Incentives. *Journal of Financial Economics*, 60(1), 45-72.

- Figlewski, S., Frydman, H., & Liang, W. (2012). Modeling the Effect of Macroeconomic Factors on Corporate Default and Credit Rating Transitions. *International Review Economics and Finance* (21), 87-105.
- Gil-Diaz, F. (1994). The Origin of Mexico's 1994 Financial Crisis. *Journal of Financial Economics* 17(3) 47-58.
- Hamerle, A., Dartsch, A., Jobst, R., & Plank, K. (2011). Integrating Macroeconomic Risk Factors into Credit Portfolio Models. *The Journal of Risk Model Validation* (5), 3-24.
- Honohan, P. (1997). Banking System Failures in Developing and Transition Countries: Diagnosis and predictions, BIS Working Paper No. 39
- Ioannidis, C., Pasiouras, F., & Zopounidis C. (2010). Assessing Bank Soundness with Classification Techniques. *Omega* (38), 345-357.
- Jensen, M.C., & Meckling, W. (1976). Theory of the Firm: Management Behavior, Agency Cost and Ownership Structure. *Journal of Financial Economics*, 3(4), 305-360.
- King, R., and Levine, R. (1993): Finance and Growth: *Schumpeter Might be Right*, *Quarterly Journal of Economics*, 108, 717-738.
- Kithinji, A.M. (2010). Credit Risk Management and Profitability of Commercial Banks in Kenya. *Journal of Business and Public Management*, 2(4).

- Kwan, S., and Eisenbis, R. (1997): Bank Risk, Capitalization and Operating Efficiency. *Journal of Financial Services Research*, 12, 117-131.
- Levine, R., & Zervos, S. (1998). Stock Markets, Banks and Economic Growth. *American Economic Review*, 88 (3), 537-558.
- Llewellyn, D. (2002). An Analysis of the Causes of Recent Banking Crisis. *European Journal of Finance*, 8, 152-175.
- Makiyan, S.N. (2003). Role of Return on Loans in the Islamic Banking System of Iran. *Managerial Finance*, 25(7), 62-69.
- Mugenda, O. M., & Mugenda, A., G. (2003). Research Methods and Statistics. African Centre Technology Publishers, Nairobi.
- Musyoki, D. (2011). The Impact of Credit Risk Management on the Financial Performance of Commercial Banks in Kenya. *Journal of Business and Public Management*, 2(2), 72-80.
- Naceur, S. B., & Omran, M. (2011). The Effects of Bank Regulations, Competition and Financial Reforms on Banks Performance. *Emerging Markets Review* (12), 1-20.
- Ngetich, J. C. (2011). The Effects of Interest Rate Spread on the Level of Non-Performing Assets in Commercial Banks in Kenya. *Journal of Business and Public Management*, 1(1), 58-65.

- Ngugi, R.W. (2001). *An Empirical Analysis of Interest Rate Spread in Kenya*. African Economic Research Consortium, Research Paper 106.
- Ochieng, O. (2013). *The Banking Survey 2013*. Think Business Publication, Nairobi.
- Ogilo, F. (2012). The Impact of Credit Risk Management on Financial Performance of Commercial Banks in Kenya. *African Management Review*, (3), 22-37
- Rajan, R. G. (1994). Why Banks Credit Policies Fluctuate: A Theory and Some Evidence *The Quarterly Journal of Economics*, 109(2), 399-441.
- Tay, T. (1991). *Methods of Optimal Risk Management*. New York, Pitman.
- Thiagarajan, S., Ayyappan, S., & Ramachandran, A. (2011). Credit Risk Determinants of Public and Private Sector Banks in India. *European Journal of Economics, Finance and Administrative Sciences* (34), 147-154.
- Vazquez, F., Tabak, B. M., & Sauto, M. (2012). A Macro Stress Test Model of Credit Risk for the Brazilian Banking Sector. *Journal of financing stability* (8), 69-83.
- Wong, J., Wong, T.C., & Leung, P. (2010). Predicting Banking Distress in the EMEAP Economics. *Journal of Finance Stability* (6), 169-179.

## **APPENDIX 1**

### **LIST OF COMMERCIAL BANKS IN KENYA AS AT 31<sup>st</sup> DECEMBER 2012.**

1. Kenya Commercial Bank
2. Equity Bank
3. Co-operative Bank of Kenya
4. Standard Chartered Bank
5. Barclays Bank of Kenya
6. CFC Stanbic Bank
7. NIC Bank
8. Commercial Bank of Africa
9. Diamond Trust Bank
10. Investments & Mortgages Bank Ltd
11. Citibank Kenya
12. National Bank of Kenya
13. Chase Bank
14. Bank of Africa
15. Bank of Baroda
16. Prime Bank
17. Housing Finance
18. Imperial Bank
19. Ecobank
20. Family Bank
21. Bank of India

22. African Banking Corporation
23. Consolidated Bank
24. Fina Bank
25. Equitorial Commercial Bank
26. Gulf African Bank
27. Development Bank of Kenya
28. Giro Commercial Bank
29. Fidelity Commercial Bank
30. Guardian Bank
31. Victoria Commercial Bank
32. First Community Bank
33. Habib A.G. Zurich
34. K-Rep Bank
35. Trans-National Bank
36. Paramount Universal Bank
37. Habib Bank Ltd
38. Credit Bank
39. Oriental Commercial Bank
40. Middle East Bank
41. Jamii Bora Bank
42. UBA Kenya Ltd
43. Dubai Bank

## APPENDIX 2

### Specific Data on Non Performing Assets (%)

	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
1 Equity Bank	2.22	2.36	4.9	7.38	5.61	4.44	5.02	8.9	8.17	
2 Standard Chartered Bank	1.49	0.7	1.29	1.42	2.39	3.26	5.07	4.78	6.03	6.96
3 Barclays	3.51	5.27	7.06	7.61	5.91	5	11.75	17.06	13.4	14.85
4 Kenya Commercial Bank	5.43	5.03	8.14	12.5	8.49	11.16	18.59	23.07	35.81	45.9
5 Co-operative Bank	4.36	3.62	4.24	8.05	10.93	13.09	21.61	21.87	26.23	9
6 Citibank	0.6	0.49	0.61	0.58	0.7	2.39	2.68	4.13	3.93	5.3
7 I & M bank	0.88	1.44	2.37	3.39	6.64	1.63	1.85	6.02	9.04	8.14
8 Diamond Trust	1.33	1.07	1.31	1.38	1.14	0.75	1.1	0.8	1.54	2.44
9 CFC Stanbic Bank	1.56	1.32	2.52	3.43	6.38	1.44	2.01	1.44	1.41	4.87
10 NIC Bank	2.97	3.03	3.23	4.13	3.34	4.23	7.33	4.75	4.88	9.95
11 Bank of Baroda	2.23	2.96	3.32	9.84	4.44	3.15	4.29	6.63	8.36	15.78
12 Bank of India	1.56	2.31	2.17	3.53	5.71	4.49	3.58	3.4	6.9	8.24
13 Chase Bank	1.56	1.72	2.38	4	5.35	5.78	4.57	5.16	9.14	0.14
14 Housing Finance	6.79	5.2	5.85	8.1	10.28	15.48	23.83	32.04	36.22	33.78
15 Imperial Bank	3.95	4.29	4.36	5.27	5.17	6.31	6.37	7.51	8.76	9.58
16 Habib Bank Ltd	9.07	1.7	2.34	3.04	4.06	4.27	5.62	11.42	4.13	3.71
17 Giro Commercial Bank	2.92	2.19	3.98	4.28	8.13	12.57	13.76	19.14	23.63	24.92
18 Habib A.G Zurich	2.81	2.73	3.33	5.34	5.21	4.3	3.26	4.13	4.51	7.18
19 Oriental Commercial Bank	10.72	11.13	11.18	19.6	31.42	45.99	59.41	70.42	83.24	76.76
20 Paramount Bank	10.87	10.67	17.63	21.44	17.58	8.33	3.54	4.38	4.18	3.66
Sample Average	3.84	3.46	4.61	6.72	7.44	7.90	10.26	12.85	14.98	14.56

Banking Survey 2013.

## APPENDIX 3

### Specific Data on Cost Income Ratio (%)

	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
1 Equity Bank	45.3	46.67	51	60.16	52.34	59.84	63.34	68.91	62.43	
2 Standard Chartered Bank	40.85	45.59	42.55	41.48	49.38	46.21	45.52	45.53	53.94	44.77
3 Barclays Kenya Commercial Bank	52	51.63	53.99	59.33	60.65	58.83	51.36	52.68	46.05	54.23
4 Co-operative Bank	50.52	52.72	61.05	66.86	55.76	63.46	64.64	73.46	77.6	68.93
5 Citibank	58.45	62.01	58.92	62.8	61.02	65.3	61.25	64.57	70.48	79.28
6 I & M bank	23.88	29.37	38.92	31.86	28.51	41.55	44.2	45.74	74.92	60.48
7 Diamond Trust	34.58	29.09	32.79	42	37.48	37.77	41.23	49.96	50	49.88
8 CFC Stanbic Bank	35.47	41.99	47.65	54.48	50.82	51.34	50.99	57.31	64.33	61.7
9 NIC Bank	60.84	64.62	68.88	69.71	58.53	50.22	51.2	65.72	82.33	115.35
10 Bank of Baroda	38.28	39.11	44.48	48.64	47.4	51.97	59.12	60.34	65.94	55.41
11 Bank of India	32.12	23.62	22.72	40.08	35.63	39.9	47.25	56.11	49.47	61
12 Chase Bank	35.23	22.88	23.92	25.92	26.05	29.46	38.52	58.61	57.43	37.73
13 Housing Finance	63.2	63.35	68.83	68.79	62.91	56.05	62.67	62.51	66.77	58.81
14 Imperial Bank	50.36	47	48.22	58.05	71.14	78.13	71.36	72.91	58.69	75.71
15 Habib Bank Ltd	48.2	49.37	50.16	54.42	55.92	57.78	58.46	66.83	48.2	49.82
16 Bank Giro	28.71	41.38	43.65	45.6	50.02	58.9	88.85	78.75	61.94	63.94
17 Habib A.G Zurich	70.06	55.76	36.47	61.9	65.96	58.59	68.34	80.94	70.81	69.7
18 Oriental Bank	40.33	53.61	51.26	46.04	49.35	50.74	53.71	55.45	73.83	64.04
19 Paramount Bank	62.19	43.9	42.08	76.85	60.12	29.58	129.82	95.45	279.69	68.51
20	64.99	66.2	86.67	101.68	113.6	76.86	77.78	86.99	70.35	58.18
Sample Average	46.78	46.49	48.71	55.83	54.63	53.12	61.48	64.94	74.26	63.02

## APPENDIX 4

### Specific Data on All Share Index

Year Month	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
Jan	3224.18	4464.92	3565.28	3198.90	4712.71	5774.27	4171.80	3094.30	3157.88	1510.63
Feb	3303.75	4240.18	3629.41	2474.75	5072.41	5387.28	4056.63	3212.81	3175.36	1557.74
Mar	3366.89	3887.07	4072.93	2805.03	4843.17	5133.67	4101.64	3208.66	2770.60	1608.34
Apr	3546.66	4029.23	4233.24	2800.10	5336.03	5148.07	4025.21	3227.59	2707.60	1846.63
May	3650.85	4078.10	4241.81	2852.57	5175.83	5001.77	4349.75	3505.39	2689.14	2074.67
Jun	3703.94	3968.12	4339.28	3294.56	5185.56	5146.73	4260.49	3972.15	2639.75	1934.96
Jul	3832.42	3738.46	4438.58	3273.10	4868.27	5340.08	4258.54	3982.00	2,708.03	2005.08
Aug	3865.76	3465.02	4454.59	3102.68	4648.78	5371.72	4486.07	3938.70	2708.86	2107.43
Sep	3972.03	3284.00	4629.80	3005.41	4180.40	5146.46	4879.86	3832.69	2670.69	2379.91
Oct	4147.28	3507.34	4659.56	3083.63	3386.65	4971.04	5314.36	3939.45	2829.65	2457.21
Nov	4083.00	3155.00	4395.17	3189.55	3341.47	5234.54	5615.20	3974.12	2,918.34	2736.98
Dec	4133.00	3205.00	4432.60	3247.44	3521.18	5444.83	5645.65	3973.04	2,945.58	2737.59
Yr Av	3735.81	3751.87	4257.69	3027.31	4522.71	5258.37	4597.10	3655.08	2112.46	2079.76

Nairobi Securities Exchange

## **APPENDIX 5**