FIRM CHARACTERISTICS AND CREDIT RISK OF MICROFINANCE BANKS IN KENYA

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Abstract: **The study sought to assess the effect of firm characteristics on the credit risk of microfinance banks in Kenya has been analysed. The specific objectives were to examine the effect of management efficiency, liquidity, earning capacity and capital adequacy on the credit risk of microfinance banks in Kenya. The findings revealed that the income capacity depicted significant but negative impact on credit risk. Liquidity depicted a positive and insignificant influence on credit risk; moreover, inappropriate management efficiency and depicted a positive influence on credit risk; Capital adequacy depicted an inverse influence on the credit risk of Kenyan microfinance banks. Moreover, interest rates have a negative regulatory influence between company characteristics and credit risk among the Kenyan microfinance banks. Based on the findings, the study recommended that the management of microfinance banks should diversify their operations to reduce credit-related risks facing microfinance banks, which is a crucial determinant that ensures increased earning capacity.**

Keywords: **Earning Ability, Earnings Ability, Liquidity, Management Efficiency, Interest Rate and Credit Risk.**

1. INTRODUCTION

1.1 Background of the Study

Banks' contribution to stimulating economic stability and development cannot be overemphasized. They enhanced the mobilization of funds for productive investments. This is done through capital formation, which emanates from customers' deposits and lending activities of the banks. Bank loans expose the intermediation role of banks in the collection of resources from excess spending units to deficit spending units (Adusei, 2018). They provide credit facilities to investors through customers' deposits at the command of an interest charge. However, Amaliah and Hassan (2019) asserted that the interest rate charged on credit facilities by banks affects economic growth either negatively or positively depending on the direction of the interest rate. In the quest to carry out banks' intermediation role, Khan, Asima, and Zahid (2020) posited that the credit risk of banks exposes the banks to the threat of losses associated with credit default. They are the engines that propel economic growth, translated into citizens' welfare maximization.

In Kenya, microfinance banks have declined since December 31, 2020. As of 2020, the sector had lost 2.2 billion Kenyan Shillings prior to actual taxes, as opposed to a deficit of 339 million Kenyan Shillings as of 2019 (CBK, 2020). These losses were attributed to the high percentage of credit risk, which led to the profitability of four institutions, with ten institutions having experienced losses. Examples of the institutions that had such losses are Faulu and Kenya Women Microfinance Bank Plc, with major loss-making contributors amounting to a deficit prior to a tax of 476 million Kenyan shillings and 1.5 billion Kenyan shillings sequentially. Furthermore, credit risk rose by 32 percent from 9.8 billion Kenyan Shillings in 2019 to 13 billion Kenyan shillings in 2020, while interest from the credit supply decreased by 11% from 11.2 billion Kenyan shillings in 2019 to 9.9 billion Kenyan shillings in 2020 (CBK, 2020 can CBK report for the

same data happened in the same). The soundness of Kenya's microfinance banks in credit issuance could be smoothened via credible and responsible credit regulations.

Microfinance finance banks are the critical engines used in stimulating core inclusive growth and development. This intermediation role played by the banks determines their exposure to credit risk. Income generation of the banks' results from a low rate of non-performing loans enhances the operational effectiveness of the banks' intermediation role (Khalil & Khalil, 2017). Banks' intermediation role and credit risk are indispensable. Minimum risk of credit default enhances banks' operational performance thereby ensuring their profitability (Kargi, 2011). In reducing the risk of credit management, banks employ operational efficient efforts that improve the ability of banks to earn more profits for their stability. Credit risk is determined by the quality of the assets portfolio which affects the income generation of the banks towards stability (Ahmadyan, 2018).

1.2 Statement of the Problem

The role of microfinance banks in credit mobilization cannot be underestimated in members' welfare maximization and Kenya's economic growth and development. However, microfinance banks have been confronted with high credit risk due to the high rate of non-performing loans. The Central Bank of Kenya (2020) posited that microfinance banks' credit risk was also affected by COVID-19, resulting in low uptake of credit, decrease in interest income, and high level of NPLs. A rise of 32% compared to 9.8 billion Kenyan shillings in 2019 to 13 billion Kenyan shillings was witnessed in NPLs, whereas an 11 percent decline in loan portfolio interest compared to Kenya shilling 11.2 billion in 2019 to Kenya shilling 9.9 billion observed.

Impairment provision for microfinance banks rose by 219 percent from 539 million Kenyan shillings in 2019 to 1.7 billion Kenyan shillings. Consequently, the banks' expenses rose more on employee costs, management, and accounting costs amounting to 29 %, 19 %, and 24 % respectively of the total expenses. The high risk associated with credit issuance led to ten institutions' losses (CBK, 2020). This, in turn, is hampering the role of financial intermediation. Furthermore, microfinance banks registered significant deficits, such as Faulu and Kenya Women Microfinance Banks. The banks recorded losses before tax of Ksh.476 million and Ksh.1.5 billion, respectively. Even though banking sector in Kenya implemented CAMEL, the credit risk level has been continuously increasing in Kenya, according to the CBK Supervision Report (CBK, 2016). According to the World Bank report (2017), the percentage of total gross loans that are considered to be non-performing rose from 4.59 % during the years 2012 to 5.05 % in the years 2013, 5.46 percent, 5.99 percent, and 7.82 percent in 2013, 2014, 2015, and 2016. Despite the introduction of credit risk procedures aimed at limiting lending risks, banks continue to record significant levels of non-performing assets on their balance sheets (World Bank, 2017).

Few empirical works have documented firm characteristics' effect on microfinance banks' credit risk. Some of the studies that have attempted to establish the connection are reported in this study which include Religiosa and Surjandari (2021), Saleh and Afifa (2020), Mennawi (2020), and Sandada and Kanhukamwe (2016). Most studies focused on other countries and did not account for an interest rate as a moderating variable. Based on this, the study considered the effect of the company's features on the credit risk of Kenyan Microfinance banking institutions, taking into account 2015 to 2020.

1.3. Objectives of the Study

1.3.1 General Objective

The general objective of the study was to examine the effect of firms' characteristics on the credit risk of microfinance banking establishments in Kenya.

1.3.2. Specific objectives

Specifically, the study aimed to:

  i. Establish the effect of earning ability on the credit risk of microfinance banks in Kenya.

  ii. Determine the effect of liquidity on the credit risk of microfinance banks in Kenya.

  iii. Establish the impact of management efficiency on credit risk microfinance banks-in Kenya.

  iv. Determine the effect of capital adequacy on the credit risk of microfinance banks in Kenya.

  v. Establish the moderating effect of interest rate on the association between firm characteristics and credit risk of microfinance banks in Kenya

2. LITERATURE REVIEW

2.1 Theoretical Review

Efficiency Structure Theory was introduced by Demesetz (1973). According to this theory, the increased managerial efficiency reduces credit risk among firms. The hypothesis states that firms' credit risk amount to the efficient structure of the firms, which affects the productive nature of firms' credit. The theory proposes that efficiency leads to a reduction in the firm's risk. The theory is characterized by two efficient structures: X-efficiency and scale efficiency.

Microfinance institutions with a better efficient management structure increase credit performance, thereby reducing the risk associated with credit performance. The X-efficiency principle believes that the lower cost structure of the firms helps them optimize profitability and, as such, tilts toward best practices.

Capital Buffer Theory was inroduced by Calem and Rob (1996). The hypothesis states that in meeting minimum capital requirements by banks, the banks ensure that capital is held above the required levels to ensure mitigation against the risk of regulatory breaches. Based on this theory, the credit behavior of microfinance banks is accredited to the buffer size of banks' capital. In contrast, banks with low capital buffers strive to meet regulatory frameworks by increasing their buffers. Risk and capital variation are associated with banks that possess high capital deposits, whereas, indirectly associated with banks that possess low capital moderation (Mendoza & Rivera, 2017). Credit difficulties are addressed through buffer capitalization. This allows bank managers to make the best use of the resources in the allocation of credit facilities to the productive sectors of the economy, ensures effective repayment, and hence reduces the risk of credit default (Khan, Asima & Zahid, 2020).

2.2. Empirical Literature Review

2.2.1 Firm Characteristics and Credit Risk

In the context of Kenya's commercial banks, Awuor (2015) examined the effect of firm characteristics on nonperforming loan levels. The period considered for the study was 2010 to 2014. Secondary data base on firms' characteristics and NPL was utilized. Multiple regression analysis was used to analyze earnings ability, operational cost efficiency, asset quality, bank size, and liquidity. They found that earning ability, liquidity, and operational cost efficiency positively affected NPLs. On the other hand, asset quality and bank size negatively impacted NPLs. Firm characteristics accounted for about 15.6 changes in banks' NPLs. Since the investigation was conducted in the commercialized banking sector, the current study investigated the credit risk in the microfinance sector.

Amuakwa and Boakye-Adjei (2015) carried out a study the relationship between Non-performing loans (NPLs) and profit rates among Ghanaian banks. A regression panel model was used to carry out the study. The study variables were bad debts, bank size, inflation rate and operational margins. The results revealed that bad debts increased nonperforming loans to a great extent. Moreover, bank size and operation margin reduced the nonperforming loans among the banks. Thus, the three variables were significant predictors of nonperforming loans among the banks listen in Ghana security exchange. Notably, this research focused on the determinants of bad debt in Ghana, and the present study examined how earnings affect the credit performance of microfinance banks in Kenya.

Sandada and Kanhukamwe (2016) assed the how credit risk increase affected the performance of banks in the Zimbabwe banking sector. The study employed descriptive, regression, and correlation analysis using 1savings bank, three building societies, and 13 commercial banks. The outcomes bore that banks specific (capital, size, the efficiency of management, operating expenses, quality, and macroeconomic variables play a significant role in enhancing credit risk. It also indicated that industrial factors have an insignificant impact on credit risk. The forgoing study's use of the Zimbabwean banking sector poses a contextual gap which the current research addressed by the present study which focuses on the performance of microfinance banks in banking sector in Kenya.

Focusing on the Middle East and North Africa (MENA) economies' banks, Alber (2016) evaluated how efficiency affects nonperforming loans. The study period was between years 2004 and 2013. Data envelopment analysis (DEA) was used in analyzing the efficiencies of banks among the 15 MENA countries. The Two-Step GMM method was employed where autocorrelation and heterogeneity were investigated to determine the liberation from prejudices. The findings shows that credit risk is a significant predictor increasing the nonperforming loans and hence affecting banks efficiency. Thus, economic conditions, environmental operation, and operation policies in Kenya vary from those of MENA countries, thus, making it significant to consider a case of Kenyan microfinance institutions.

Sandada *et al.* (2016) examine the impact of credit risk increase on the financial bank profitability among the selected banks in Zimbabwe. The research employed descriptive, regression, and correlation analysis using one savings bank, three building societies, and 13 commercial banks. The outcomes bore that banks specific (capital, size, the efficiency of management, earning ability, operating expenses, quality) and critical macroeconomic factors are responsible for rising credit risk. However, industrial factors had an insignificant impact on expanding their credit risks. This study employed a descriptive research design, while the current study employed an explanatory research design.

In Nigeria, Ugoani (2016) studied how bank earnings help in banks' capital formation during the banking crisis. The target population was a total of 14 financial institutions in Nigeria with huge non-performing loans and those making huge losses. A questionnaire format was employed in the study. Descriptive as well as Chi-square technique of analysis was employed. Gross earnings depicted a strong and significant influence on profitability of banking institutions. Therefore, the investigation was carried out in the commercialized banking institutions in Nigeria utilizing a primary database. Here, the study will utilize secondary data in Kenyan microfinance banking establishments.

Rahman, Asaduzzaman and Hussain (2017) studied the influence of financial ratios on non-performing loans among listed commercial banks in Bangladesh. The study employed econometric model to determine the relationship between financial ratios and nonperforming loans. The sample population was a total of 96 respondents selected form 20 of the 30 listed commercial banks between 2010 and 2015. Findings from the ratios used in the study indicated that the net interest margin and the credit-deposit ratio positively influenced nonperforming loans. In contrast, return on assets and capital adequacy ratio negatively influenced nonperforming loans. Furthermore, the priority sector's and sensitive sector's loans were found to increase the nonperforming loans. In contrast, profit per employee, unsecured loans, and investment deposit ratio negatively impacted gross nonperforming loans. The findings of this research may not be significant to Kenyan microfinance banks given the variations in government policy between the two countries.

Odora et al. (2017) assessed the role of capital adequacy on credit risk among commercial banks in African for the period 2000 and 2011. 167 commercial banks were include in the study selected from different African countries. From the results of the research, capital adequacy was found to increase the level of bad debts among the selected small banks, with the exception of large banking institutions. The study focuses on the fact that Africa is made up of different countries, which unlike this study are different, therefore, it will focus on a single country, thus documenting its unique recommendations and findings.

Okoye, et al. (2017) examined the effect of efficiency on credit risk in Africa financial institutions for the years 2000 to 2011. The target population was a total of 167 banks selected form various African countries. The results indicated that banks efficiency depicted a moderate impact on the non-performing loans in African banks. The focus of the study was on Africa, which included different countries, as opposed to this study, which focused on a single country, thus documenting its unique recommendations and findings.

Indonesia's bank size and capital adequacy effect on public banks" nonperforming loans between 2012 and 2016 by Yulianti and Aliamin (2018). Panel regression estimation of the multiple regression analysis was analyzed where 81 banks sample was employed. Simultaneously, the findings documented that loan to capital adequacy ratio, deposit ratio, and bank size had impacted nonperforming loans. Furthermore, loan to deposit ratio and bank size had an inverse impact on nonperforming loans, while capital adequacy reported a positive effect on nonperforming loans. The location of the study was Indonesia, and Kenya was for this current research.

In Nigeria, Kajola, Alao, Sanyaolu, & Ojurongbe, (2019) assessed liquidity and leverage's effect on the financial performance of selected firms in Nigerian (2012-2017). A regression technique was used for analyzing the data on consumer goods. It was noted from the study that leverage which was measured by operating leverage degree and combined leverage degree, significantly impacted financial performance. Liquidity measured by quick and current asset ratio significantly impacted companies' financial performance. It was advocated that profitability level can only be improved if top decision-makers and corporate managers can take advantage of debts' tax shield provided by the financial interest structure of companies. Despite considering the liquidity issue, the study focused on Nigeria's consumer goods-producing firms, whereas this study focused on the MFBs in Kenya. Quick and current assets were employed as predictors of liquidity; this study used liquidity assets over total assets predictors of liquidity.

Oynaka (2019) examined the factors influencing dad loans among commercial banks in Ethiopia. Focusing on how customer and regulatory characteristics affect non-performing loans in the banking sector, a descriptive design of the study was applied based on a quantitative research approach. Responded were sampled using purposive sampling method;

Fifty-two (52) credit officers were used from the Dashin Banking Districts and the Central Bank of Egypt in the South District. The results revealed that, credit volume was a significant factor influencing bad debts among commercial banks in the region. Considering one of the developing countries in Africa with unique banking characteristics, the findings do not apply to the banking sector in Kenya; therefore, this inspired the idea for this study which focused on the credit risk associated with MFBs in Kenya.

Ngungu and Abdul (2020) evaluated the impact of firm characteristics on banks debts of selected banks in Kenya. A causal study design was utilized to produce research findings in 2013 and 2017. The study variable were capital adequacy, liquidity and volume of capital. A total of 40 commercial banks formed the target population. The results revealed that the three variables depicted a minimal influence on bad debts. Thus, the remuneration were made that bank managers should apply effective risk management strategies whenever they are lending money to customers. The current study focused on the characteristics of the company, is isolated from the effectiveness of management, which is an important factor at the company level.

Mennawi (2020) investigated the establishment of certain risks affecting the bank performance among Sudanese banks for the years 2008 to 2018. A total of 13 banks in Sudan formed the target population, where the panel regression analysis technique was employed. The result stated that credit risk insignificantly influenced the performance of banking institutions in Sudan. It was recommended that an effective policy and investment portfolio suitable with collateral should be implemented. The study focus was on the factors enhancing the credit risk of Islamic banks in Sudan. However, this study focus was on the role of credit risk on the performance of microfinance banks in Kenya.

Odekina, Gabriel, and Solomon (2019) assessed the relationship between the amount of credit risk and profitability level of banks in Nigeria. The research deployed a random effect model of panel regression analysis method. Operational adequacy and credit risk possessed a scientifically negative substantial impact on Nigeria's commercialized banking institutions' financial performance. The study concluded that capital adequacy actively and strongly stimulates, grows, and improves the sufficiency of capital adequacy management which translates to the performance of the banks. The utilization of commercialized banks by the study identifies a research gap. Thus, this present study utilized microfinance banks as its target population.

Evident from emerging markets, Saleh *et al.* (2020) analyzed the effect of certain risks (credit bank capital and liquidity) between 2010 and 2018. A generalized method was employed in carrying out the study, and the study instituted that all the risks influence the probability of banks in emerging markets. The Basel requirement guided the study as the criteria for both local and foreign banks' profitability efficiency to minimize banks' risk exposure. The study focused on emerging markets, while this current investigation was centered on Kenyan Microfinance banking credit risk. The preceding study analyzed BASEL characteristics and utilized CAMEL characteristics in this study.

Chiesa and Mansilla-Fernandez (2021) assessed nonperforming loan transmission channels to liquidity creation, credit provision, and cost of capital in Eurozone banks. Regression and causality techniques of analysis were carried out. Empirically, the study revealed that holdings of nonperforming loans reduce banks earning ability in the short and long, affecting bank cost of capital. In addition, low-capital banks reduce credit provision by a more significant margin and create liquidity due to capital cost increases. The periphery countries' banks were found to have more significant economically than the core countries' banks. This study based in Eurozone, where Kenya is a non-member; hence its outcome will not apply to Kenya's setting. This study did not check for causality, unlike this study.

Religiosa *et al.* (2021) evaluated how liquidity, CAR leverage, and company risk affected the performance among selected Indonesian banks. The target population was the banks listed in Indonesian security exchange (2014 to 2018). A multi-regression assessment method was used. Based on the results, the assessment discovered that business risk positively enhances credit risk while CAR and liquidity negatively affect credit risk. It was concluded that liquidity, company risk, capital adequacy, and leverage in earning management execution re-observation. Considering the study in Indonesia, the study's outcome cannot be generalized to Kenya due to the unique features of the economies.

An intertemporal association between efficiency, bank recapitalization, and nonperforming loans was examined by Bolarinwa, Akinyele, and Vo (2021) from 2011 to 2018. From the result of the stochastic frontier analysis (SFA) and generalized system method of moments (SGMM), it was reported that efficiency is vital in tackling credit risk escalation following restructuring policies in the system, which the medium pass-through nonperforming loans and effectiveness and the recapitalization-credit risk linkage. Additionally, it was documented that efficacy goes through the size of a bank and recapitalization to cushion credit risk issues. The geographical location was banks in Nigeria, the current study focus will

be in Kenyan banking sector. The study used stochastic frontier analysis and a generalized system method of the moment for analysis; this study used inferential statistics where panel regression and correlations were carried out.

In Pakistan, Ahmed, Majeed, Thalassinos, and Thalassinos (2021) examined the determinants of non-performing loans affecting banks for the years 2008 to 2018. The system GMM estimator was applied where the J test and Arellano–Bond AR (2) tests were used to validate the stud instruments. The exposure that net interest margin, credit growth, bank diversification, and loan loss provision significantly increase the NPLs. ROA, bank size, and operating efficiency reduce NPLs. Political risk, exchange rate, and interest rates increase NPLs significantly, whereas GDP growth reduces NPLs in Pakistan's banking sector. Contextually the study focused in Pakistan banking sector, based on different government policies, the findings may not be applicable in the Kenya banking sector. Also, despite the application of J-test and Arellano-Bond test. The study ignored to carry out some diagnostics tests like normality and multicollinearity.

Evident from emerging markets, Saleh and Afifa (2020) analyzed how credit risk determined the probability of banks using a generalized method of moment between 2010 and 2018. The results showed that credit risk significantly influences the banks' probability. The Basel requirement guided the study as the criteria for both local and foreign banks' profitability efficiency to minimize banks' risk exposure. The investigation looked at emerging markets and was guided by BASEL requirements, while this study was guided by CAMEL requirements and focused on microfinance banks in Kenya.

Using a dynamic panel regression model, Olarewaju (2020) analyzed macroeconomic and business-specific factors in determining the bad debt of commercial banks in nine countries from 2010 to 2017.This result observed that lower-middle-income countries' non-performance was affected significantly by capital adequacy, real interest rate, and cost income and credit growth ratio. The modification and institution of regulations and policies were suggested for credit advancement in the study area. Nine countries were used for the study, whereas this study will only concentrate on Kenya's credit performance microfinance banks.

Barngetuny (2021) assessed capital adequacy ratio requirements' effects on Kenya'sKenya's commercial Bank loan demand. An experimental design was adopted for the research. Qualitative analysis was applied in the study. From the study outcome, it was observed that capital adequacy ratio requirements might impact KCB loan demand. The results of the study indicated that banking regulators should be firm about capital adequacy ratios for banks by emphasizing financial regulations related to liquidity.

Despite the research conducted in Kenya, the study focused on a particular commercial bank, whereas this investigation will stress 13 Kenyan Microfinance banking credit risks.

A study was carried out on the credit risk effect on Indonesian banking companies earning management by Religiosa *et al.* (2021). The study considered listed companies from 2014 to 2018. A multi-regression assessment technique was utilized, and it was discovered that liquidity, leverage, company risk, and capital adequacy ratio significantly affect their earnings. Also, capital adequacy was discovered to be a moderating variable between liquidity and earning management. It was concluded that liquidity, company risk, capital adequacy, and leverage in earning management execution re-observation. Considering the study in Indonesia, the study's outcome cannot be generalized to Kenya due to the unique features of the economies.

2.2.2 Interest Rate and Credit Risk

According to Mathina (2017), assessed the influence of interest rates on non-performing loans in the Kenyan banking sector. The researchers employed a series of data for the period to evaluate the correlation between interest rates and non-performing loans. Because of the varying character of the time series model, it was thought that using time series research would be beneficial. Vector autoregression (VAR) models were utilized in the research. Because the research variables were not cointegrated, vector error correction (VEC) models were ineffective. The study discovered that interest rates and nonperforming loans had no long-term relationship. Finally, interest rates increaser the volume of nonperforming loans both in the short-run and long-run. The study used vector error corrections to find the variables' long-run relationship; however failed to employ regression model in establishing the relationship.

Onyango and Olando (2020) evaluated the impact of banking rate on credit risk in Kenya's banking sector. The targeted population was a total of 43 selected commercial banks. The qualitative study methodologies were used. From 2012 to 2016, secondary data from accounting records were gathered from the survey. A quantified test was utilized to generate descriptive metrics, inferential assessments, and findings to develop modelling research for predicting nonperforming

loans utilizing banking institution characteristics. According to the survey, Kenyan commercial banks have an aggregate NPL level of more than 5%, indicating that the nation's commercial banks have a severe NPL issue. According to the findings, the interest rate had a considerable beneficial effect on credit risk. This present study used interest rate as a moderating variable.

The influence of an interest rate setting on institutions' credit risk as determined by the nonperforming loan (NPL)/total loans ratio is examined in Matej and Petr's (2020) article. The study examined a one-of-a-kind data set of annual time series data on 823 banking institutions from the Eurozone, Denmark, Japan, Sweden, and Switzerland for 2011-2017, which includes zero and minus interest rates. We infer that the NPL ratio rises after a year of low-interest rates. The results are generally consistent with other studies, and most discrepancies may be attributed to changes in the socio-economic climate within the low-interest-rate period. The study mainly focused on the period of low-interest rates within the Eurozone countries and its effect on credit risk. This study analysed Kenya's microfinance banks, not indicating any low-interest rate period but used as a moderating factor.

3. RESEARCH METHODOLOGY

In line with the study, the population target entails the whole microfinance banking institutions operational in Kenya, considering the risk associated with their lending activities. Thirteen (13) licensed microfinance banks were utilized in this study from 2015 to 2020. Credit risk of microfinance banks detailed in their published central bank records and financial statements were used.

The study model captured the link between the study variables. A collection of microfinance banks was used, considering the risk associated with their credit function. A panel regression framework was employed to assess the effects of firms' features on the credit risk of Kenyan microfinance banking institutions. Mathematically, the study model is arrived at thus:

$CR_{it} = \beta_0 + \beta_1 EA_{it} + \beta_2 LQ_{it} + \beta_3 ME_{it} + \beta_3 CA_{it} + \varepsilon$……………………………………………………..3.1

Where:

CR= Credit Risk at given time (t)

EAit = Earning Ability at given time (t)

LQit = Liquidity for bank at given time (t)

MEit = Management Efficiency for bank at given time (t)

CAit = Capital Adequacy for bank at given time (t)

$B_1 - \beta_4$ = Parameters Estimates

ε = Stochastic term

The moderation model was based on the procedures of Whisman and McChelland (2005), which employs a two-step approach as presented below:

Step One

$CR_{it} = \beta_0 + \beta_1 FC_{it} + \beta_2 IR_{it} + \varepsilon$………………3.2

Step Two

$CR_{it} = \beta_0 + \beta_1 FC_{it} + \beta_2 IR_{it} + \beta_5 IR_{it}*FC + \varepsilon$…..3.3

Where:

CR = Credit Risk

EA = Earning Ability

LQ= Liquidity

ME= Management Efficiency

CA = Capital Adequacy

IR= Interest Rate

FC = Firm Characteristics

4. RESEARCH FINDINGS AND DISCUSSION

4.1 Descriptive Statistics

Table 4.1: The Descriptive statistics for credit risk

Variable	Obs	Mean	Std. Dev.	Min	Max
Credit Risk	72	0.1595	0.1076	0	0.4201
Earning Ability	81	-6.8703	159.5019	-827	474
Liquidity	72	0.2213	0.1288	0.0625	0.6989
Management Efficiency	72	3.0496	8.3014	-33	53.5263
Capital Adequacy	91	0.0034	0.0043	-0.0015	0.031
Interest Rate	91	9.4285	1.0555	8.5	11.5

Source: Research Data (2022)

The descriptive statistics in Table 4.1 revealed that the credit risk variable depicted a mean of 0.1595 and the SD of 0.1076, respectively. The mean score recorded for credit risk fall within the minimum (0) maximum values (0.4201). The findings imply that credit risk showed infinitesimally short volatility from one microfinance bank to the other in Kenya. Thus, the risk of credit encountered by these microfinance banks varies to a standard of 0.1076% in Kenya. Earning ability showed a mean of -6.8703 from the earnings ability of the microfinance banks, which has a standard deviation of 159.5019, with a min -827 and max 474. From the outcome of the descriptive statistics, there is a high variation in the earning ability of the microfinance banks as each microfinance bank has different ways of income generation, thereby making each microfinance profit highly different from another by 159.5019% with some of the microfinance banks making losses as denoted by the minimum value of -827.

On the other hand, the liquidity depicted mean (0.2213) and a standard deviation against 0.1288.The result showed that the M and SD fall within the min of 0.0625 and maximum 0.6989. The results imply that the microfinance banks' liquidity does not vary to a high degree from each other, given the standard deviation value. Also, management efficiency revealed a M 3.0496, with SD 8.3014. The standard deviation depicted a situation in which the microfinance banks' efficiency in management varies by a relatively high degree resulting from competitive nature of the microfinance banks, thus warranting the adoption of the best strategy that could allow for-profit maximization through optimum credit performance. Minimum and maximum values of -33 and 53.5263 were recorded.

A mean value of 0.0034 was accredited to capital adequacy, which also recorded a standard deviation of 0.0043. Based on the result, -0.0015 was recorded as the minimum value, while 0.031 was documented as the maximum value for capital adequacy. Following the value of the standard deviation, it is worthy of note to imply that microfinance banks in Kenya have adequate capital that does not vary significantly. The change could be attributed to the capital adequacy regulation that allows for an amount of capital mandated by microfinance banks to begin operation in the country. Furthermore, the rate interest showed M 9.4285 and SD 1.0555, where the variables mean value falls within the minimum values of 8.5 and maximum values 11.5. The mean implies that the interest rate is relatively high in Kenya.

4.2 Model Specification Test

In estimating panel regression models, there is a need to consider between the random effect model and fixed effect models to determine the most suitable for the study (Baltagi, 2005). The Hausman Test was used to estimate both the random effect and fixed effect models to determine the most appropriate.

Table 4.2: Model Specification Results

	(b)	(B)	(b-B)	Sqrt (diag(V_b-V_B))
	Fixed	Random	Difference	S.E.
Earning Ability	-0.0001564	-0.001619	5.47e-06	0.0000133
Liquidity	0.1177463	0.0367805	0.0809657	0.0564141
Management Efficiency	0.0004211	0.000468	-0.0000469	0.0002711
Capital Adequacy	-7.097724	-5.70752	-1.390204	1.356491
chi2(3)	2.20			
Prob>chi2	0.5312			

Source: Study Data (2022)

Hausman test outcome is shown in Table 4.2, demonstrating that the null hypothesis is accepted. The random effect model is recommended above the other (fixed) in light of this. With a 5% (0.05) significance level, the Hausman test revealed a prob > chi2 value of 0.5312, which is higher than the p-value. Consequently, it becomes essential for the investigation to use the random effect regression model.

4.3 Regression Analysis

Table. 4.3: Direct Effect, Model Results

Credit Risk	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Earning Ability	-0.00016	0.00006	-2.66	0.008	-0.0002812	-0.0000425
Liquidity	0.03678	0.10361	0.35	0.723	-0.1663005	0.2398616
Management Efficiency	0.00046	0.00123	0.38	0.704	-0.0019463	0.0028823
Capital Adequacy	-5.70752	2.90733	-1.96	0.050	-11.4058	-0.0092446
_cons	0.17053	0.03108	5.49	0.000	0.1096123	0.2314578

R^2 = 0.1686

Wald chi2 (4) = 11.66

Prob> chi2 = 0.0201

Source: Study Data (2022)

Following the result of the direct random effect model, the importance of the model was determined using the Wald Chi-Square of 11.66, which has a corresponding p-value of 0.0201. The results demonstrate that the direct random effect model fits the test to determine the influence of firm characteristics on the credit risk of microfinance banks in Kenya. The finding indicates that the model had the goodness of fit, implying those firm characteristics significantly determined microfinance credit risk in Kenya. In addition, the R2 indicated variability in the outcome construct in light of fluctuations emanating from predictors, indicating that 16.86% of changes in microfinance credit risk are affiliated with firm characteristics. The model showed an intercept of 0.17053, indicating that the credit risk value at the microfinance banks is positive. The direct regression results indicate that the earning ability coefficient of-0.00016 has a corresponding p-value of 0.008, which is statistically significant at the 5% significance level. Hence, the results indicate a significant negative effect of earning ability on microfinance credit risk in Kenya, denoting that an increase in the earning ability of the banks would result in a reduction in credit risk. Notably, liquidity demonstrated a positive (0.03678) coefficient that showed an insignificant (0.723) effect on the credit risk of Kenya's microfinance banks at a 5 percent level of significance. Liquidity will result to an increase in credit risk of microfinance banks. Further, management efficiency depicted a moderate but positive influence on the credit risk (0.00046).

Conversely, it depicted a statistically insignificant impact on the credit risk of microfinance banking institutes in Kenya (0.704), implying that the credit risk of the microfinance banks would increase as the efficiency in management increases. These results implied that an increase in capital adequacy would reduce the risk of microfinance credit in Kenya (0.05).

Moderation Effect, Step One

The study's moderation effect entails including the moderating variable to determine its significance or otherwise (Whisman & McClelland, 2005). The moderating variable is included in the model as a descriptive variable for an onward procession to the next step of the moderation model. The significance of the moderating variable on the dependent variable implies that such a variable is used as an explanatory variable. On the other hand, the insignificance of the interaction term indicates that a variable could have a moderating effect on the dependent variable and hence the procession to the estimation of the moderating model. Table 4.8 presents the results for moderation effect step one.

Table 4.4: Step one Moderation Effect.

Credit Risk	Coef.	Std. Err.	Z	P>|z|	[95% Conf.	Interval]
FC	-0.00065	0.00024	-2.61	0.009	-0.0011423	-0.0001631
Interest Rate	-0.00153	0.00952	-0.16	0.872	-0.0202093	0.0171378
_cons	0.17040	0.094332	1.81	0.071	-0.0144791	0.3552985

R^2 = 0.0969

Wald chi2 (2) = 6.87

Prob> chi2 = 0.0323

Source: Study Data (2022)

From table 4.4, the R squared value (0.0969) implies that firm characteristics and interest rates collectively had low predicator influence on the credit risk of microfinance given it accounting for only 9.69 percent of the changes in credit risk. The significance of the model was determined using the Wald chi2, which revealed a statistical value of 6.87 and a p-value of 0.0323, which is significant at a 0.05 level of significance. This means those firm characteristics and the interest rate moderately influenced the credit risk of MFBs in Kenyan financial sector.

Further, the results revealed that the application of interest rates as a regression coefficient and company characteristics have adversely influenced the credit risk of microfinance banks in Kenya. The results also show that the interest rate as an explanatory variable depicted an insignificant impact on the credit risk of MFBs. The nominal interest rate of the credit risk of microfinance banks meets the conditions for further estimation of the second step of the regulatory model.

Moderation Effect, Step Two

After being satisfied with the first step of the moderation model, where interest rates depicted a small influence on the credit of MFBs in Kenya, the control test is conducted in the second step. This step involves the interaction of the explanatory variable (company characteristics) with the mediator (interest rate) in the study to investigate the importance of the mediator in the relationship between company characteristics and the credit risk of microfinance banks in Kenya. Table 4.5 presents the findings for step two moderation effect.

Table 4.5: Step Two for Moderation Effect

Credit Risk	Coef.	Std. Err.	Z	P>|z|	[95% Conf.	Interval]
FC	-0.00065	0.00025	-2.60	0.009	-0.0011417	-0.0001602
Interest Rate	-0.00116	0.00959	-0.12	0.903	-0.0199655	0.0176268
FC*Interest Rate	-0.00002	0.00008	-0.28	0.779	-0.0001809	0.0001356
_cons	0.16871	0.09463	1.78	0.075	-0.016771	0.3541959

R^2 = 0.0976

Wald chi2 (2) = 6.88

Prob> chi2 = 0.0759

Source: Field Data (2022)

Table 4.5 show the results where the R-squared (0.0976) implies that the proposition that firm characteristics holds (management efficiency, earning ability, liquidity, and capital adequacy). Thus, the interest rates, together with firm characteristics were weak predictors of the credit risk. Cumulatively, these factors explained only 9.76% of the changes in the instability in Kenya's Microfinance Banks' credit risk. Wald chi2 value for statistics (6.88) and p-value (0.0759) obtained implies that there was insignificant influence. Interest rates, Firm characteristics, and firm characteristic*collectively with rates of interest rates depicted an insignificant influence on credit risk of MFBs in Kenya.

The introduction of the interaction terms and a moderator between firm characteristics and rate of interest negatively influenced Kenya's Microfinance Banks' credit risk. Thus, if other predictors are held constant, the interaction between firm characteristics and rate of interest positively affected Kenya's Microfinance Banks' credit risk, as demonstrated by (-0.00002) coefficient. Thus, increasing firm characteristics and rate of interest together reduces Kenya's Microfinance Banks' credit risk by 0.00002. Notably, the effect on firm characteristics*interest rates on Microfinance Banks' credit risk in Kenya denoted insignificance (p-value=0.0.779).

4.4 Hypotheses Testing

4.4.1: Effect of Earning Ability on the credit risk of microfinance banks in Kenya

The study aimed to examine the effect of earning capacity on the credit risk of microfinance banks in Kenya and Table 4.3 illustrates the results. The corresponding null hypothesis was tested at a significance level of 0.05. The findings show that earning ability depicted a negative but significant influence on credit risk of Kenyan MFBs. The results showed that an increase in earning ability of microfinance banks would results to a decline in banks' credit risk. The null hypothesis in this regard, which states that earning ability has no statistically significant influence on the credit risk of microfinance banks, was rejected. Therefore, the study concluded that earning ability significantly negatively affects the credit risk of microfinance banks in Kenya. The outcome could be attributed to the measures the microfinance banks took to recoup their loans from customers, thereby bolstering the profitability of the microfinance banks in Kenya. The study support

findings of Chiesa and Mansilla-Fernandez (2021). They established that holdings of non-performing loans reduce banks earning ability in the short- and long-term financials, affecting banks' capital cost. The research findings are inconsistent with Awuor's (2015) findings that earning ability, liquidity, and operational cost efficiency positively affected NPLs. The variation in the outcomes of the studies could be attributed to the context in which the study was carried out, thus mandating different outcomes depending on the direction.

4.4.2: Effect of Liquidity on Credit Risk of microfinance banks in Kenya

Given the study's second objective, which sought to determine the effect of liquidity on microfinance banks' credit risk in Kenya, the null hypothesis concerning this objective was tested at a 0.05 significance level. Table 4.3 showed that liquidity has a positive coefficient of $\beta = 0.03678$ and a corresponding p-value = 0.723 > 0.05. Therefore, the liquidity of microfinance banks has a positive and minimal impact on the credit risk of microfinance banks in Kenya. Based on these findings, the study fails to reject the null hypothesis that liquidity does not significantly affect the credit risk of Kenyan microfinance banks. ThusThus, liquidity does not have predictive power on the credit risk of microfinance banks in Kenya. The research results could be linked to the fact that microfinance banks have high liquidity, which stimulates their desire for loan issuance, thus putting them at a very high risk of loan default from customers in Kenya. The research finding is inconsistent with Religiosa *et al.* (2021), who discovered that business risk positively enhances credit risk while CAR and liquidity negatively affect credit risk. Kajola, Alao, Sanyaolu, and Ojurongbe (2019) also found that liquidity measured by quick and current asset ratios significantly impacted companies' financial performance. The different contexts in which these studies were conducted provided the avenue through which the outcomes differ from the current study.

4.4.3: Effect of Management Efficiency on Microfinance Banks' Credit Risk in Kenya

The research further sought to determine the impact of management effectiveness on the credit risk of microfinance banks in Kenya. The study hypothesis was evaluated at a significance level of 5% to evaluate the null hypothesis. Table 4.3 illustrates the findings from management efficiency. The $\beta = 0.00046$ while the p-value was 0.704 > 0.05. The outcome showed that management efficiency depicted a moderate abut positive influence on credit risk of microfinance banks in Kenya. Based on these findings, the null hypothesis, that is management efficiency has no statistically significant influence on credit risk of microfinance banks, was upheld. Thus the management efficiency was found not to be a predictor of credit risk among the microfinance banks in Kenya. Thus the changes may be attributed to poor management of microfinance banks' credit risk, which increases the chances of loans defaulting by customers and, thus, lowers the banks' financial performance.

These findings concerning the management efficiency and liquidity of banks are in disagreement with those of Gabriel and Solomon (2019); Majeed, Thalassinos, and Thalassinos (2021); Sandada and Kanhukamwe (2016) and Odekina, Bolarinwa, Akinyele and Vo (2021) who noted that banks specific (capital, size, the efficiency of management, operating expenses, quality, and macroeconomic variables play a significant role in enhancing credit risk. These contrary opinions in the study's findings depicted a situation in the different locations where the studies were carried out as well as the organization's unique management efficiency approach that led to the varying outcomes with the current study.

4.4.4 Effect of Capital Adequacy on the Credit Risk of Microfinance Banks in Kenya

The study evaluated the effect of capital adequacy on credit risk of MFBs in Kenya. As observed by the study's objective, the null hypothesis was tested using a 5% significance level. The capital adequacy revealed a negative coefficient of $\beta = -5.70752$ and p-value = 0.05. The results implies that capital adequacy depicted a negative but significant influence the banks' credit risk. Thus, given these results, the null hypotheses that capital adequacy has no statistically significant influence on the credit risk of microfinance banks in Kenya was rejected. The changes can be attributed to the tight capital adequacy regulation, which reduces the number of loans given to customers to properly manage the recovery process of existing loans. Thus, increasing the capital adequacy of microfinance banks lowers the risk associated with the banks' credit in Kenya. Therefore, capital adequacy significantly predicted microfinance banks' credit risk in Kenya. The study finding supported Barngetuny (2021) found that capital adequacy ratio requirements might impact KCB loan demand. But a contrary outcome was recorded by Yulianti and Aliamin (2018), who established that capital adequacy positively affected nonperforming loans. The differences in the study's outcome could be linked to the various locations where these studies were conducted, thus, paving the way for the different outcomes in the study.

4.4.5 Effect of Interest Rate on the relationship between firm characteristics and Credit risk of microfinance banks in Kenya

Following the approach of Whisman and McClelland (2005) two step are conducted to estimate the moderating influence of one variable on the relationship between two or more other variables. From the estimated results, the study failed to reject the null hypothesis. Thus, interest rates depicted no statistically significant moderating influence on the relationship between firm characteristics and credit risk of Kenyan microfinance banks. The results were confirmed with a factor coefficient (-0.0002) and a corresponding p-value (0.779). In light of this, the researchers concluded that interest rates have little predictive power for the relationship between firm characteristics and credit risk for Kenyan microfinance banks. The results of this study contrast with those of Onyango and Olando (2020), according to which interest rates have a significant beneficial effect on credit risk. The effect of bank rate determinants on credit risk among Kenyan commercial banks was investigated, highlighting the variable results noted by the study.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

The research made several conclusions on the basis of the subject matter. Research shows that the earning capacity of microfinance banks significantly affects the credit risk in Kenya. The study concluded that monetization works as a tool to reduce bank default rates by reducing credit risk ratios in the study area. The results also show that liquidity insignificantly inlfeunce the credit risk of Kenyan microfinance banks. Therefore, the study concluded that liquidity does not have a significant impact on the credit risk of Kenyan microfinance banks. According to the report, changes in liquidity did not affect the credit risk of Kenya's microfinance banks. The results of the study also indicate that management efficiency does not have a significant impact on the credit risk of Kenyan microfinance banks. The study concluded that the effect of management efficiency on credit risk in Kenya's microfinance banks is very small. The study concluded that changes in management efficiency did not significantly affect credit risk in Kenya's microfinance banks, which in turn could be attributed to poor credit management. Research shows that the capital adequacy of Kenyan microfinance banks significantly affects the credit risk of these institutions. The study concluded that capital adequacy is an important factor in predicting the credit risk of microfinance banks in Kenya. The credit risk of microfinance banks decreases with the increase in their total assets.

5.2 Policy Recommendations

Recommendations in view of characteristics and how it affects the credit risk of microfinance banks based in Kenya. Based on the results of the research, the earning capacity has a significant negative impact on the credit risk of microfinance banks were made. Therefore, the study recommendations are that the management of microfinance banks increase their earning capacity through diversification to reduce the risks associated with bank credit in Kenya.

The findings revealed that liquidity depicted a positive influence on the credit risk of Kenyan microfinance banks. To finish this, the study recommendation also shows that managers of MFBs in Kenya to control the amount of liquidity that banks use in loans to customers to reduce the loan rate. Banks.

The findings further indicated that management efficiency depicted a small but positive influence on the MFBs; credit risk. Consequently, managers of the microfinance bank should take every possible opportunity to ensure that the risks associated with the credit risk of the microfinance bank are minimized. Uses may be made by applying a technique to check the creditworthiness of the customer through synergistic coordination with credit bureaus. Operating a microfinance bank can also expand investment possibilities to build a business and protect an enterprise from default. The study further made recommendations that policy-makers and money market regulators (the government) develop policies for microfinance banks with regard to certain minimum core capital ratios. They should maintain their core capital base based on the total capital base to minimize the credit risk associated with bank operations.

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