

**RELATIONSHIP BETWEEN CREDIT SCORING PRACTICES AND
THE LEVEL OF NON-PERFORMING LOANS OF DEPOSIT
TAKING MICROFINANCE INSTITUTIONS IN KENYA**

ZIPPORAH WANJIKU MUTURI

D63/79426/2012

**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF
SCIENCE IN FINANCE DEGREE, UNIVERSITY OF NAIROBI**

OCT, 2014

DECLARATION

This research project is my own original work and it has not been presented for award of a degree in any university.

Signature: Date:

ZIPPORAH WANJIKU MUTURI

D63/79426/2012

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

Signature: Date:

DR. JOSIAH ADUDA

SUPERVISOR.

DEDICATION

This research project is dedicated to my parents Hiram Muturi and Magdaline Muturi for instilling the value of education in me and to Kelvin and Fredrick who stood by me and supported me during my working on this project.

ACKNOWLEDGEMENT

I am greatly indebted to many people who assisted me in various ways to complete my study. My foremost gratitude goes to God Almighty who renewed my strength at every single stage of working on this project. Many thanks also go to Mr. Mirie Mwangi and my supervisor Dr. Josiah Aduda, who dedicated a lot of time and effort to my work. I also take this opportunity to thank the University for granting me the opportunity to acquire the knowledge required to complete this project.

Additionally, I would like to thank my parent Mr. Hiram Muturi and Mrs. Magdaline Muturi, who denied themselves the luxuries of life to educate me up to this point. I sincerely thank Kelvin for being there for me during the numerous late nights and early mornings of working on this project. You are a source of inspiration, comfort and shoulder to lean on.

I would also like to thank the Deposit Taking Micro Finance institutions for unconditionally availing me the information I needed.

Table of Contents

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
ABBREVIATIONS	viii
ABSTRACT.....	ix
CHAPTER ONE	1
INTRODUCTION.....	1
1.1. Background of the Study.....	1
1.1.1. Credit Scoring Practices	2
1.1.2. Non-Performing Loans	3
1.1.3. Credit Scoring Practices and Non-Performing Loans	4
1.1.4. Deposit Taking Microfinance Institutions in Kenya	5
1.2. Research Problem	6
1.3. Research Objective	8
1.4. Value of the Study.....	8
CHAPTER TWO	10
LITERATURE REVIEW	10
2.1. Introduction	10
2.2. Theoretical Framework.....	10
2.2.1. Portfolio Theory	10
2.2.2. Adverse Selection Theory	11
2.2.3. Moral Hazard Theory	11
2.3. Determinants of Non-Performing Loan	12
2.4. Empirical Studies.....	13
2.5. Conclusion.....	17
CHAPTER THREE	19
RESEARCH METHODOLOGY	19
3.1. Research Design.....	19
3.2. Population and Sample	19
3.3. Data Collection.....	19

3.4. Data Analysis	20
3.5. Data Validity and Reliability	21
CHAPTER FOUR	22
DATA ANALYSIS, RESULTS AND DISCUSSION	22
4.1 Introduction	22
4.2 Data Presentation	22
4.2.1 Response Rate.....	22
4.2.2 Credit Appraisal.....	23
4.2.3 Loan Default Management	26
4.2.4 Regression Analysis.....	27
4.3 Summary and Interpretation of Findings.....	30
CHAPTER FIVE	33
SUMMARY, CONCLUSION AND RECOMMENDATIONS	33
5.1 Summary	33
5.2 Conclusion.....	34
5.3 Recommendations for Policy	35
5.4 Limitations of the Study	36
5.5 Suggestions for Further Studies.....	37
REFERENCES.....	38
APPENDICES	42
APPENDIX 1: QUESTIONNAIRE.....	42
APPENDIX 2: LIST OF DEPOSIT TAKING MICROFINANCE INSTITUTIONS IN KENYA.....	47

List of Tables:

Table 1: Response Rate..... 22

Table 2: How long has the model been used?..... 23

Table 3: Which type of loan is the model used to assess? 24

Table 4: Persons involved in formulation of credit scoring model..... 24

Table 5: Characteristics considered when evaluating an applicant before availing credit 25

Table 6: Time of decision on whether the client has defaulted on loan payment..... 26

Table 7: Factors that contribute to the presence of non-performing loans 27

Table 8: Model Summary 27

Table 9: ANOVA (a). 28

Table 10: Coefficients (a). 29

ABBREVIATIONS

AMFI	-	Association of Microfinance Institutions
CAR	-	Capital Asset Ratio
CBK	-	Central Bank of Kenya
C&I	-	Commercial and Industrial
CRMP	-	Credit Risk Management Practices
CSMI	-	Credit Scoring Model for Individuals
DTMs	-	Deposit Taking Microfinance Institutions
FNGOs	-	Financial Non-Governmental Organizations
GDP	-	Gross Domestic Product
IMF	-	International Monetary Fund
MFI	-	Micro Finance Institutions
NPAs	-	Non-Performing Assets
NPLs	-	Non-Performing Loans
SMEs	-	Small and Medium Enterprises

ABSTRACT

Extension of credit facilities is one of the major activities of Deposit Taking Microfinance institutions. This is usually evidenced by the large proportion that loans constitute in the overall operating assets of these lending institutions. However, lending activities have been controversial and a difficult matter. This is because business firms are complaining about lack of credits and the excessively high standards set by financial institutions, while financial institutions on the other hand have suffered large losses on bad loans. In order to raise the quality of giving loans and reduce the risk involve in giving loans, credit scoring models have been developed by banks and researchers to improve the process of assessing credit worthiness during the credit evaluation process. The purpose of this study was to investigate the relationship between credit scoring practices and the level of non-performing loans of Deposit Taking Microfinance institutions in Kenya.

The study used a descriptive survey approach in collecting data from the respondents. Census survey of all 8 licensed Deposit Taking Microfinance institutions in Kenya was carried out. From the findings, the study concludes that Deposit Taking Microfinance institutions in Kenya adopted credit scoring approaches in screening and analyzing risk before awarding credit to clients to minimize loan loss. The study further concludes that there was a negative relationship between credit scoring practices and the level of non-performing loans of Deposit taking microfinance institutions.

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Extension of credit facilities is one of the major activities of all Microfinance institutions (MFIs) including Savings and Loans Companies, Rural banks, Financial Non Governmental Organizations (FNGOs) and credit Unions (Kofi, 2012). This is usually evidenced by the large proportion that loans constitute in the overall operating assets of these lending institutions. Healthy loan portfolios are therefore vital for lending institutions in view of their impact on liquidity, lending capacity, earnings and profitability of the MFIs.

Whilst the Kenyan banking sector is the largest in terms of assets in the financial services industry, it is not the largest supplier of credit (Ahmed and Karunditu, 2010). Within the MFIs sector, 4 million clients exist with a \$300 million portfolio. Their participation goes beyond simple information exchange. Potential consumers have multiple borrowings within MFIs in addition to the same consumer obtaining finance from the formal banking sector. According to the Central Bank of Kenya Bank Supervision Annual Report 2011, in the MFI sector, the net loan portfolio grew by 13.3%, however, the profit before tax dropped by 19% between 2010 and 2011. The reduction in profits was partly attributed to formation costs for newly licensed DTMs and increased provisions for nonperforming loans.

One widely adopted technique for solving non-performing loans problem is credit scoring. Credit scoring consists of the assessment of risk associated with lending to an organization or an individual (Sadatrasoul et al, 2013). A study conducted by Einav, Jenkins and Levin (2013) described the magnitude and channels by which the adoption of credit scoring affected loan originations, repayment and defaults, and profitability at a large auto finance company. The adoption of credit scoring technology led to a large increase in profitability. This paper therefore sought to evaluate the effectiveness of

credit scoring practices used by Deposit Taking Microfinance Institutions (DTMs) and their relationship with the level of non-performing loans.

1.1.1. Credit Scoring Practices

Credit scoring as defined by Caire and Kossmann (2003) means a system which members use to help them make decisions about whether to lend money. According to the Opportunity International White Paper No. 9 (2008) on credit scoring in microfinance, credit scoring analyzes the characteristics and performance of past loans to predict the performance of future loans. Application and behavior scorecards were identified as the two most commonly used scorecards. Application scorecards predict the probability of first-time loan applicants defaulting at a future point based on demographic, business, and financial data, loan characteristics, and (if available) credit bureau data. The scorecard isolates characteristics that are statistically predictive of default based on the organization's recent experience, and uses those variables to predict the risk of new loan applicants. On the other hand, behavior scorecards predict the probability of an existing account going bad at a future point in time based on repayment information. They are used to define risk-based loan terms that reward good clients with lower interest rates and larger loans.

Most credit scoring models used by financial institutions to assess the credit risk and credit worthiness of customer's are based on the 6 C's (Jonathan, 2012). According to Mutie (2006), this method is important because its elements cover all the areas that affect credit risk assessment and evaluation of a customer and his/he characterization. The intent of this analysis is to determine: Will the borrower pay? (character or credit reputation); can the borrower pay? (Capacity); does the borrower have enough cash on hand to pay if a period of adversity arises? (Capital); will something adversely affect the borrower's ability to pay? (Conditions); will the credit issuer be protected if the borrower fails to repay the loan? (Collateral); and does the borrower demonstrate an ability to make wise decisions? (Common sense).

The most popular credit scoring model is the Altman's Z-Score. In 1968, the Z-score equation was given by Dr. Edward Altman, which is still used today to measure the financial position of an organization and a powerful indicative method that predict the bankruptcy of a corporation within couple of years and provide 75% to 80% accurate results. (Altman, 1968 in Samreen et al., 2013) As the Z score increases, the probability of default decreases.

Other credit scoring models include linear probability models, logit models, probit models, linear discriminant analysis models, options pricing theory models and neural networks (Mester, 1997). According to Abedi (2000) as cited in Mutie (2006), Linear probability models use past data such as accounting ratios as input into a model to explain repayment experience on old loans. While discriminant models divide borrowers into low and high default risk classes, contingent on their observed characteristics. The author also states that risk adjusted return on capital measures how much risk the bank is taking and determines if returns are providing adequate compensation for risk. Option pricing theory model predicts the probability of a firm defaulting from its asset price volatility. Neural networks are artificial intelligence models that allow for some learning through experience to determine the relationship between borrower's characteristic and the probability of default.

1.1.2. Non-Performing Loans

According to Islam, Shil and Mannan (2005), loan becomes non-performing when it cannot be recovered within certain stipulated time that is governed by some respective laws. According to the International Monetary Fund (2009), a non- performing loan is any loan in which interest and principal payments are more than 90 days overdue; or more than 90 days worth of interest has been refinanced. This is further supported by the Basel Committee (2001), who defined non performing loans as those loans which are left unpaid for a period of 90 days.

The causes for loan default vary in different countries and have a multidimensional aspect both, in developing and developed nations. Various researches have concluded

various reasons for a loan to be default. These include a slowdown in the economy, exchange rate, interest rate, inflation, lenient terms of credit, credit orientation, high credit growth and risk appetite, and poor monitoring among others. Khemraj and Pasha (2009) categorize causes of non-performing loans to macroeconomic and bank specific factors.

The level of non-performing loans in bank's portfolio depicts the quality of bank loans which gives an indication of the profitability of bank lending activities (Alhassan, Brobbey, and Asamoah, 2013). Lower bank asset quality signals banks as to their risk levels, therefore their reluctance to take on more risk through lending. To overcome the challenge of NPLs, an institution is required to monitor the behavior of borrowers. According to the Central Bank of Kenya Bank Supervision Annual Report (2013), non-performing loans is the single most important threat that a bank can face. To assess its magnitude, it is weighted against the total portfolio of all loans and advances the bank has extended. A high ratio of non-performing loans to advances is a reflection of imprudent lending practices and poor credit management. It poses a threat to customer's deposit. A low ratio is therefore desirable.

1.1.3. Credit Scoring Practices and Non-Performing Loans

According to Gatimu (2014) who sought to find out whether loan appraisal process contributed to loan defaulting in MFIs in Kenya, there is a negative correlation between loan appraisal process and loan defaulting. The author defined a loan appraisal as a request/application for loan/funds on credit evaluated on its merits by a microfinance institution. Among others aspects, the purpose of loan, genuineness of its need, its quantum, borrower's repayment capacity, security etc are assessed on some parameters before loan is actually granted.

In a separate study conducted by Mutie (2006) to identify the relationship between credit scoring practices and non-performing loans in commercial banks in Kenya, the results showed a negative correlation implying that banks that used credit scoring models had low levels of NPLs while those that didn't use any credit scoring model had high levels

of NPLs. According to Mutie (2006) most banks preferred the risk adjusted return on capital model compared to other models. Linear discriminant and neural networks were the least preferred models.

In order to raise the quality of giving loans and reduce the risk involve in giving loans, credit scoring models have been developed by banks and researchers to improve the process of assessing credit worthiness during the credit evaluation process (Jonathan, 2012). The author suggested that logistic regression model has a 70.5% accuracy rate of distinguishing defaulters from non-defaulters. If one was identified as defaulter, he/she had 84% chance of actually defaulting and if a customer was identified as non-defaulter, he/she had 54% chance of actually not defaulting.

According to Checkley and Dickinson (2010) as cited by Wambua (2012), borrowers should be subjected to stringent CRMP, this will enable analyze the borrowers character, ability to repay their loans, margin of the venture that the loan is to finance, purpose for the loan emphasizing on viability, amount of the loan relative to the venture, repayments and insurance to caution risk defaulting on the loan.

1.1.4. Deposit Taking Microfinance Institutions in Kenya

In a report written by Frankfurt School of Finance and Management (2012), the Kenyan microfinance sector is identified as one of the most vibrant in Sub-Saharan Africa. Former credit-only institutions wanting to leverage deposits from the public can only operate successfully in the market if it is properly regulated financial institutions and depositors must be protected. MFIs that wished to take in customers' deposit would need to fall under the regulatory ambit of Central Bank of Kenya (CBK). Aptly referred to as DTMs, these companies are changing the financial landscape in Kenya.

The Microfinance act of 2006 regulates the provision of microfinance in Kenya. The act applies to deposit taking microfinance institutions; parts of the act may be declared applicable to non-deposit-taking institutions. The act addressed such issues as definition

of MFIs, licensing provisions, provisions related to governance and supervisions by the Central Bank that includes protection of deposits.

According to Central Bank of Kenya (2013) Supervision Annual Report, there is about 50 microfinance institutions-out of which 8 are licensed for deposit taking. The first DTMs to be registered were Kenya Women Finance Trust (KWFT) DTM Ltd, and Faulu Kenya DTM Ltd. They were followed by Rafiki DTM, Remu DTM, SMEP DTM, Uwezo DTM, Century DTM, and SUMAC DTM.

Mwirigi (2006) carried out a study to access the credit risk management techniques adopted by microfinance institutions in Kenya. The results indicated that most of the institutions used the 6 C's criteria and that capacity/completion was the most important factor followed by contribution and character, and reasonableness (common sense) of cash flows from business. Further, the study found that a majority of the institutions a loanee was considered a defaulter as early as one late repayment.

According to Central Bank of Kenya as at 31st March 2013, 8 Deposit Taking Microfinance Institutions (DTMs) were in operation and had gross loans worth Ksh. 21.2 billion compared to Ksh. 20.6 billion registered in December 2012 thus translating to a growth of 3.7 percent. Similarly, the deposits base stood at Ksh. 16.4 billion representing a growth of 6.4 percent from Ksh. 15.4 billion in December 2012. The long-term borrowings by DTMs increased from Ksh. 8.3 billion in December 2012 to Ksh. 8.8 billion in March 2013. The number of DTMs deposit accounts and loan accounts stood at 1.79 million and 0.47 million respectively in March 2013 compared to 1.76 million deposit accounts and 0.46 million loans accounts registered at end of December 2012. The Central Bank of Kenya (2013) Supervision Annual Report indicate an increase in the total non-performing loans from Ksh. 418 million in 2011 to Ksh. 539 million in 2012.

1.2. Research Problem

Existence of high levels of loan delinquency problem in microfinance industry negatively affect the level of private investment, increase in deposit liabilities and

constrain the scope of microfinance institution credit to borrowers through reduction of MFIs' capital, following falling accumulation of losses to compensate for loan delinquency losses. The success of MFIs largely depend on the effectiveness of their credit management systems because these institutions generate most of their income from interest earned on loans extended to small and medium entrepreneurs (Moti et al., 2012). The CBK Annual Supervision Report, 2010 indicated rising levels of non- performing loans by the MFI's in the last 10 years, a situation that adversely impacted on their profitability.

Jonathan (2012) argued that in order to raise the quality of giving loans and reduces the risk involved in giving loans, banks have developed credit scoring models to improve the process of assessing credit worthiness during credit appraisal process and to distinguish defaulters from non-defaulters. This is supported by Mutie (2006) who argued that the use of credit scoring models reduce the level of non-performing loans.

A lot of research has been done in developed countries on credit scoring practices by various companies. Lawson (1995) examined the use of credit scoring by Hibernia Corp. Hibernia Corp formed a partnership with Appro Systems Inc, LA and Fair Isaac Co., CA and tailored an evaluating system to fit the lender's specialized needs. It employed Appro's 20/20 small business lending database system and used Fair Isaac's application software to build the actual credit scoring model that was used to grade borrowers. This resulted to an increase in small business loans from \$100 million to over \$600 million and an increase in loan application processing from 100 to over 1,100 applications a month in two years. According to Lawson (1995), credit scoring can help reduce the likelihood of a loan default, reduce costs, and allow banks to use fewer people to process loans.

Locally, Mutie (2006) carried out a study to evaluate the credit scoring practices in Kenyan commercial banks and to assess the relationship between these credit scoring practices and non-performing loans. The result indicated a negative relationship implying that banks that use scoring models have low asset quality ration while those that don't use credit scoring models have high asset quality ratio.

A few studies had been done on credit scoring practices and among them are credit scoring practices and non-performing loans in the Kenyan commercial banks (Mutie, 2006). However, most studies focusing on credit risk management practices covered the used of credit scoring models in credit risk management. Among them are credit risk management practices and the level of non-performing loans of microfinance institutions in Nyeri county (Mwithi, 2012), credit risk management practices and financial performance of deposit taking microfinance institutions in Kenya (Korir, 2012) and credit risk management practices and loan losses in microfinance institutions in Kenya (Wambua, 2012). To the researcher's understanding no study had been done on credit scoring practices in relation to non-performing loans in DTMs in Kenya. Based on this evaluation, there was a gap in literature that warranted a research to be conducted in this industry. This study therefore sought to answer the question what is the relationship between credit scoring practices and the level of non-performing loans in DTMs in Kenya.

1.3. Research Objective

The objective of the study was to establish a relationship between the credit scoring practices and the level of non-performing loans in Deposit Taking Microfinance Institutions in Kenya.

1.4. Value of the Study

The findings of this study provides insights on the use of credit scoring by the Deposit Taking Microfinance Institutions in Kenya in categorize good or bad credit risk. The findings of the study also identifies the most commonly faced challenges by data analysts and decision making teams in selection of the model to employ for the credit risk assessment. The study will help the portfolio managers of emerging DTMs to develop sound credit risk policies that will help them come up with efficient tools of measuring,

controlling and evaluating credit risk in their loan portfolio so as to effectively contribute to the development of more efficient financial systems.

The Government, Ministry of Finance, Central Bank of Kenya as the regulator of MFIs of both deposit taking MFIs and credit only MFIs will derive information on the overall usage and application of credit scoring models. The study will inform on the critical prudential regulations that the Government needs to issue to the microfinance sector to prevent moral hazards and information asymmetry. Association of Microfinance Institutions (AMFI) is the umbrella body of microfinance in Kenya. The study will provide critical information for AMFI to aid in the development of a code of ethic and best practices in management of various credit risks facing the sector.

Academics will benefit by getting more information about how credit scoring practices impact the level of non-performing loans in DTMs in Kenya. This contribution will offer additional information on the relationship between credit scoring and non-performing loans. The study will provide a source of reference for future studies on microfinance institutions. It will also act a source of literature for academics in the field of entrepreneurship.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter introduces the concept of credit scoring and non-performing loans. It focused on discussing underlying theories and the expansion of the theories to derive the current theoretical framework. Articles, textbooks, research reports, dissertations, the internet and other scientific publications relevant to credit scoring and the non-performing loans were used. The viewpoint of different authors was compared and evaluated.

2.2. Theoretical Framework

2.2.1. Portfolio Theory

Companies recognize how credit concentrations can adversely impact financial performance. As a result, a number of institutions are actively pursuing quantitative approaches to credit risk measurement. This industry is also making significant progress toward developing tools that measure credit risk in a portfolio context. They are also using credit derivatives to transfer risk efficiently while preserving customer relationships. Portfolio quality ratios and productivity indicators have been adapted. (Kairu, 2009 as cited in Gakure, 2012).

Traditionally, organizations have taken an asset-by-asset approach to credit risk management (Gakure et al., 2012). This approach involves periodically evaluating the quality of credit exposures, applying a credit risk rating, and aggregating the results of this analysis to identify a portfolio's expected losses. The foundation of the asset-by-asset approach is a sound credit review and internal credit risk rating system. This system enables management to identify changes in individual credits, or portfolio trends in a timely manner. Based on the changes identified, credit identification, credit review, and

credit risk rating system management can make necessary modifications to portfolio strategies or increase the supervision of credits in a timely manner.

2.2.2. Adverse Selection Theory

In the pure adverse selection model developed by Pagano and Jappelli in 1993, information sharing improves the pool of borrowers, decreases defaults and reduces the average interest rate (Pagano and Jappelli, 2002). In the model, each bank has private information about the credit worthiness of local residents but no information about immigrants, who therefore face adverse selection.

If banks exchange their private information about residents, they can lend safely to immigrants as well, so the default rate decreases. The effect on lending is ambiguous, however. The authors stated that the volume of lending may increase or decrease, because when banks exchange information about borrowers' types, the implied increase in lending to safe borrowers may fail to compensate for the reduction in lending to risky types. They also pointed out that banking competition tends to strengthen the positive effect of information sharing on lending: when credit markets are contestable, information sharing reduces informational rents and increases competition, which in turn leads to greater lending.

2.2.3. Moral Hazard Theory

Information sharing can reinforce borrowers' incentives to perform, either via a reduction of banks' rents or through a disciplinary effect (Pagano and Jappelli, 2002). The exchange of information between banks reduces the informational rents that banks can extract from their clients within lending relationships.

Padilla and Pagano (1997) as cited in Pagano and Jappelli, (2002) make this point in the context of a two-period model where banks are endowed with private information about their borrowers. This informational advantage confers to banks some market power over their customers, and thereby generates a hold-up problem: since banks are expected to charge predatory rates in the future, borrowers exert low effort to perform, leading to

high default and interest rates, and possibly to the collapse of the credit market. By committing to exchange information about borrowers' types, they restrain their own future ability to extract informational rents. This reduces the probability of default of each borrower and the interest rate he is charged, and increases total lending relative to the regime without information sharing.

2.3. Determinants of Non-Performing Loan

According to Islam, Shil and Mannan (2005), the leading causes of nonperforming loans are reduced attention to borrowers, lack of plans by lenders to deal with risk, lack of good models, and weak follow up systems. Bhide, Prasad and Ghosh (2002) suggested that the root problem of non-performing loans arises from weak debt recovery processes, inadequate legal structures, weakness in underlying security, and inadequate risk management techniques among others.

The World Bank Policy Research Working Paper 3769, November 2005 identified the leading causes of nonperforming loans to extremely high credit risk, economic growth, real exchange rate appreciation, the real interest rate, net interest margins and interbank loans. Simulated results show that macroeconomic stability and economic growth are associated with a declining level of nonperforming loans; whereas adverse macroeconomic shocks coupled with higher cost of capital and lower interest margins are associated with a rising scope of nonperforming loans.

Lis, et.al. (2000) as cited in Ranjan and Dhal (2003) used a simultaneous equation model in which they explained bank loan losses in Spain using a host of indicators, which included Gross Domestic Product (GDP) growth rate, debt-equity ratios of firms, regulation regime, loan growth, bank branch growth rates, bank size (assets over total size), collateral loans, net interest margin, capital asset ratio (CAR) and market power of default companies. They found that GDP growth (contemporaneous, as well as one period lag term), bank size, and CAR, had negative effect while loan growth, collateral, net-interest margin, debt-equity, market power, regulation regime and lagged dependent

variable had positive effect on problem loans. The effect of branch growth could vary with different lags.

In a study carried out by Ng'etich and Wanjau (2011) to establish the effects of interest rate spread on the level of Non Performing Assets in commercial banks in Kenya, concluded that interest rate spread affect performing assets in banks as it increases the cost of loans charged on the borrowers. They established that regulations on interest rates have far reaching effects on assets non-performance, for such regulations determine the interest rate spread in banks and also help mitigate moral hazards incidental to NPAs.

Mutie (2006) identified poor and unprofessional credit evaluation as a cause of non-performing loans in commercial banks. He points out that accessing loans from financial institutions was easier as long as the borrower has security to be charged than the ability to service the loan. Cash flow projection, viability of the project, character of the borrower, previous loans completion, and ability to repay were not considered important. Thus a number of banks ended up with many non-performing loans due to incomplete, poor and unprofessional credit risk assessment and evaluation.

Poor credit assessment, failed loan monitoring, underdeveloped credit culture, lenient credit terms and conditions, aggressive lending, compromised integrity, weak institutional capacity, unfair competition among banks, willful default by borrowers and their knowledge limitation, fund diversion for unintended purpose, over/under financing by banks ascribe to the causes of loan default (Negera, 2012).

2.4. Empirical Studies

Frames et al. (2001) empirically examined the effect of the use of credit scoring by large banking organizations on small business lending in low- and moderate-income (LMI) areas. Using census tract level data for the southeastern United States, the authors estimated that credit scoring increases small business lending by \$16.4 million per LMI area served. The authors also found that credit scoring increased the probability that a large banking organization will make small business loans in a given census tract. They

concluded that if credit scorecard is thoughtfully developed, flexibly implemented and properly managed which speed loan processing and inform pricing and provisions it will help banks and MFI's save cost, reduce subjectivity and improve risk management, this will also increase profitability and expand micro borrowers access to credits

Samreen and Zaidi (2013) studied the design and development of credit scoring model for the commercial banks of Pakistan. The main objective of this research was to evaluate credit risk in commercial banks of Pakistan using credit scoring models. A sample set of 250 individual borrowers who had taken personal loans from the various commercial banks of Pakistan, out of which 144 applicants had clear history having no default ever, 51 applicants had default up to 30 days, and 37 applicants had 90 days default. They found out that the Credit Scoring Model for Individuals (CSMI) assessed the creditworthiness of individual borrowers with 100% accuracy rate and distinguished the high risk loan applications to low risk prior to default. They used logistic regression and discriminant to support the results of developed credit scoring model. The accuracy rate of Credit Scoring Model for Individuals was 100%, logistic regression (LR) had the accuracy rate of 98.8% and the discriminant analysis credit scoring model for individuals had the accuracy rate of 95.2%. They recommended that future research studies should use the advanced credit scoring techniques like genetic algorithms, fuzzy discriminant analysis and neural networks. For the generalization and accuracy of the results generated by the credit scoring models, they recommended a large data of individual borrowers.

Kofi (2012) conducted a study to establish the causes, trend and impact of NPLs on the operations of MFIs with particular focus on Sinapi Aba Trust (SAT), Ghana. The study specifically focused on the impact of NPLs on operating profits, interest incomes and loanable funds of SAT. In terms of data, primary and secondary data were used for the study. The study found out that SAT recorded substantial amounts as non performing loans in the five-year period reviewed and this adversely affected the financial performance of the organization by way of reducing its operating profits, loanable funds and undermining the liquidity position among others. Business failure, lack of monitoring of loans, inadequate marketing avenues were identified as the principal causes of the non

performing loans in the organization. The study also found that trade and service sectors have the highest incidence of NPLs. In order to address the menace of NPLs in the MFIs, the following measures were recommended to the management of (SAT). These measures include effective monitoring of loans, credit training programs, tight security requirements and seeking the services of credit reference bureaus and private debt collectors.

In a separate study, Mabvure et al (2012) investigated the causes of non-performing loans in Zimbabwe. A case study research design of CBZ Bank Limited was employed. Interviews and questionnaires were used to collect data for the study. The paper revealed that external factors are more prevalent in causing non performing loans in CBZ Bank Limited. The major factors causing non performing loans were natural disasters, government policy and the integrity of the borrower.

Using descriptive study, Korir (2012) investigated the impact of credit risk management practices on the financial performance of Deposit Taking Microfinance institutions in Kenya. The number of the respondents was 36 staff working in all licensed Deposit taking microfinance institutions in Kenya. From the findings the study concludes that Deposit taking microfinance institutions in Kenya adopted credit risk management practices to counter credit risks they are exposed to and it also concluded that Deposit taking microfinance institutions adopt various approaches in screening and analyzing risk before awarding credit to clients to minimize on loan loss. This included establishing capacity/competition and conditions and use of collateral/security and character of borrower were used in screening and risk analysis in attempt to reduce manages credit risks. The study further concludes that there was a positive relationship between credit risk management practices and the financial performance of Deposit taking microfinance institutions.

Mwithi (2012) carried out a study to establish the relationship between credit risk management approaches employed by MFIs in Nyeri County and the level of NPLs. To achieve the objective of the assessment, primary data of the research was collected through administering questionnaires to 44 respondents of selected MFIs from their

various levels of employment, that is, the top, middle and low level management. The data was then analyzed using Spearman's correlation coefficient statistical method. The study found that the level of credit risk assessment and management was high in the MFIs. The study also found that the organizations have specified credit collection period. Respondents unanimously indicated that effective management of their institutions was affected by liquidity and profitability, and that asymmetric information in loan market affects the effective management of NPLs in MFIs in Nyeri County. The study found that inability to enforce covenants leads to NPLs among MFIs in Nyeri County to a very large extent. 90% of the respondents indicated that the inability to enforce covenant was high. In conclusion, the study found that the relationship between credit risk management approaches employed by Micro Finance Institutions in Nyeri County and the level of Non-Performing Loans is a negative correlation i.e. the higher the level of credit risk management, the lower the level of NPLs

Mutie (2006) carried out a study to evaluate the credit scoring practices in Kenyan commercial banks and to assess the relationship between these credit scoring practices and non-performing loans. In his study, data was collected from all 43 commercial banks, and the level of non-performing loans measured using the asset quality ratio. The results indicated that 62% of the banks used credit scoring practices compared to 38% which never used. Using correlation analysis, the results indicated a negative relationship between credit scoring practices and non-performing loans with a correlation coefficient of -0.773.

Aduda, Magutu & Wangu (2012) conducted a study to establish the relationship between credit scoring by Kenyan banks and access to credit by SMEs in Kenya. This was an explanatory study where the research sought to establish a relationship between the use of credit scoring and access to credit for SME loans by Kenyan banks. A census survey was conducted involving all 43 Commercial Banks in Kenya registered and licensed under the banking act as at 31st December 2009 as per the Central Bank of Kenya. This study used primary data that was collected from the respondents of the survey. Data was captured and analyzed using Statistical Package for the Social Sciences (SPSS) version 17.

Regression analysis was used to determine the relationship between credit scoring and approval rates for SME's. The study concludes that there is a relationship between credit scoring by Kenyan banks and access to credit by SMEs in Kenya. The benefits gained from the use of credit scoring include accuracy in the decision making process. This accuracy is gained to the reduction of adverse selection cases where better assessments are made in regards to an application therefore providing better decision making. The study recommends that banks need to use various credit assessment methods before availing loans to SME applicants. This in turn improves the credit scoring of banks. In addition, the banks need to regularly review their credit policies.

Ogilo (2012) carried out a study to analyze the impact of credit risk management on the financial performance of commercial banks. The objective was to establish a relationship between credit risk management determinants by use of CAMEL indicators (Capital Adequacy, Aset Quality, Management Quality, Earnings and Liquidity) and financial performance of commercial banks in Kenya. The author used secondary data from the Central Bank of Kenya publications on banking sector survey and employed multiple regression analysis in the analysis of data. The study established that there was a strong relationship between the CAMEL components on the financial performance of commercial banks. The study also established that capital adequacy, asset quality, management efficiency and liquidity had weak relationship with financial performance whereas earnings had a strong relationship with financial performance. He concluded that CAMEL model can be used as a proxy for credit risk management.

2.5. Conclusion

As Deposit Taking MFIs continue expand and diversify in serving more customers and attracting more mainstream investment capital and funds, they need to strengthen their internal capacity to identify and anticipate potential risks to avoid unexpected losses and surprises. The success of the DTMs depends largely on the ability to evaluate credit risk.

The quality of loans depends on the quality of the borrower. One widely adopted technique for solving this problem is credit scoring. Credit scoring consists of the

assessment of risk associated with lending to an organization or an individual. Bankers should make a fairly accurate personality-morale profile assessment of prospective and current borrowers and guarantors. They banker should try to draw some conclusions about staff morale and loyalty, study the person's personal credit report, do trade-credit reference checking, check references from present and former bankers, and determine how the borrower handles stress. This will in turn reduce the major threat to banking sector which is the prevalence of non-performing loans.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter presented a detailed description of the methodology selected to carry out the study. It described the research design preferred, target population, sampling technique, data collection technique, and data analysis and presentation.

3.1. Research Design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose. The research investigated the relationship between credit scoring practices and non-performing loans of Deposit Taking Microfinance Institutions in Kenya. To conduct this study and to realize the objectives of the study, descriptive study was used due to its appropriateness to enable generalizing the results to a large population. The descriptive research approach allowed analysis and relation of variables.

3.2. Population and Sample

The population for this research was comprised of all the deposit taking microfinance institutions in Kenya. According to the CBK Bank Supervision Annual Report 2013, there were eight deposit-taking MFIs licensed by the Central Bank of Kenya (CBK) and regulated under the Microfinance Act 2006. These were Kenya Women Finance Trust Limited, Faulu Kenya Limited, SMEP Limited, Rafiki Limited, Remu Limited, Uwezo Limited, and Century DTM.

3.3. Data Collection

Primary data was collected using a questionnaire with both open and closed ended questions. The open ended questions were considered as they permit the individuals to respond in their own words and to express what they consider to be most important. The

closed ended questions were considered appropriate since they were simple to administer and relatively inexpensive to analyze because they were in an immediate usable form.

The questionnaire was chosen as a data collection instrument in this study due to its practicability and applicability to the study and the size of the population. It was also cost effective, easy to code, and gave the respondent adequate time to fill in and return to the researcher. In most cases, a five-point Likert-scale was used to represent the responses of the subjects.

The study also used secondary data sources to gather information relevant in reaching at the research objectives. The secondary data was collected from the CBK's annual supervision reports. This was preferred since data on NPLs of all DTMs were available in CBK's annual bank supervision report.

3.4. Data Analysis

Data collected was tabulated and descriptive statistics used for the analyses. The descriptive statistical tools such as frequencies, mean, percentages and standard deviation aided in describing the data. Inferential statistics was used to generalize the results from samples to population. Regression analysis was employed to determine the relationship between credit scoring practices and non-performing loans.

The latest available version of the Statistical package for social science (SPSS) was used to analyze the data. Regression analysis was used to test the relationship between non-performing loan (dependent variable) and the credit scoring practices (independent variable).

The regression equation used was derived from the equation of a straight line as follows;

$$Y = \beta_0 + \beta_1 X + \alpha$$

Where;

Y was the dependent variable (Non Performing Loans),

β_1 was the coefficient function of the independent variable.

X was the use of credit scoring models at a particular Deposit Taking Micro Finance institution

β_0 was the Y intercept

α was an error term.

Asset quality ratio was used to analyze the level of non-performing loans calculated as:

Asset quality = Total non-performing loans

Total Loans

3.5. Data Validity and Reliability

Mugenda and Mugenda (2003) pointed out that the accuracy of the data collected depends on the data collection tool used. To ensure that the data was valid, expert opinion was used to establish whether the questionnaire represents the content and that it was appropriate for the population and sample selected. Validity was also be established by ensuring that the questionnaire was comprehensive enough to collect all the information needed to address the purpose and goal of this study. The questionnaire was well organized and includes objective questions.

Reliability was enhanced by pre-testing the questionnaire by administering it to a selected group of subjects. The pilot testing assisted in testing the clarity of the questionnaire.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents analysis and findings of the study as set out in the research methodology. The results presented investigate the relationship between credit scoring practices and the level of non-performing loans of Deposit Taking Micro Finance institutions. The primary data was gathered exclusively from questionnaire as the research instrument and the questionnaire was designed in line with the objectives of the study to enhance quality of data obtained. Likert type questions were included whereby the extent to which the variables were practiced was indicated in a five point likert scale. Secondary data was obtained from the CBK's annual supervision reports.

4.2 Data Presentation

4.2.1 Response Rate

The study targeted 8 Deposit Taking Microfinance institutions in Kenya in collecting data with regard to credit scoring practices and the level of non-performance of loans. 7 out of 8 target institutions filled in and returned the questionnaire contributing to 87.5% response rate.

Table 1: Response Rate

Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Responded	7	87.5	87.5	87.5
	Not responded	1	12.5	12.5	100.0
	Total	8	100.0	100.0	

Source: Research Findings

4.2.2 Credit Appraisal

The research result shows that 100 percent of the DTMs surveyed have a credit scoring model. The study inquired about the length in which this credit scoring model had been used and it was revealed in table 2 that 50 percent of the DTMs had used the credit scoring model for 5 to 10 years while 25 percent had used it for 2 to 4 years. Only 12.5 percent had used the credit scoring model for more than 10 years.

Table 2: How long has the model been used?

How long the model has been used

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2 to 4 years	2	25.0	28.6	28.6
	5 to 10 years	4	50.0	57.1	85.7
	More than 10 years	1	12.5	14.3	100.0
	Total	7	87.5	100.0	
Missing	System	1	12.5		
Total		8	100.0		

Source: Research Findings

The study proceeded to establish the type of loan the model is used to assess. Results presented in table 3 indicated that 62.5 percent of the DTMs used credit scoring models to assess both business and personal loans.

Table 3: Which type of loan is the model used to assess?

Type of Loan the model is used to assess

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Personal Loans	1	12.5	14.3	14.3
	Business Loans	1	12.5	14.3	28.6
	PERSONAL AND BUSINESS LOANS	5	62.5	71.4	100.0
	Total	7	87.5	100.0	
Missing	System	1	12.5		
Total		8	100.0		

Source: Research Findings

Table 4: Persons involved in formulation of credit scoring model

Descriptive Statistics

	N	Mean	Std. Deviation
Senior Management's	7	4.5714	.53452
Board of Directors	7	3.4286	.53452
Credit Managers	7	3.5714	.53452
Credit Analysts	7	3.1429	.37796
Credit Committee	7	4.0000	.57735
Branch Managers	7	2.7143	.48795
Loan Officers	7	2.5714	.53452
Valid N (listwise)	7		

Source: Research Findings

The study went further to establish the various persons involved in formulation of credit scoring models. Data in this section was analyzed using a likert scale where 1=Least involved, 2 = less involved, 3= moderately involved, 4= More involved and 5 = Most involved. Data was presented after calculating the mean and standard deviation. Results in presented table 4 shows that senior management were the main persons involved in formulation of credit scoring models with a high mean of 4.57, followed by credit committees shown by a mean of 4 and credit managers shown by a mean of 3.57. The

least involved in formulation of credit scoring models and credit policies were the branch managers as was shown by a low mean of 2.71 and loan officers shown by a mean of 2.57.

The study proceeded to establish the various characteristics considered when evaluating an applicant before availing credit for SME's. Data in this section was analyzed using a likert scale where 1=Least important, 2 = less important, 3= moderately important, 4= More important and 5 = Most important. Data was presented in mean and standard deviation. Results presented in table 5 shows that the most important characteristics considered when evaluating an applicant before availing credit was character of borrower shown by a high mean of 4.8333 followed by capacity to pay shown by a mean of 4.50, collateral/security available as was shown by a mean of 3.8333 and economic conditions shown by a mean of 3.6667. The least cited characteristic considered when evaluating an applicant before availing credit was capital shown by a mean of 3.5 and common sense shown by a low mean of 3.1667.

Table 5: Characteristics considered when evaluating an applicant before availing credit

Descriptive Statistics			
	N	Mean	Std. Deviation
Character of the borrower	6	4.8333	.40825
Capacity to pay	6	4.5000	.54772
Collateral	6	3.8333	.40825
Condition	6	3.6667	.51640
Capital	6	3.5000	.83666
Common sense	6	3.1667	.75277
Valid N (listwise)	6		

Source: Research Findings

4.2.3 Loan Default Management

The study proceeded to establish the time of decision on whether the client had defaulted on loan payment. From the findings presented in table 6, most of the institutions agreed to a greater extent that client was said to have defaulted the loan after more than twelve months' late payments as indicated by a mean of 4.7143 and three months late payment indicated by a mean of 4.5714. The study also found that most of the institutions agreed that default on loan payment was considered after using supervision on one to one basis and one month's failure of loan repayment to a moderate extent as indicated by a mean of 2.4286 and 3 respectively.

Table 6: Time of decision on whether the client has defaulted on loan payment

Descriptive Statistics			
	N	Mean	Std. Deviation
One month late payment	7	3.0000	.57735
Three months late payment	7	4.5714	.53452
More than twelve months payment	7	4.7143	.48795
Using supervision on one to one basis	7	2.4286	.53452
Valid N (listwise)	7		

Source: Research Findings

The study further established the factors that contribute to the presence of non-performing loans. Results presented in table 7 indicate that most of the DTMs agreed to a greater extent that non-performing loans are as a result of poor credit assessment and evaluation as indicated by a mean of 4.7143 and wilful default by borrower indicated by a mean of 4.5714. The study also found that most of the DTMs agreed that default on loan payment is caused by weak debt recovery processes, compromised integrity considered and fund diversion for unintended purpose to a moderate extent.

Table 7: Factors that contribute to the presence of non-performing loans

Descriptive Statistics			
	N	Mean	Std. Deviation
Wilful default by borrower	7	4.5714	.53452
Weak debt recovery processes	7	3.7143	.75593
Inadequate legal structures	7	2.7143	.48795
Poor credit assessment and evaluation	7	4.7143	.48795
Compromised integrity	7	3.7143	.48795
Weak institutional capacity	7	2.2857	.75593
Fund diversion for unintended purpose	7	3.2857	.75593
Valid N (listwise)	7		

Source: Research Findings

4.2.4 Regression Analysis

A simple regression model was applied to determine the relationship between credit scoring practices and the level of non-performing loans of Deposit Taking Micro Finance Institutions in Kenya. The model used was:

$Y = \beta_0 + \beta_1 X + \alpha$ where; Y was the dependent variable (Non Performing Loans), β_1 was the coefficient function of the independent variable, X was the use of credit scoring models at a particular Deposit Taking Micro Finance institution, β_0 was the Y intercept and α was an error term.

Table 8: Model Summary

Model Summary

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	.938 ^a	.879	.855		.02229

a. Predictors: (Constant), Credit scoring

Source: Research Findings

Adjusted R² is known as the coefficient of determination and explains the extent to which changes in the level of non-performing loans of Deposit Taking MFIs can be explained by the change in the credit scoring practices. From the table 8 above the value of the adjusted R² is 0.855. This implies that the independent variable studied explains only 85.5% of the relationship between credit scoring practices employed by the Deposit Taking MFIs and the level of non-performing loans. This therefore means that other factors not studied in this research contribute 0.145 which is (1-R²) of the relationship between credit scoring practices employed by the Deposit Taking MFIs and the level of non-performing loans. Therefore, further research should be conducted to investigate the other factors (14.5%) that affect the relationship between credit scoring practices employed by the Deposit Taking MFIs and the level of non-performing loans.

Table 9: ANOVA (a).

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.018	1	.018	36.483	.002 ^b
	Residual	.002	5	.000		
	Total	.021	6			

a. Dependent Variable: Non performing loans

b. Predictors: (Constant), Credit scoring

Source: Research Findings

In table 9, the significance value is 0.002 which is less than 0.05 thus the model is statistically significant in predicting Credit Risk, Credit Risk Management and the level of Non-Performing Loans. The statistic value of F is 36.483. Hence, the regression as a whole is significant; this means that credit scoring practices reliably predict NPLs.

Therefore the F-value, associated with P-value proves that there is a significant relationship between credit scoring practices employed by the Deposit Taking MFIs and the level of non-performing loans.

Table 10: Coefficients (a).

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.386	.045		8.504	.000
	Credit scoring	-.067	.011	-.938	-6.040	.002

a. Dependent Variable: Non performing loans

Source: Research Findings

As per the table 10 above, the equation

$$Y = \beta_0 + \beta_1 X + \alpha$$

becomes: $Y = 0.386 - 0.067X$ Where Y was the dependent variable (Non Performing Loans), β_1 was the coefficient function of the independent variable, X was the use of credit scoring models at a particular Deposit Taking Micro Finance institution, β_0 was the Y intercept and α was an error term. This implies that, taking all factors into account (Credit scoring practices and the level of non-performing loans) constant at zero, the relationship between credit scoring practices employed and the level of non-performing loans would be 0.386. The data findings analyzed also show that, a unit increase in credit scoring practices decreases NPLs by 0.067 units.

4.3 Summary and Interpretation of Findings

Out of 8 targeted DTMs 87.5% filled in and returned the questionnaire. Results indicated that 62.5 percent of the DTMs used credit scoring models to assess both business and personal loans. The results indicated that senior management were the main persons involved in formulation of credit scoring models followed by credit committees and credit managers. The least involved in formulation of credit scoring models and credit policies were the branch managers and loan officers.

The research result shows that 100 percent of the DTMs surveyed have a credit scoring model. The study inquired about the length in which this credit scoring model had been used and it was revealed that 50 percent of the DTMs had used the credit scoring model for 5 to 10 years while 25 percent had used it for 2 to 4 years. Only 12.5 percent had used the credit scoring model for more than 10 years.

From the findings of this study, the most important characteristics considered when evaluating an applicant before availing credit for Deposit Taking Microfinance institutions was character of borrower followed by capacity to pay, collateral/security available and economic conditions. The least cited characteristic considered when evaluating an applicant before availing credit for Deposit Taking Microfinance institutions was capital and common sense.

The study also enquired when a decision on whether the client has defaulted on loan payment was made. From the findings of the study, most of the DTMs agreed to a greater extent that client is said to have defaulted the loan after more than twelve months' late payments and three months late. The study also found that most of the DTMs agreed that default on loan payment is considered after using supervision on one to one basis and one month's failure of loan repayment to a moderate extent.

Most of the Deposit Taking Microfinance institutions agreed to a greater extent that non-performing loans are as a result of poor credit assessment and evaluation and wilful default by borrower. The study also found that most of the DTMs agreed that default on

loan payment is caused by weak debt recovery processes, compromised integrity considered and fund diversion for unintended purpose to a moderate extent.

The results of the study indicated an adjusted R² of 0.855. This implies that the independent variable studied explains only 85.5% of the relationship between credit scoring practices employed by the Deposit Taking MFIs and the level of non-performing loans. This therefore means that other factors not studied in this research contribute 14.5%.

On ANOVA, the sum of squares due to regression is greater than the sum of the squares due to the residues. This means that the degree of freedom of the variables is more accurate to explain the relationship and the influence of the credit scoring practices on the level of non-performing loans of Deposit Taking DTMs.

The significance value is 0.002 which is less than 0.05 is an indication that the model is statistically significant in predicting the relationship between credit scoring practices and the level of Non-Performing Loans of Deposit Taking MFIs. The regression equation established shows a negative relationship of 0.067 between credit scoring practices employed and the level of non-performing.

The study conducted a simple regression analysis so as to determine the relationship between credit scoring practices employed by the Deposit Taking MFIs and the level of non-performing loans. As per the SPSS generated table above, the equation

$$Y = \beta_0 + \beta_1 X + \alpha$$

becomes: $Y = 0.386 - 0.067X$ Where Y was the dependent variable (Non Performing Loans), β_1 was the coefficient function of the independent variable, X was the use of credit scoring models at a particular Deposit Taking Micro Finance institution, β_0 was the Y intercept and α was an error term.

According to the regression equation established, taking all factors into account (Credit scoring practices and the level of non-performing loans) constant at zero, the relationship

between credit scoring practices employed and the level of non-performing loans would be 0.386. The data findings analyzed also show that, a unit increase in credit scoring practices decreases NPLs by 0.067 units.

The findings of this study compare to that carried out by Mutie (2006) whose result indicated a negative relationship between credit scoring practices and non-performing loans implying that banks that use scoring models have low asset quality ratio while those that don't use credit scoring models have high asset quality ratio. Aduda, Magutu & Wangu (2012) concluded that the benefits gained from the use of credit scoring include accuracy in the decision making process. This accuracy is gained to the reduction of adverse selection cases where better assessments are made in regards to an application therefore providing better decision making. The study recommended that banks need to use various credit assessment methods before availing loans to SME applicants. This in turn improves the credit scoring of banks.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The objective of the study was to establish a relationship between the credit scoring practices and the level of non-performing loans in Deposit Taking Microfinance Institutions in Kenya. Extension of credit facilities is one of the major activities of all Microfinance institutions (MFIs). However, existence of high levels of loan delinquency problem in microfinance industry negatively affect the level of private investment, increase in deposit liabilities and constrain the scope of microfinance institution credit to borrowers through reduction of MFIs' capital, following falling accumulation of losses to compensate for loan delinquency losses. The success of MFIs largely depend on the effectiveness of their credit management systems because these institutions generate most of their income from interest earned on loans extended to small and medium entrepreneurs. In order to raise the quality of giving loans and reduces the risk involved in giving loans, banks have developed credit scoring models to improve the process of assessing credit worthiness during credit appraisal process and to distinguish defaulters from non-defaulters.

To conduct this study and to realize the objectives of the study, descriptive study was used. The research adopted a census survey of all the deposit taking microfinance institutions in Kenya. Primary data was collected using a questionnaire with both open and closed ended questions. Secondary data was collected from the CBK's annual supervision reports. The descriptive statistical tools were used in describing the data. Regression analysis was employed to determine the relationship between credit scoring practices and non-performing loans. Version 22 of the Statistical package for social science (SPSS) was used to analyze the data. Simple regression analysis was used to test the relationship between non-performing loan (dependent variable) and the credit scoring practices (independent variable).

The study revealed that 62.5 percent of the DTMs used credit scoring models to assess both business and personal loans. The results also indicated that senior management, credit committees and credit managers were more involved in formulating the credit scoring model than the branch managers and loan officers. Results also revealed that character of borrower followed by capacity to pay, collateral/security available and economic conditions. The least cited characteristic considered when evaluating an applicant before availing credit for was capital and common sense. The regression equation established a negative relationship between credit scoring practices employed and the level of non-performing of Deposit Taking MFIs.

5.2 Conclusion

Credit scoring is increasingly being used to evaluate loan applications. Credit scoring will never be able to predict with certainty the performance of an individual loan, but it does provide a method of quantifying the relative risks of different groups of borrowers. The study revealed that 62.5 percent of the DTMs used credit scoring models to assess both business and personal loans. The results also indicated that senior management, credit committees were involved to a great extent in formulating the credit scoring model. Credit managers were moderately involved while branch managers and loan officers were the least involved in formulating the credit scoring model.

The most important characteristics considered when evaluating an applicant before availing credit was character of borrower shown followed by capacity to pay, collateral available and economic conditions. The least cited characteristic considered when evaluating an applicant before availing credit was capital and common sense.

Most DTMs consider a client to have defaulted the loan after more than twelve months' late payments and three months late payment. Non-performing loans are as a result of poor credit assessment and willful default by borrower. Default on loan payment is also caused by weak debt recovery processes, compromised integrity and fund diversion for unintended purpose to a moderate extent.

The study indicated a negative relation between credit scoring practices and the level of non-performing loans of Deposit Taking MFIs. According to the regression equation established, taking all factors into account (Credit scoring practices and the level of non-performing loans) constant at zero, the relationship between credit scoring practices employed and the level of non-performing loans would be 0.386. The data findings analyzed also show that, a unit increase in credit scoring practices decreases NPLs by 0.067 units.

5.3 Recommendations for Policy

From the finding and conclusions the study recommends that all Deposit Taking MFIs as well as banks should have established Credit Policies that clearly outline the senior management's view of business development priorities and the terms and conditions that should be adhered to in order for loans to be approved. Organizations should enhance credit risk management practices which include portfolio management, Deposit Taking MFIs loan policy procedure, risk monitoring, risk analysis and assessment, and credit scoring mechanism.

The study also recommends that active oversight by board and senior management, borrower screening, careful loan structuring, clear collection procedures, and good portfolio reporting should be adhered to. Credit committee, whose purpose is to address issues relating to credit policy and procedures, should be formed in every Deposit Taking MFI. The lending policies and procedures should encompass clear guidelines regarding borrower analysis and approval, credit limits and diversification, and risk mitigation. Risk measurement, monitoring, and control should be established, keeping accurate records, stress testing, managing problem credits, maintaining a sound information system, and continually gauging and assessing risk. The lending policies and procedures should be updated at least annually to reflect changes in the economic outlook and the evolution of the Deposit Taking MFIs loan portfolio, and be distributed to all lending officers and marketers.

The lending officers and marketers should know their customers and conduct due diligence on new borrowers, principals, and guarantors to ensure such parties are in fact who they represent themselves to be. All Deposit Taking MFIs should have established Know Your Customer (KYC) and Money Laundering guidelines. From the findings and conclusion, the study recommends that all Deposit Taking MFIs should adopt a tool for the measurement of credit risk. The tool should define the risk profile of borrower's to ensure that account management, structure and pricing are commensurate with the risk involved. The tool will enable an informed and considered credit decision as good or bad. It will also help to appropriately price loan products. All loan facilities should have a credit score. This is a summary indicator of risk inherent in individual credit signifying the risk of loss due to default of counterparty by considering qualitative and quantitative information. Where deterioration in risk is noted, the credit score assigned to a borrower and its facilities should be immediately changed. Borrower credit score should be clearly stated on all credit applications.

5.4 Limitations of the Study

The study was carried out in Deposit Taking MFIs in Kenya and cannot be extended to all MFIs in Kenya and for a longer period. Not all DTMs provided the information required. If all DTMs were available better results could be obtained. 7 out of 8 target respondents filled in and returned the questionnaire contributing to 87.5% response rate.

The study also faced challenges of time resources limiting the study from collecting information, especially where the respondent delayed in filling the questionnaire. Sometimes travelling for collection of the filled questionnaire had to be done.

The respondents were also found to be uncooperative because of the sensitivity of the information required for the study. The researcher explained to the respondents that the information they provided was to be held confidential and was only for academic purpose only.

5.5 Suggestions for Further Studies

This research study was focused on the relationship between credit scoring and the level of non-performing loans of Deposit Taking MFIs in Kenya. More research needs to be carried out in other lending institutions such as Sacco's and microfinance institutions to get more insight on various credit scoring models used in the country in relation to the level of non-performing loans in these organizations.

This study also suggests that there are many more reasons besides the use of credit scoring that affect the level of non-performing loans of Deposit Taking MFIs. This is shown by the fact that credit scoring independently only constitutes 85.5% to the level of non-performing loans of Deposit Taking MFIs. A study could be conducted to research into other factors that affect the level of non-performing loans of Deposit Taking MFIs in the country.

Further analysis can also be carried out to find out which credit scoring model gives the best prediction of the probability of default for Deposit Taking MFIs loans. This would give an insight into what the best credit scoring models to invest in would be especially for the Deposit Taking MFIs that have not implemented credit scoring in their decision making process.

Mutie (2006) looked at the relationship between the use of credit scoring and the level of non-performing loans in commercial banks in Kenya. There are various dimensions that a researcher may test the use of credit scoring in the market today to provide more information on credit scoring uses, their impact and limitations.

REFERENCES

- Aduda, J., Magutu, P.O., & Wangu, M.G. (2012). The Relationship Between Credit Scoring Practices by Commercial Banks and Access to Credit By Small and Medium Enterprises in Kenya. *International Journal of Humanities and Social Sciences*, 2 (9), 203-213.
- Ahmed, R. & Karunditu, S. (2010). *Kenya Credit Providers Association: Roadmap 2010 – 2015* (Report No.1, 1-38). Nairobi, Kenya: Financial Sector Deepening (FSD) Kenya.
- Alhassan, A.L., Brobbey, F.O., & Asamoah, M.E. (2012). Does Asset Quality Persist on Bank Lending Behavior? Empirical Evidence from Ghana. *Global Journal of Management and Business Research Finance*, 13 (4), 1-8.
- Basel Committee. (2001). *Sound Practices for the Management and Supervision of Operational Risk*. Basel Committee on Banking Supervision.
- Bhide, M.G., Prasad, A. & Ghosh, S. (2002). Banking Sector Reforms: A Critical Overview. *Economic and Political Weekly* 35(5), 399-408.
- Caire, D. & Kossmann, R. (2003). *Credit Scoring: Is it Right for Your Bank?* [Working Paper]. London, UK: Bannock Consulting.
- Central Bank of Kenya. (2011). *Bank Supervision Annual Report*. Nairobi, Kenya.
- Central Bank of Kenya. (2013). *Bank Supervision Annual Report*. Nairobi, Kenya.
- Eivan, L., Jenkins, M., & Levin, J. (2013). The Impact of Credit Scoring on Customer Lending. *RAND Journal of Economics*, 44 (2), 249-274.
- Frames, W.S, Padhi, M. & Lynn, W. (2001) *The Effect of Credit Scoring on Small Business Lending in Low-and Moderate- Income Areas*. [Working Paper 2001-6]. Federal Reserve Bank of Atlanta.

- Frankfurt School of Finance and Management. (2012). *Transforming Microfinance in Kenya: The Experience of Faulu Kenya and Kenya Women Finance Trust*. Nairobi, Kenya: Financial Sector Deepening (FDS) Kenya.
- Gakure, R.W., Ngugi, J.K., Ndwiga, P.M., & Waithaka, S.M. (2012). Effect of Credit Risk Management Techniques on the Performance of Unsecured Bank Loans Employed By Commercial Banks in Kenya. *International Journal of Business and Social Research (IJBSR)*, 2(4), 221-236.
- Gatimu, E.M. (2014). Assessing Institutional Factors Contributing to Loan Defaulting in Microfinance Institutions in Kenya. *IOSR Journal of Humanities and Social Sciences*, 19(5), 105-123.
- International Monetary Fund. (2009). *Initial Lessons of the Crisis*. IMF Staff Paper 09/37. International Monetary Fund, Washington, DC.
- Islam, M.S., Shil,N.C., & Mannan, A.(2005). *Non Performing Loans-It's Causes, Consequences and Some Learning* [working paper No. 7708]. Bangladesh, East West: Munich Personal RePEc Archive.
- Jonathan, P. (2012) *Credit Risk Management in Banking Industry: Case Study*. (Master's thesis). Kwame Nkrumah University of Science and Technology, Ghana.
- Khemraj, T. & Pasha, S. (2009). *The Determinants of Non-Performing Loans: An Econometric Case Study of Guyana*. [Working Paper No. 53128]. Munich Personal RePEc Archive.
- Kofi, A.S. (2012). *Determining The Causes and Impact of Non Performing Loans on The Operations of Microfinance Institutions: A Case of Sinapi Aba Trust* (Master's thesis). Kwame Nkrumah University of Science and Technology, Ghana.
- Korir, M.K. (2012) *Effects of Credit Risk Management Practices on Financial Performance of Deposit Taking Microfinance Institutions in Kenya* (Master's thesis). University of Nairobi, Kenya.

- Lawson, J.C. (1995). Knowing the Score. *U.S. Banker*, November 1995, p. 61.
- Mabvure, J.T., Gwangwava, E., Manuere, F., Mutinvu, C., & Kamoyo, M. (2012). Non Performing Loans in Commercial Banks: A Case of CBZ Bank Limited In Zimbabwe. *Interdisciplinary Journal of Contemporary Research in Business*, 4 (7), 467-488.
- Mester, L.J. (1997). *What's the Point of Credit Scoring?* [working paper]. Federal Reserve Bank of Philadelphia.
- Moti, H.O, Masind, J.S., Mugenda, N.G., & Sindani, M.N. (2012). Effectiveness of Credit Management System on Loan Performance: Empirical Evidence from Micro Finance Sector in Kenya. *International Journal of Business, Humanities and Technology*, 2 (6), 99-108.
- Mugenda, O.M. and Mugenda, A.G. (2003). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi: Act Press.
- Mutie, C.M. (2006). *Credit Scoring Practices and Non-Performing Loan in the Kenyan Commercial Banks* (Master's thesis). University of Nairobi, Kenya.
- Mwirigi, P.K. (2006). *An Assessment of Credit Risk Management Techniques Adopted by Microfinance Institutions in Kenya* (Master's Thesis). University of Nairobi, Kenya.
- Mwithi, S. (2012). *Relationship Between Credit Risk Management Practices and the Level of Non-Performing Loans Of Microfinance Institutions in Nyeri County* (Master's thesis). University of Nairobi, Kenya.
- Negera, W. (2012) *Determinants of Non Performing Loans: The case of Ethiopian Banks* (Master's Thesis). University of South Africa, South Africa

- Ng'etich, J.C. & Wanjau, K. (2011). The effects of interest rate spread on the level of non-performing assets: A Case of Commercial Banks in Kenya. *International Journal of Business and Public Management*, 1(1), 58-65.
- Ogilo, F. (2012). The Impact of Credit Risk Management on Financial Performance of Commercial Banks in Kenya. *DBA Africa Management Review*, 3 (1), 22-37.
- Opportunity International. (2008). *Credit Scoring in Microfinance* [White Paper No.9]
- Pagano, M. & Jappelli, T. (2002). Information sharing, Lending and Defaults: Cross-country Evidence. *Journal of Banking and Finance*, 26(10), 2017-2045.
- Ranjan, R. & Dhal, S.C. (2003). Non-Performing Loans and Terms of Credit of Public Sector Banks in India: An Empirical Assessment. *Reserve Bank of India Occasional Papers*, 24(3), 81-121.
- Sadatrasoul, S.M., Gholamian, M.R., Siami, M., & Hajimohammadi, Z. (2013). Credit Scoring in Banks and Financial Institutions via Data Mining Techniques: A Literature Review. *Journal of AI and Data Mining*, 1 (2), 119-129.
- Samreen, A., Zaidi, F.B. & Sarwar, A. (2013). Design and development of credit scoring model for the commercial banks of Pakistan: Forecasting creditworthiness of individual borrowers. *International Journal of Business and Commerce*, 2(5), 1-26.
- Kenya Gazette Supplement. (2006). *The Microfinance Act* (Act No.19). Nairobi, Kenya: Government Printer.
- Wambua, M.K. (2012). *The Effect of Credit Risk Management Practice on Loan Losses in Microfinance Institutions in Kenya* (Master's thesis). University of Nairobi, Kenya.
- World Bank Policy Research Working Paper 3769, November 2005

APPENDICES

APPENDIX 1: QUESTIONNAIRE

My name is Zipporah Muturi, and I am undertaking Master's degree in Finance at University of Nairobi. The findings of this study will be of substantial interest and value to all in the field of banking. However, this will not be possible without your help. Please take a few minutes (no more than 10 minutes) to answer a few questions based on your experience and knowledge. Your participation is voluntary and your response will be treated confidentially, and shall not be used for any other purposes except for academic purposes.

Thank you for your cooperation.

Please answer appropriately.

SECTION A: GENERAL INFORMATION

1. What is the name of the Deposit Taking MFI? _____
2. How many branches do you have in Kenya? _____

SECTION B: CREDIT APPRAISAL

3. Do you use any credit scoring model?

Yes No

(If answer to question 3 above is Yes, kindly proceed to answer the below questions)

4. Please indicate which type of loan the model is used to assess.

Personal Loans Business Loans Other, specify _____

5. On a scale of 1 to 5, please indicate how often the credit scoring model is used in assessing credit worthiness.

Please record your answer by ticking at the space provided, by the scale indicator (1= Least often, 2= Less often, 3= Moderately often, 4= More often, 5= Most often)

	1	2	3	4	5
Credit Scoring Model					

6. On a scale of 1 to 5, please indicate how the following people are involved in formulating the credit scoring model.

Please record your answer by ticking at the space provided, by the scale indicator (1= Least involved, 2= Less involved, 3= Moderate involved, 4= More involved, 5= Most involved)

Person involved	1	2	3	4	5
Senior Management					
Board of Directors					
Credit Managers					
Credit Analysts					
Credit Committee					
Branch Managers					
Loan officers					

7. Which characteristics/aspects among the following do you consider in your scoring model before availing credit in case of personal loans?

Please record your answer by ticking at the space provided, by the scale indicator (1= Least considered, 2= Less considered, 3= Moderate considered, 4= More considered, 5= Most considered)

Characteristics/Aspects	1	2	3	4	5
Character of the borrower					
Capacity					
Condition					
Collateral					
Capital					
Common sense					

(If answer to question 3 above is No, kindly proceed to answer the below questions)

8. Please indicate the method used in credit assessment. _____

SECTION C: LOAN DEFAULT MANAGEMENT

10. When does your company decide that a client has defaulted on loan repayment?

Please record your answer by ticking at the space provided, by the scale indicator (1= Least considered, 2= Less considered, 3= Moderate considered, 4= More considered, 5= Most considered)

Period	1	2	3	4	5
One month late payment					
Three months late payment					
More than twelve months payment					
Using supervision on one to one basis					

11. Please indicate the extent to which the following factors in your company contribute to the presence of non-performing loans.

Please record your answer by ticking at the space provided, by the scale indicator. (1= not at all, 2 = small extent, 3 = moderate extent, 4 = large extent, 5 = very large extent).

Factors	1	2	3	4	5
Wilful default by borrower					
Weak debt recovery processes					

Inadequate legal structures					
Poor credit assessment and evaluation					
Compromised integrity					
Weak institutional capacity					
Fund diversion for unintended purpose					

*******Thank You*******

APPENDIX 2: LIST OF DEPOSIT TAKING MICROFINANCE INSTITUTIONS IN KENYA

Century Deposit Taking Microfinance

Faulu Kenya Deposit Taking Microfinance Ltd

Kenya Women Finance Trust (KWFT) Deposit Taking Microfinance Ltd

Rafiki Deposit Taking Microfinance

Remu Deposit Taking Microfinance

SMEP Deposit Taking Microfinance

SUMAC Deposit Taking Microfinance

Uwezo Deposit Taking Microfinance

Source: www.centralbank.go.ke