FINANCIAL RISK, FIRM SIZE AND FINANCIAL PERFORMANCE OF MICROFINANCE BANKS IN KENYA

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Financial Risk, Firm Size and Financial Performance of Microfinance Banks in Kenya

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

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This thesis has been submitted for examination with my approval as the University supervisor.

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DEDICATION

I dedicate this thesis to Ishmail Musyoki, Regina Mueni Ishmail, my wife Faith Mbithe, and sons Nicanor Sumaili and Neziah Maweu.

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ACRONYMS AND ABBREVIATIONS

AFC	Agricultural Finance Corporation
AMFI-K	Association of Microfinance Institutions of Kenya
ASCA	Accumulating Savings and Credit Association
BCBS	Basel Committee on Banking Supervision
CBK	Central Bank of Kenya
CFSI	Center for Financial Services Innovation
CGAP	Consultative Group to Assist the Poor
GDP	Gross Domestic Product
GOK	Government of Kenya
KPOSB	Kenya Post Office Savings Bank
MENA	Middle East and North Africa
MFBs	Microfinance banks
MFIs	Microfinance Institutions
NGOs	Non- Governmental Organizations
OECD	Organization for Economic Cooperation and Development
ROSCA	Rotating Savings and Credit Association
SACCO	Saving and Credit Corporative Organizations
SASRA	Sacco Societies Regulatory Authority

DEFINITION OF TERMS

Credit Risk Credit risk refers to the anticipated risk to the bank's earnings and capital due to the failure of the obligor to fulfill the contract stipulations with the financial institution or otherwise the borrower defies the contractual agreement (Central Bank of Kenya [CBK], 2013).

Financial Performance Financial performance refers to a measure of gauging organizational goals attainement in monetary terms (Daher & Saout, 2015).

Financial Risk Financial Risk refers unexpected volatility of banks returns. It consists of credit risk, liquidity risk, market risk, interest risk, operational risk, foreign currency risk and capital risk (Olumayokun & Adekoya, 2020).

Firm Size Bank size represent how big or small a bank usually in terms of book value of total assets. Bank size as the moderating variable is computed as the natural logarithm of the book value of total assets (Ewool & Quartey, 2021).

Liquidity Risk Liquidity risk refers to the bank's inability to satisfy all short-term obligations as they mature (Fadun & Oye, 2020)

Microfinance Banks Microfinance banks refers to microfinance institutions approved and authorized by the Central Bank of Kenya to accept from the members of the public money on deposit and current account (Government of Kenya [GOK], 2014).

Operational Risk Operational risk is a loss attributable to inadequate or malfunctioned internal processes, people, and systems or external events affecting a bank (Basel Committee on Banking Supervision [BCBS], 2012).

ABSTRACT

Microfinance play pivotal role in providing financial services to low-income household and small business that are excluded by traditional banking thus aiding alleviating poverty. Therefore, this study was inspired by critical facts; firstly, microfinance banks have performed poorly in the past by reporting losses compared to their counterpart, commercial banks have continued to be resilient to report improved financial performance. Secondly, there exists a contradiction in past studies on the significance of financial risk on the financial performance Microfinance Banks (MFBs). Further, the research aims at demonstrating and modeling the effect of credit risk, operational risk and liquidity risk as the financial risk components on the financial performance of MFBs in Kenya. The general objective was to assess the effects of financial risk on the financial performance of MFBs in Kenya. The study's specific objectives were: To analyze the effect of credit risk on the financial performance of MFBs in Kenya; operational risk on the financial performance of MFBs in Kenya; liquidity risk on the financial performance of MFBs in Kenya; and to analyze the moderating effect of firm size on the relationship between financial risk and the financial performance of MFBs in Kenya. The study was guided by positivist paradigm approach. Descriptive research design and explanatory research design were adopted. All 14 MFBs licensed by Central Bank of Kenya (CBK) at the end of 31st December 2021 formed the study's target population. The study also obtained quantitative data. The quantitative data were obtained from the CBK, Bank Supervision Annual Report, and audited financial statements of MFBs for the period between 2011-2021, which was analyzed through panel data analysis. Panel regression was used to establish the association between independent and dependent variables. The following diagnostic test was conducted; To test normality, Kolmogorov -Smirnov test and Shapiro test were carried out and found that data was following normal distribution; Augmented Dickey-Fuller (ADF) test was conducted to test unit root and found that all variables had unit roots and were non-stationary; Wooldridge test was conducted found that data never violated serial correlation; Variance inflation Factor (VIF) was carried out and found out no presence of multicollinearity; Breusch-pagan test and Levene test were carried out and revealed no evidence of heteroscedasticity; and finally Hausman specification test was conducted and revealed that fixed effect models were suitable for Return on Assets (ROA). The finding on results and test of Hypothesis revealed that credit risk exerted a negative and statistically significant effect financial performance of MFBs while Operational risk and Liquidity risk had a negative and statistically insignificant relationship with ROA as measures of the Financial performance of MFBs. The study therefore recommends that, MFBs should adopt strategies and policies that ensure vetting and issuance of credit facilities to credit worth customers. The bank should also develop and implement policies to improve managerial efficiency to reduce operational cost.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In developing and underdeveloped countries, the microfinance sector is considered a strategic means of poverty reduction, promoted by both governments and donors for a society's social and financial being (Founanou & Ratsimalahelo, 2016). Microfinance thrives in economies of developing and transiting countries. Their main objective is to provide financial services to the poor section of society excluded by providers of formal financial services or, in general, considered unbankable or undeserving. They are commonly referred to as the Undeserved, and these segments mainly consist working poor, the majority of whom survive on less than US $ 2 per day. They further include self-employed or micro-entrepreneurs running a micro-business. The majority of these poor people toil in the informal sector, which developing nations constitute up to 80 percent or more (Benedetta et al., 2015).

Availing financial resources to the poor segment is a vital mechanism for poverty alleviation and wealth generation in underdeveloped economies where enormous unmet demand for financial facilities exists. There exist limited inclusion and use of financial services by the underprivileged in commercial banks, which is attributable to high expenses of market agreements and limitations (Demirgüç-Kunt & Klapper2012). The ability of people with low incomes to borrow, pay moderate interest charges, and save continuously has been well proved by Microfinance institutions (MFIs), leading to great improvement in credit markets for developing nations.

Banks' prominent role is financial intermediation, channeling surplus funds from household units and firms to deficit investment units (Mishkin & Eakin 2012). Commercial banks conduct four fundamental services in intermediation: liquidity management, asset management, liability management, and capital adequacy management (Kwakwala, 2015). A well-developed financial system is essential for fostering a nation's economic development and growth by facilitating the optimal

distribution of financial and non-financial resources to the greatest utilization.The provision of financial facilities such as short-term credit, saving and current accounts, and insurance products promotes accelerated investments, risk diversification, and currency exchanges within a nation. Wide-ranging Financial mechanism that reduces or eliminates price and non-price obstacles particularly benefits the poor section of a nation, who, in most cases, are barred from using financial services (Demirgüç-Kunt & Klapper, 2012). Moreover, in Kenya, increased cost for financial products and access of financial service has remained an impediment toward digital finance expansion and adoption thus fostering financial exclusion (GOK, 2022). Therefore, the government has continued to prioritize financial deepening through banking sector to attain a GDP of 10% per annum (GoK, 2012).

Batinge (2014) defines Microfinance as a diversity of banking and insurance services developed for poor consumers, mostly women. The key targets of Microfinance Institutions (MFIs) are undeserved and low-income earners excluded from the mainstream financial system; thus, their products usually have low monetary denominations compared to services offered by commercial banks. Gradually, MFIs transformed into commercial or Microfinance Banks (MFBs), initially credit-only structured organizations. After transformation, they must comply with stipulated regulatory requirements enshrined within laws, Acts of Parliament, or Bank regulators. Transformation to MFBs, privileges an institution to mobilize deposits from the public. MFBs constitute the highest stake of assets, loans, and savings in the microfinance sector (Benedetta et al., 2015). The MFIs pose as the most preferred financial intermediary by people experiencing poverty because of their ability to provide short-term loans without collateral and low-interest rate compared to other moneylenders such as shy lockers and pawnbrokers.

Maniagi (2018) notes that financial institutions operate in volatile and unpredictable environments. Encountering multi faced risks that include credit, operational, liquidity, and market risks, among other business risks. With stiff competition and emerging new market opportunities, banks have adopted expansion, strategies, and sophisticated lending techniques to micro, small, and medium enterprise and low-

income population, which has led to high non-performing loans and hence the high level of credit risk. Similarly, severe competition from fintech and Internet banking has mounted more pressure on the banking sector. Financial institutions (banks) venture into risky investments to improve their earnings to satisfy their investors.

1.1.1 Global Perspective of Microfinance Institutions

The World Bank's survey, The Global Findex (2015), reports impressive progress in the financial inclusion of the underserved between 2011 and 2014. The survey found that approximately 700 million people opened an account with a prudential and non-prudential form of financial institutions such as commercial banks, MFBs, credit-only MFIs, cooperatives, and mobile banking providers service providers. It further reported an increase of adults holding bank accounts from 52% to 61%, while the financially excluded people fell by 20% to 2 billion adults. Mutai (2012) noted that in Canada and the USA, MFIs focus their financial services on sidelined people barred from accessing or using banking financial resources, nearly 8% of Americans, which translates to 9 million people excluded from mainstream banking and lacking any access to any form of formal finance services such as bank account. Meanwhile, in Canada, credit unions foster the development of microfinance by offering financial services to marginalized populations through the mainstream banking system.

For a couple of years, the European microfinance sector has continuously expanded during the economic crisis. This sector in Europe has emerged as an essential tool for promoting self-employment, Micro-enterprise, and reduction of social and financial inclusion for the 24 million people, constituting nearly 24.8% of the European population facing abject poverty.

The EU-28 supports the development of the microfinance sector with the EU Programme for Employment and Social Innovation (EaSI) between 2014 to 2020 with loans and technical support services. Further, they promote the sector by maintaining the European Code of Good Conduct for Microcredit Provision (Severino, 2014). India's population of more than 1.2 billion people is considered today the third largest economy after the United State America (USA) and China

based on purchasing power of its citizens. Despite its impressive rank, over 50% of the population is financially excluded from traditional banking. The microfinance sector, supervised by the reserve bank of India, serves more than 25 million clients and has an annual growth of between 30%- 50% per annum. In addition, the proper functioning of credit bureaus enhances low default rates and transparency in the sector. (ResponsAbility Investment report, 2014).

1.1.2 Regional Perspective of Microfinance

The African continent, with more than 800 million people living in rural areas and relying on agriculture as the only economic occupation, faces many problems, including a need for elementary infrastructure. Despite the lack of rudimentary infrastructure, the Gross Domestic Product (GDP) has been on an upward trend, depicting its potential for growth and expansion (Arun & Murinde 2010). According to MicroFinanza (2014), the microfinance sector in Morroco comprises 12 licensed MBFs, with three MFIs controlling 90% of the market share. The Moroccan microfinance sector is the most developed in the Middle East and North Africa (MENA) region, with an outstanding portfolio of 64% for the entire region. Despite Morrocan MFI's rapid growth in the MENA region, the sector still needs comprehensive risk management guidelines and a concrete institutional framework. The above is attributed to the rapid growth of portfolios and widespread multiple borrowing hence higher levels of indebtedness and loan defaults (MicroFinanza, 2014).

The quality of the portfolio and profit margins has dramatically declined in the Moroccan microfinance sector as the MFBs' non-performing loans increased significantly to 1.9% in 2007 from 0.42% in 2003. The Portfolio at Risk (PAR 30) increased tremendously from 5% in 2008 to 10% in 2009. Due to high credit risk, write-offs of non-performing loans increased dramatically, negatively impacting MFBs' profitability and degree of solvency. The deteriorating level of PAR 30 led to the merger of the two largest MFBs, namely Zakoura and Banque Populaire (Microfinza, 2014).

1.1.3 Kenya Perspective of Microfinance

The microfinance sector in Kenya is composed of various competing institutions, which vary in formality, professionalism, visibility, commercial orientation, geographical coverage, and size. The institutions offering microfinance services are categorized into non-governmental organizations, limited companies, SACCOs, trusts and informal operators such as shylockers (Maobe, 2013). Kenya takes the lead in the vibrant microfinance sector in sub-Saharan Africa, with micro-credit programs microfinance more than any other country in Sub-Saharan Africa, with micro-credit programs starting in the early parts of the 1980s (Oseno, 2013). The 12 MFBs registered and supervised by CBK had issued a total worth KSh 43.3 billion in 2015 compared to KSh 32.9 billion in 2014, which translates to a growth magnitude of 31.6%. The total customer deposits collected in 2015 by MFBS was KSh 39.7 billion, representing a growth of 45.42% from KSh 27.3 billion year 2014. Also, MFBs have continued to portray impressive performance by opening 2.4 million deposit accounts in 2015 compared to 2.1 million accounts in 2014 (CBK, 2015).

According to FinAccess Household 2016 survey, financial inclusion in Kenya increased to 75.3% in 2016, a 50% increase in the last ten years. The financially excluded Kenyan stood at 17.4% in 2016 compared to 41.3% in 2006, which translates to more than half reduction of excluded. However, financially excluded Kenyans remained high in rural areas at 22.0% compared to urban areas at 9.5% in 2016. In addition, uptake of informal financial services from *chamas*, ROSCAs, shopkeepers, shylocks, and employers remained relatively high for women at 10.2% in 2016 compared to men at 4.1% in the same period in 2016. The survey further reports increased usage of mobile financial services and bank agents at 82.5% and 45.4% in 2016, respectively, compared to 2013, where mobile financial service was 74.5% and bank agents 33%. In contrast, access to financial service providers through the bank branch decreased to 30.1% in 2016 compared to 32.4%. Finally, the report depicts increased uptake of financial services offered by formal prudential service providers in urban areas at 59.9% in 2016 at urban areas compared to rural areas at 32.1% in the same period (FinAccess, 2016).

The vibrant informal sector in Kenya, provides employment to 83.25 percent and 83.34 percent of active workforce in year 2021 and 2020 respectively (Kenya National Bureau of Statistics, (KNBS), 2022). Additionally, 30 per cent of adult population rely on informal service and products, despite the background of increased access of financial access in Kenya, (GoK, 2022). The use of information technology has fostered aggressive day-by-day penetration of microfinance consumers. The recent improvement over the last few years in East Africa and the Indian sub-continent has led to new opportunities for enhancing client experience and reducing financially excluded communities in our society. In Kenya, the flagship mobile banking and lending system M-Shwari, offered by Commercial Bank Africa (CBA) to all M-pesa users, has over 10 million accounts and 4.5 Million active customers. This mobile banking product, M-Shwari, offers short-term credit facilities of $15 on average, with more than 50,000 credits offered daily. The service aims to satisfy the need for quick access to cash besides having minimum conditions to account holders. The accounts are opened in less than 30 seconds, and loan appraisal is done promptly using credit scoring aided by the customer's M-Pesa data (Cook & Mckay, 2015)

MFIs can be registered under nine different Acts of Parliament: the Banking Act, the Company Act, the Non-Governmental Organizations (NGOs) Coordination Act, the Building Society Act, the Cooperative Act, the Trustees Act, the Kenya Institute of Education Act, and the Societies Act. Self-Help Groups, ROSCA, and ASCA are registered with the relevant ministries and practice microfinance.

1.1.4 Financial Risk and Financial Performance of Microfinance Institutions

According to Ochieng (2016), Banks play a crucial role in resource mobilization from the surplus economic unit (savers) to the deficit economic unit, thus enhancing the efficiency of the financial market. Banks encounter information asymmetry when enforcing contracts for financial and money market participants; in the process, banks are exposed to several risks. Lukic (2015) asserts that risk management in the banking industry aims to identify, analyze, and control five common risks: interest

rate, market, operational, liquidity, and credit risk. Financial risk management in banking is imperative to economic growth, development, and financial stability.

Muriithi (2016) asserts that financial risk as a sub-category of risk management in financial institutions encompassed the following risks: credit risk, liquidity risk, market risk, operational risk, compliance and legal risk, and strategic risk. The financial risk exposure on commercial banks and microfinance institutions causes unanticipated volatility in earning profitability. Efficient mitigation of financial risk exposure leads to minimal earnings and cash flow volatility in financial institutions. Efficient risk management techniques are essential in maintaining stability in the banking industry and promoting economic growth momentum in a country. Financial institutions have increasingly adopted robust financial risk management frameworks to evaluate and mitigate the effects of financial risk exposure.

An optimal microfinance sector thrives where the MFIs are either autonomous or regulated by Banking Act or any other special law. In Kenya, MFIs are regulated by either one or more regulatory plans. The microfinance sector in Kenya plays a strategic role in poverty reduction by issuing credits in small amounts to the poor and other financial services hence enhancing greater financial inclusion and sustainable and efficient flow of services in the economy. The service offered is micro-credits to low-income earners and micro and small enterprises. Therefore, the crucial role that MFIs play in the economy prompted the government to create a favorable environment for operation by enacting the Microfinance Act of 2006. The law endeavors to institute a sustainable mechanism and safeguard the savings of poor and vulnerable depositors (Gathuku, 2010).

It addresses several issues, such as licensing, governance, supervision, and protection of depositors. The Act sets out the minimum capital requirements and provides a two-tier regulation for the MFBs. Governance issues related to maintenance of minimum capital requirements, maintenance of minimum liquid assets, declaration of dividends, prohibited activities, insider lending, limits in shareholding, and management of institutions. Supervision aims at ensuring compliance by institutions. The Act provides for inspecting institutions for breach/ contravention of the law,

irregularities, mismanagement, and periodic reporting (Microfinance Act, 2006). Microfinance Act 2006 specifically contains provisions on the minimum capital requirement, capital adequacy, governance, maximum shareholding, and liquidity. Minimum capital is an obligation to maintain minimum capital that MBFs must raise and keep at a particular period. It requires the investor to place their financial resources at risk, and this capital should encourage owners to supervise the institutions' activities.

MFB's financial profitability sustainability is adversely affected by credit risk as one of the major financial risks. Small-size MFBs are particularly disadvantaged, struggling to meet high industry operational costs and product diversification to compete effectively with larger microfinance institutions (Muriu, 2011). Bank size is an indicator of economies or diseconomies of scale of MFI, and the normally natural logarithm of the total asset of a firm is adopted as a proxy of size (Cull et al., 2015). According to Olumayokun and Adekoya (2020), routine banking activities involve loan provision; thus, MFBs should fundamentally identify, analyze and control financial risks facing their business operations by aiming to achieve optimal equilibrium between risk and return while maintaining minimal fluctuations of financial performance. MFBs to mitigate liquidity risk efficiently, the bank's management should establish optimal cash management requirement levels for both short-term and long-term, taking into account various stress scenarios (Olumayokun & Adekoya, 2020).

Financial institutions have adopted various supervision and regulation agreements (Basel I, II, and III) proposed and set by the Basel Committee on Banking Supervision (BCBS). The committee provides a raft of recommendations on banking and financial regulations, specifically concerning credit, liquidity, capital, market, and operation risks. The first Basel Accord focused on the capital adequacy risk of banks by coming up with capital adequacy requirements. This accord provided a framework for mitigating credit risk through the risk weighting of different assets.

The second Basel Accord II was introduced in 2004. Basel II created a standardized measure for key financial risks (Credit, Operational, and Market Risk). Basel II concerns banks' liquidity by stipulating the minimum level of capital that financial institutions maintain. In contrast, Basel Accord III set 2010 proposed strengthening minimum capital requirements outlined in Basel I and II. In addition, Basel III introduced various capital, leverage, and liquidity ratio requirements that banks should maintain with sufficient reserves to survive future crises.

A survey on risks facing the microfinance industry conducted in 70 countries based on 306 responses by CSFI (2014) reported that the top ten ranking risks internationally included over-indebtedness, credit risk, competition, risk management, governance, strategy, political interference, management, regulation, and staffing. However, in Africa, they found that credit risk, governance, over-indebtedness, risk management, management strategy, competition, liquidity, and technology management ranked highest among the 19 risks under consideration. The study intends to focus on credit risk management, liquidity management, corporate governance, and capital requirement since the regulation enables the mitigation of high-ranking risks. According to Eckles et al. (2014), risk management frameworks are adopted by financial institutions to mitigate financial loss exposure, therefore, boosting stakeholder confidence and facilitating investors' and regulators' assess the bank's financial performance and solvency risk.

Financial risk crisis of 2009 – 2010, due to the collapse of Lehman Brothers in September 2008, exposed banking sector unpreparedness, weak governance, and inadequate risk management structures demonstrated by mispricing of credit facilities, liquidity risk, and excess credit growth. The unfolding effect of the crisis led to the development and critical focus of risk management in the government and banking industry (Lam et al., 2011). Financial risk poses a great threat to the financial sustainability of Microfinance Institutions, both in the short term and long-term duration. This study explored the impact of financial risks on the financial performance of microfinance banks in Kenya. Muriithi (2016) observed that market, credit, operational, and liquidity risks are the most prevalent risks in the Kenyan banking sector.

Financial performance is the ability of the financial institution to run cost-effectively, profitably, endure, grow, and respond to business risks (Turyahebwa et al., 2013). Additionally, Pandey (2010) notes that it measures firms' ability to utilize their assets optimally to maximize returns on shareholder wealth and, therefore, a general indicator of a firm's overall financial status for a given period. Consequently, return on asset (ROA) and return on equity (ROE) are common measures of profitability (Pandley, 2010). Banks' financial performance depicts the bank's capacity to generate sustainable profits. Banks strengthen their capital base by minimizing earning volatility through improving long-term profitability due to the re-investment of retained earnings. Therefore, banks should produce and maintain a positive return on equity (ROE) to maximize shareholder value.

Firm financial performance typically refers to the degree to which a corporation utilizes tangible and non-tangible assets to run the enterprise operations to make revenues or generate profits. Financial performance evaluates the overall firms' financial well-being of an entity within a given period, mostly in years, and is generally used in benchmarking companies within similar industries (Sangali, 2013). Financial statements such as the statement of financial position, income statement, cash flow statement, and changes in owner's equity act as the main source document for retrieving a firm's internal data. The statement of financial position, also known as the balance sheet, points outs the corporation's assets, liabilities, and owners' contributions, while the other hand, the income statement shows the firm's revenue, operating expenses, taxes, and profits (losses); the statement of cash flow depicts the entities cash inflow from various source and outflows; and the statement of changes in the owners' equity demonstrate changes of owners' equity within a year. Financial ratios are the measurement parameters of a firm financial performance, commonly utilizing information from one or more statements.

Kioko et al. (2019) define financial performance as a firm's ability to adopt and implement strategies to attain its organizational goal and high return. They argue that financial performance is well evaluated by the net income obtained from the firms' operations. Therefore, banks' profitability can be viewed as the ultimate gauge of the effectiveness of financial risk management. Fundamentally, the inherent objective of

every financial institution is to maintain financial stability and improve its growth and expansion through operating profitability. A healthy and stable, vibrant banking system is imperative to enhancing sustainable economic growth and development and a stable financial system. ROA and ROE are widely used financial performance measures. Return on Assets (ROA) measures return per each invested unit, and Return on Equity (ROE) gauges the earning for a period per unit of shareholders' equity. Thus, ROA and ROE are considered as suitable measures for MFBs. Most studies on the financial performance of MFIs and commercial banks have used the ROA and ROE financial ratios to measure financial performance (Strøm et al., 2014; Marsland et al., 2011; Bassey & Moses, 2015). ROA gauges the capacity of MFI to utilize its fixed and short-term assets to create income. ROA uses net income after taxes to total institutions' assets.

1.2 Statement of the Problem

The Vision 2030 recognizes micro-finance banking sub-sector as a vital player in fostering financial and social inclusion through access of financial services and products by poor, low-income households and Micro- and Small-scale enterprises (GoK, 2012). According to FinAccess (2019) report, there has been a tremendous increase in the uptake of financial products of prudentially governed service providers, supervised and monitored by authorized statutory bodies in the last ten years, to 43.9 % in 2019 from 15.0% in 2006. Despite the impressive use of financial services, the Central Bank of Kenya Supervision reported that MFBs had ROA of negative 0.5% in 2016, negative 0.9% in 2017, negative 2% in 2018, negative 0.4% in 2019, negative 3% in 2020 and negative 1% in 2021(CBK, 2015; CBK, 2017; CBK, 2019; CBK, 2021).

Ochieng (2016) asserts that financial risk and performance are paramount to financial service institutions due to their essential role in financial intermediation. In this light, legal and regulatory frameworks have been developed, adopted, and implemented to mitigate financial risk exposure, which includes The Basel Committee on Banking Supervision Accords and CBK Prudential Guidelines. Besides the adoption and continuous observation of the regulatory frameworks and guidelines, the banking

sector in Kenya has witnessed several cases of financial risk management weakness among the banks, thus resulting in dismal financial performance and, to some extent, bank failures.

A plethora of past studies (Tafri et al., 2009; Htay & Salman,2013; Akong'a,2014; Aruwa & Musa, 2014; Muteti,2014 Okehi,2014; Muriithi, 2016; Mafu, 2017; Gweyi, 2018; Juma,2018; Maniagi, 2018; Kioko et al., 2019; Ali & Oudat, 2020; Onsongo et al., 2020b; Ikponmwosa, 2020; Olumayokun & Adekoya, 2020) mostly examined the effect of financial risk on commercial banks financial performance. However, there dearth of comprehensive studies of this relationship in microfinance banks. In addition, some of the previous studies on the impact of financial risk on the financial performance of microfinance institutions have limited their focus on one aspect of financial risk, ignoring other components. For instance, Gatuhu (2013); Korir (2014); Wakaria (2016); Bashabe et al. (2017); Afolabi, Obamuyi& Egbetunde (2020); Munangi & Bongani (2020) investigated on impact credit risk on the financial performance of MFI, while Annannab et al. (2022) and Cheng et al. (2020) have examined Operational risk. Mwangi (2014); Otieno et al., (2016); and Njue (2020) focused on liquidity risk. Thus, the need to have a comprehensive view.

Therefore, this study was motivated by the following fundamental issues. Firstly, microfinance banks have continued to post poor performance in the recent past, which calls for an in-depth examination on the influence of financial risk on the financial performance of MFBs. Secondly, past empirical studies in MFBs are incomprehensive, inconclusive and establish contradictory results on the impact of financial risk on the financial performance of the institutions. Finally, the research aimed at establishing and modeling the effect of credit risk, operational risk and liquidity risk as proxies of financial risk on the financial performance of MFBs in Kenya.

1.3 Objectives of the Study

1.3.1 General Objective

The study's main objective was to determine the effects of financial risk on the financial performance of Microfinance Banks (MFBs) in Kenya.

1.3.2 Specific Objectives

(i) To determine the effect of credit risk on the financial performance of Microfinance Banks in Kenya

(ii) To establish the effect of operational risk on the financial performance of Microfinance Banks in Kenya.

(iii) To determine the effect of liquidity risk on the financial performance of Microfinance Banks in Kenya.

(iv) To determine the moderating effect of Firm size on the relationship between financial risk and financial performance of Microfinance Banks in Kenya.

1.4 Research Hypotheses

H_{01}: The Credit risk has no significant effect on the financial performance of Microfinance Banks in Kenya.

H_{02}: The operational risk has no significant effect on the financial performance of Microfinance Banks in Kenya.

H_{03}. The liquidity risk has no significant effect on the financial performance of Microfinance Banks in Kenya.

H_{04}: The Firm size has no significant moderating effect on the relationship between financial risk and financial performance of Microfinance Banks in Kenya.

1.5 Justification of the Study

The findings of this research will benefit several stakeholders, such as academicians and researchers, regulators, and microfinance institutions.

1.5.1 Academicians and Researchers

The researchers and scholars will utilize the findings and discussions of the study as a basis for improving existing theories and literature on MFBs' regulations and gaining theoretical and practical experience on the impact of financial risk on the financial performance of MFBs in the microfinance sector. The study findings, discussion, and recommendations would be a source of future reference for academic and industry researchers in banking-related issues.

1.5.2 Financial Institution Regulators

The banking sector regulators, CBK and SASRA, may utilize the study findings to understand the bottom-line impact of regulation and supervision on credit-only MFIs, MFBs, commercial banks, and SACCOs. The insights from the study's findings will provide approaches to guide regulation and policy formulation and hence enhance the sector's growth. Further, the results will be a basis for formulating effective and efficient risk management policies and strategies for the banking industry.

1.5.3 Microfinance Institutions

MFBs' management, board of directors, and employees will be able to gain an in-depth understanding of the research findings, thus enabling them to make informed decisions on operations on how to mitigate credit risk and operational risk that were found to influence the performance of MFBs significantly.

1.6 Scope of the Study

The study assessed the effect of credit risk, operational risk and liquidity risk as components of financial risk on the financial performance of MFBs in Kenya

between 2011-2021. The period was taken into consideration based on availability of up-to-date financial information of microfinance during the period of the study. It concentrated on microfinance banks (MFBs) licensed, monitored, and supervised by the Central Bank of Kenya (CBK). The CBK had fourteen (14) MFBs registered and authorized to collect deposits from the public under the Microfinance Act (2006) as of December 2021.

1.7 Limitations of the Study

The study had the following limitations; focused solely on microfinance institutions registered and supervised by the CBK thus discriminating informal microfinance institutions. Further, majority of the Microfinance banks had some missing financial statements in their websites. To overcome this constraint, the missing financial statements were obtained from the CBK supervision department. Also, the secondary data analyzed was subject to limitations of MFB's financial statements as reported to the CBK and general public.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focuses on a review of existing literature in line with the research objective to create a better understanding of the research problem. The literature review consists of the following sections: review of theories, conceptual framework, review of empirical evidence, literature critiques, research gap, and summary. The theoretical review consists of essential theories supporting specific objectives. The conceptual framework presents a diagrammatical association between predictor variables and criterion variables. The empirical review enhances the conceptualization of the study problem and identification of the research gap that the study aims to fill.

2.2 Theoretical Review

This section discusses theories that underpin the four objectives of the study. The credit risk theory, agency theory, liquidity preference theory and stakeholder's theory informed the study objectives.

2.2.1 Credit Risk Theory

The credit risk theory was developed by Robert Merton in 1974 as structural framework for analysis of credit risk in corporate bond and options (Merton, 1974). Credit risk refers to the failure of the borrower to meet their contractual obligation to their financial institutions (Natufe & Evbayiro-Osagie, 2023). The failure to adhere to debt covenants constitutes to default risk. The default risk is central to Merton's default model that led to pioneering of Credit risk theory. The default risk causes partial or complete loss of the principal and interest. This loss occasioned as result of violation of contractual terms may lead to bank's insolvency due to its inability to meet depositors demand and thus result to financial contagion in the financial sector. The credit risk is primarily constituted by counterparty risk and default risk (Adegbie

& Otitolaiye, 2020). Structural models and intensity-based models are main approaches for credit risk quantification.

Merton's model (1974) is a structural model utilized to assess credit risk. The model determines credit risk by the chances of borrowers' default or by the difference between firm's assets and default barrier (Valaskova & Kliestik, 2014). The structural models determine the credit risk based on underlying economic fundamentals. On the other hand, intensity-based models also known as reduced approach or hazard rate models were developed 20 years after structural models, simulate individual parameters exogenously and express the likelihood of firms' default. The Merton's theory computes the probability of default on the basis of the proportions of the various components of equity and debt. The credit risk theory is based on the following underlying assumption, validity of Modigilini and Miller theorem; debt structure is static; constant risk-free rate; absolute priority to lendor, degree of bankruptcy is zero; the charges for renting is proportionate to lending capital; and the firm's value is tradeable (Valaskova & Kliestik, 2014).

Merton (1974) posit that firm's credit risk relates to its equity and debt obligations. The inability of debtor to meet their credit facilities impacts bank's capital structure. Its therefore imperative for bank regulators, the central banks to devise stringent processes and procedures that prevent against delinquent loans and regularly issuing, enforcing and monitoring guidelines. The fundamental objective of regulators is to maintain sound financial system, public confidence and mutual compliance of covenants (Natufe & Evbayiro-Osagie, 2023). There is need for bank management to maintain a balance between financial performance and credit risk exposures. The management should ensure adoption and implementation of appropriate strategies to mitigate the degree credit risk exposure. To minimize default risk, lenders should conduct credit worthiness evaluation, demand asset securities, security guarantees, derivatives and insurance against credit instruments. Banks charge higher interest rates to clients considered to have higher degree of default risk (Taiwo, et al., 2017). Financial institutions need to mitigate inherent risk in their entire loan portfolio with the intent consideration of individual credit facilities or transactions. Banks must ensure that credit risk is managed considering the institution's other risks. Banks

enjoy long-term success by effectively embracing appropriate credit risk management techniques as a major component of the overall organization risk management framework. In the banking and microfinance sector, loans remain the largest contributing element to financial institution credit risk besides existing activities in the banking book and trading book.

According to the theory, credit risk has adverse effect on the firm's financial performance. It provides a structural relationship between the default risk and the assets of a company. The theory argues that financial assets are impacted negatively by credit risk exposure from inception to maturity. The theory focuses on credit portfolio management, it proposes five C's framework (capacity, capital, collateral, character and condition) for client evaluation before extending credit instruments. It inspires banks' credit allocation strategy (Mrindoko, Macha & Gwahula, 2020).The credit risk theory suffers the following deficiencies; the interest rates are volatile; in practice not, all liabilities of the firm are settled at the same point, companies offer credit with different maturities; defaults happens at any time; and does not distinguish among different types of credit instruments in accordance to their seniority, securities, or covenants; and firm's assets values do not follow log-normal distribution (Hull, Nelken & White, 2005)

The modelling of credit risk underpins the Basel Accord II. This is attributed to the fact bank's capital requirement is directly influenced by risk embedded in credit portfolio. Basel Accord II proposes bank's capital should be in proportion to inherent credit risk exposure. The underlying assumption of credit risk modelling is determination of the borrower's attributes and their potential of default. Risk mitigation is imperative in minimizing the credit risk exposure that cannot be completely avoided due to its complex structure that is embedded in the asset. Banks enforcing stringent lending guidelines, demanding asset securities, security guarantees and derivatives (Khan & Ahmed, 2001). Credit risk is adequately monitored and kept to a lower level through the use of an internal risk rating system that determines the degrees of exposure from individual borrowers and sector concentrations. Banks should monitor loan loss reserves as stipulated by CBK classification criteria. The degree of credit risk exposure reduces substantially

through the demand for collateral and the existence of guarantees. Determining credit facility degree of risk exposure entails assessing the type of loan, maturity length, existence and quality of collateral, and probability of customer default. Consequently, the financial institution should develop a contingency strategy for delinquencies and defaults exceeding the institution-set limit within the economy or sector (CBK, 2013).

CGAP (2012) argues that MFIs making a repeatedly short-term loan to the same borrower need not carry out cash flow analysis, and credit assessment reports for every loan granted. Banks' credit policies and procedures and ad hoc determinations should enshrine the number of times for carrying out a credit assessment on a borrower. Thus, institutions develop appropriate credit risk management strategies to govern the practice with the financial institution and aid in detecting and handling inherent and potential risks in credit issuance. The credit risk theory suggest that increase of credit risk exposure in banks is associate with decreased financial performance. This Melton's theory of credit risk underpins effect of credit risk on financial performance on MFBs.

2.2.2 Agency Theory

The proponents of agency theory, Jensen and Meckling (1976), argue that a relationship arises between principals or proprietors and agents or administrators in a firm setup. They assume that administrators act in the best interest of the firm's proprietors or shareholders. Thus, an agency relationship arises from an interaction between the administrators or managers and the principal or shareholder. Consequently, the terminology 'agency relationship' would be defined as the legally binding relationship between the principal and another party, a representative or agent undertaking functions on their behalf. The relationship is fostered by entrusting authority or autonomy in decision-making to the firm's manager or administrators. The theory also points out that the firm's shareholders or owners or principals assume that administrators are not satisfactorily motivated and thus driven by self-centeredness and individualism interest instead of wealth maximization. It negatively impacts the shareholder's economic welfare through these sought behaviors to pursue

individualistic interests. Marashdeh (2014) posits that the fundamental argument for agency theory is that corporate interaction between the shareholders and the firm managers cause conflicts of interest dues to divergent interest.

The central postulation of agency theory is that managers pursue and maximize their utility rather than enhancement of shareholder's economic welfare; contracts are expensive when writing and executing; information is disseminated asymmetrically between partners in the agency relationship; and the principal and agent have restricted or confined rationality Marashdeh (2014). However, information asymmetry arises between the firm's management and shareholders since the latter needs help to accurately determine or quantify the output of managers who are more knowledgeable about the firm's daily operations. Therefore, due to imperfect information, shareholders face adverse selection problems since they cannot perfectly evaluate the suitable skills or abilities the managers assert to possess at employment contracting, thus may fail to select well-suited applicants to execute responsibilities and duties within the company or improperly gauge their output (Jensen & Meckling, 1976). Further, Jensen and Meckeling (1976) proposed that moral hazards arise when managers dispense their efforts and knowledge not in the best interest of their principals. With limitations due to information asymmetry, the shareholders cannot monitor the manager's output or effort level to reward them appropriately.

Madison (2014) argued that the theory's main objective is cost reduction and greater efficiencies within firms. Further observe that the theory proposes two ways for reducing agency difficulties, both of which can mitigate the agent's opportunistic behavior such as free-riding, delusion, and perk consumption. The first is creating governance structures to enhance monitoring and assessment of the actual conduct of the agent. Such structures include examples, provision of mechanisms for accountability, or oversight bodies such as a board of directors. The second is establishing governance structures where the contract is anchored on the actual outcome of the agent's conduct. Rewards are some examples of structural mechanisms.

The theory underpins the operational risk concept that evaluates the relationships among various stakeholders. It accentuates the roles of administrators as the agents of owners and the roles of the board members as the agents of the real owners of a firm (Jensen & Meckling 1976). The board of directors, defined by key components such as board size, Chief Executive Officer Duality, and Non-executive boards, constitute the corporate governance mechanism. The agency theory opines that Non-Executive Directors (NED) participate in crucial supervisory roles in BOD owing to the assumption that they are autonomous and concerned with reputations (Fama & Jensen, 1983). Therefore, NEDs enhance the value maximization of the firms as they possess vast experience, knowledge, and skill set, and there are more independent when undertaking monitoring functions (Fama, 1980; Fama & Jensen, 1983). Therefore, based on this theory, corporate governance structures should strive to align the interest of the board of directors, managers, and shareholders.

The Basel Committee on Banking Supervision (BCBS) (2014) recognizes that operational risk arises from the following operational loss events; Employment and Safety Practices; internal fraud; external fraud; Customer, product, and business practices; breakdown of Physical assets; business disruptions and system failure; and execution, delivery and process management. Furthermore, good governance can benefit a company through a better flow of funds and improved access to low-cost capital, strong internal controls, and discipline. It might achieve better credit ratings, leading to lower debt funding and higher stock price valuation, which can result in equity dilution when additional stock is floated. Properly governed companies are supported by deep and transparent financial markets, robust legal systems, and efficient resource allocation. In turn, promotes financial and economic stability and increases national and global growth rates, whereas poorly governed companies do the opposite."

Ochieng (2016) asserts that "effective corporate governance structures promote firms to create value, through innovation, entrepreneurialism, development, and exploration, and provide transparency, accountability and control system commensurate with the risks involved". Corporate governance stimulates the productive use of all resources within the corporation and the nation's economy. And

governance inspires confidence in investors and lenders, thus enabling the corporation to attract low-priced debt and equity finance. It also promotes inclusivity of all stakeholders in the firm decision-making and hence leads to the long-term suitability of the Bank. Heenetigala (2011) posit that efficiency and better financial returns are influence by adoption of good governance practices.

The output of the management team is generally qualitative and assessed by subjective appraisal of management structure and mechanism, corporate culture, and control systems. However, the capability of the management of financial institutions is also be measured with the help of accounting ratios of a bank's management ability to deploy its resource optimally to maximize the revenue, utilize the institution's facilities productively and minimize costs (Bank for International Settlement [BIS], 2013). Banks' Corporate Governance being among the main internal elements that affect the Bank's financial performance turns out to be a complicated subject to capture with financial ratios (Ongore & Kusa, 2013). However, scholars have used various accounting ratios utilizing financial data from statements to indicate management efficiency. Different researchers adopted different ratios to gauge management quality, such as the operating profit to income ratio (Muiruri, 2015; Nazir, 2010); and the ratio of costs to total assets (Nassreddine et al., 2013).

CGAP (2012) argues that an independent board should supervise and monitor senior management. It is critical to the microfinance sector, sponsored by NGOs, which lack owners, thus leaving the management needing an effective supervisory board. Additionally, CGAP (2012) contends that MFBs should ensure a minimum number of experienced board of directors and senior professional managers equipped with banking and risk management knowledge. Board members need to understand the needs of the target market and their uses for financial services. Therefore, corporate governance plays an oversight role in influencing the success or failure of a bank. The senior management and board of directors have an obligation to a bank's activities, monitoring the quality of credits issued and the long-term profitability capacity of the Bank.

Agency theory posits that firms ought to develop proper governance structures to monitor the conduct of professional managers and mitigate the principal-agent problem. This strategy will lead to shareholders bearing additional agency costs in the principal-agent relationship. Nevertheless, the effects of those costs can be minimized, and the organization's financial performance be boosted, provided that the firm has an effective governance mechanism (Nguyen, 2015). In microfinance institutions, agency problem is likely to arise if the managers have individual vested interests. Some issues would be that the managers allocate themselves loans at the expense of the members. This theory has a critical link to operational risk their respective impacts on the financial performance of MFBs.

2.2.3 Liquidity Preference Theory

The proponent of this theory is John May Keynes (1936), as a theory of the rate of interest which proved to be more significant for policymakers and for expounding on near-term net changes in interest rates. Keynes (1936) proposes that the interest rate is the reward for utilizing a scarce financial resource. Corporates and households opt to hold cash for conducting daily transactions and also for precautionary motives. Therefore, investors in debt instruments such as treasury bonds, corporate bonds, and certificates of deposits yearn to hold money against declining asset prices. Interest rate is the compensation that has to be paid to lenders to surrender a perfect liquid asset. The relationship between the trading price of bonds and their interest rates is inverse. Upward interest rate fluctuations discourage bond investment for fear of falling bond prices.

According to Keynes (1936), liquidity preferences arise from three key motives: transaction, precautionary and speculative. Firstly, the transaction motive relates to the need for liquidity to meet current transactions of households and business units. The transaction motive of money will remain perfectly inelastic irrespective of market fluctuation of interest rates. Graigwell and Maxwell (2006) argue that households with higher disposable income tend to have greater transaction demand for money than lower-income earners. Secondly, the precautionary motive arises because households and firms anticipate meeting unforeseen contingencies and thus

opt to hold cash balances. The level of cash reserve held for precautionary motive differ with individuals and firms depending on financial confidence, income generation ability, level of business activity, and access to loans. These business risks determine the premium financial institutions charge to compensate for risks of default from their clients. Thirdly, the speculative motive is the demand for money to invest in enterprises that generate higher returns. Keynes argues that an individual's cash level depends on investments' returns. Therefore, the return promised by an investment venture must exceed the inherent risk of the investment.

Keynes (1964) argues that bankers ordinarily decide the total amount of money to lend, the approaches to lending, and proportionate resources to distribute to various investment opportunities open to the financial institution. Three investment categories are open to financial institutions: bills of exchange and call loans to the money market, investments, and customer advances. In terms of profitability, advances to customers have more profit margin than investments, bills, and call loans. On the other end, bills and calls loans are more liquid, followed by investments and customer loans. He further argues that banks weigh profitability against liquidity. However, the Bank's assessment is influenced by the prevailing degree of economic uncertainty. Minsky (1986) contended that banks' liquidity preference is reflected in specific asset portfolios adopted by financial entities. Its choices for a certain degree of liquidity banks retains by forgoing profitable ventures would mainly be influenced by the Bank's risk assessment of depositors being willing to cash liabilities.

Cash demand from the Bank's customers is mainly satisfied through the proceeds of income-generating investment; sales of income generating avenues; the issue of new debt; or the depletion of the Bank's cash reserve. If uncertainty rises, liquidity preference increases, and asset demands will bias toward more liquid but less profitable assets (Minsky, 1986). Keynes (1964) argues that the liquidity preference of banks is reflected in the balance sheet and the aggregates of each category of assets. The liquidity preference approach of financial institutions naturally reflects balance sheet strategy rather than choices of individual assets and liabilities. Ndede (2015) claimed that lenders are risk averse, and risk gradually increases with the

length of time. Thus, lenders prefer making short-term loans rather than waiting for a long time, which is probably uncertain. Banks' liquidity refers to banks having liquid assets when the need arises to fulfill the withdrawal demands of their clients. Therefore, liquid assets should be readily convertible into cash and easily redeemable before maturity to meet financial commitments or maturing obligations. (Drehmann & Nikolaou 2013). Richard (2013), thus, contends that client deposits and short-term marketable securities are more liquid than a bank's equity investment, which is attributable to the fact that market prices and the latter's value are less long-lasting than the former.

According to Fu, Lin and Molyneux (2014), the minimum capital is required by regulators to preserve their banking institutions against financial distress, conflict of interest, and poor market behavior due to bank reserves. The aim of maintaining minimum capital is to boost the stability of the mainstream banking system by availing a cushion against unforeseen losses when financial institutions get into a risky point so that banking crises and failures are minimized. According to Hull (2012), bank capital has two components: Tier I and Tier II. Tier I Capital comprises equity and noncumulative perpetual preferred stock net of goodwill. It reflects the core capital contribution of the Bank's stockholders. Tier II Capital, referred to as supplementary capital, refers to all secondary capital sources, such as cumulative perpetual preferred stock and subordinated debt (debt subordinated to depositors) with an original life of five years (Hull, 2012). Saunders and Cornett (2014) argues that capital adequacy protects bank depositors and promotes the stability and efficiency of a financial system. A bank's Tier I Capital is the ordinary capital of the Bank, which can absorb bank losses without the Bank having to suspend trading. Tier II Capital is the Bank's capital which can absorb losses if the Bank has to shut down and so provides some degree of protection to depositors (Saunders & Cornett, 2014). The capital adequacy ratio is more rigorous since it considers stockholders' core contributions and all other available supplementary capital options (Hull, 2012).

Financial institutions experiencing liquidity problems halt lending activities to preserve cash levels. However, MFI must continue lending activities since it will undermine the borrowers' motivation to honor their outstanding credit. Self-

Regulating MFIs need access to emergency liquidity from the regulators or to sources readily available to commercial banks. In the recent past, MFIs have relied on foreign lenders despite the debt being denominated in foreign currency, which disadvantages the organization due to lack of manager's lack of expertise to mitigate foreign exchange risk; this requires MFIs to set limits on net open position for each international currency relative to institutions capital and earnings (BCBS, 2012). In addition, MFIs using foreign exchange currency should evaluate the fitness of their senior management. Risk management strategies and procedures implemented by MFIs should contain foreign exchange risk. In developing countries, MFIs need more opportunities to hedge foreign risk despite the senior management being well-equipped with expertise.

However, lenders will only be induced to lend for longer periods by granting them higher interest rates. Therefore, poor liquidity management exposes financial institutions to liquidity risk, which impacts the performance of the entities. In microfinance institutions, liquidity problems would arise if the organization cannot honor customers' demand for their savings or cash deposits and delays in the issuance of borrowed funds. This theory instigates the effect of liquidity risk on the financial performance of MFBs.

2.2.4 Stakeholder Theory

A firm's stakeholder comprises any party that positively or negatively impacts the company in achieving its core objectives (Freeman, 1984). The corporation's mission is attained by harmonizing various competing interests through balancing the conflicting interest of a group of firms' interest parties. Thus, the central aim of stakeholder theory is identifying the stakeholders affected by the company's operations. Freeman (1984) further suggests that it is the board of directors' obligation to consider the interests of the firm's shareholders and the needs of all interested parties, more so those linked firms' impact on the environment and societal well-being. Heenetigala (2011) claimed that the moral standpoint of the theory is that firms' stakeholders are entitled a privilege to have their needs considered appropriately by the corporation, and the professional managers should run the

enterprise for the profit of all interested parties, irrespective of whether the party contributes to improved profitability of the company. The researcher further argues that the theory promotes putting into practice corporate social responsibility and risk management systems to cope with the numerous interests of stakeholders.

The interrelatedness of various groups of stakeholders impacts the company's decision-making processes since stakeholder theory posits that decisions should consider the benefits accruing to the firm and all interested parties (Freeman, 1984). According to Emerson and Raposo (2011), two major stakeholders are the primary and secondary. The primary interested parties directly involve the firm, including employees, clients, lenders, and suppliers, while the secondary parties don't have any enforceable contract like the society, government, and ecology. The primary and secondary parties influence the success or failure of the business operations. Madison (2014) argued that a superior firm's financial performance is the envisioned outcome of a stakeholder theory assumption. The theory implies that results accrue from both the shareholders and professional manager from contractual relationships such as employment contracts act as stewards. Therefore, if parties act as stewards and pursue the firm's objective, the theory assumes a positive effect on the firm's performance since all parties are working in harmony.

According to Prihatiningtias (2012), companies that have a composition of all key interested parties is considered diversified and stands a good chance to pursue societal needs and thus forming a positive reputation for the company, which enhances the maximization of wealth of all group of individual interested in the firm's operation hence stimulate the need for the firm to participate more in social corporate responsibility in surrounding communities. The theory suggested further that the recognized group of interested individuals may agitate to participate in the firm's decision-making process at the strategic management level. Therefore, the stakeholder theory's fundamental objective is to maximize the value of all firms' interested parties.

Tse (2011) argued that firms that embrace the interest of all parties generate more revenues since consumers are willing to acquire the firm's services and products at higher prices; lower costs may accrue since employees will accept lower remuneration or by being more productive and the government will lessen the regulatory oversight and compliance cost because the company is collaborating with state agencies. Therefore, the firm should take keen consideration of the interrelatedness of the parties and seek to maximize all stakeholders' value instead of only focusing on the shareholders' wealth maximization. Different stakeholders are interested in the organization in the context of microfinance institutions. The government, for example, wants to know whether the customers in the organization are well protected. The depositors would be interested in knowing the liquidity status of their organization. They will also want to see if their money is protected. The bank size is integral to determine the number of interested parties on the firm activities. Large sized firms, due to their diversified products and market dominance attracts numerous parties whom the company need to mitigate inherent financial risk arising contractual obligation. This theory inspires moderating effect of firm size on effect of financial risk on financial performance in MFBs objective.

2.3 Conceptual Framework

Bhattacherjee (2012) defines a conceptual framework as a graphical representation of constructs of variables studied and their relationship. The dependent variable in this study is financial performance, while independent variables are Credit risk, Operational risk and liquidity risk while the moderating variable is the firm size. This conceptual framework was partially adopted by Muiruri (2015).

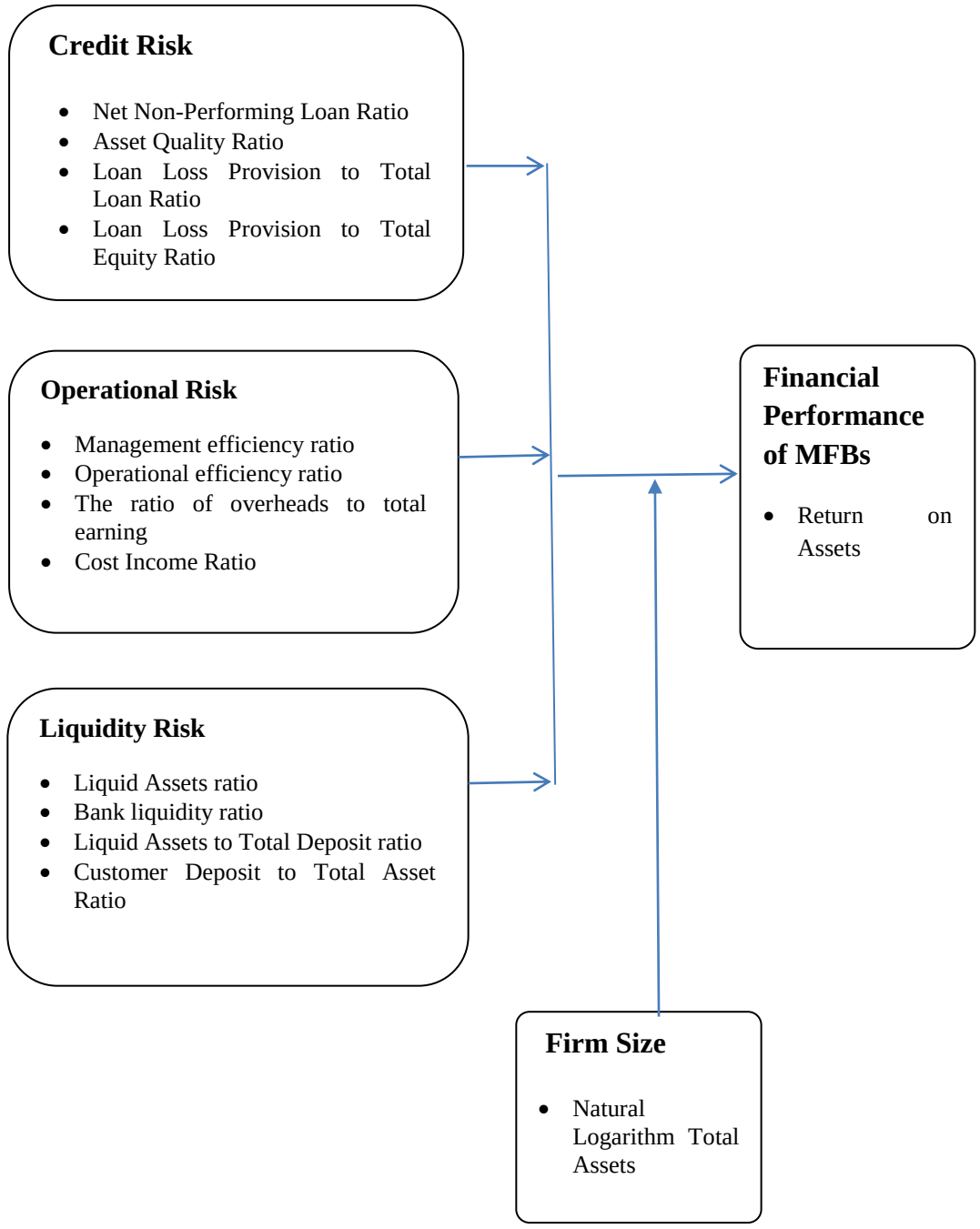

Figure 2.1: Conceptual Framework

2.3.1 Credit Risk

According to CBK (2013), Credit risk refers to the anticipated risk to the Bank's earnings and capital as a result of the failure of the obligor to comply with the contract requirements with the financial institution or otherwise the borrower defies the contractual agreement. The credit risk affects the quality of banks' loan portfolio and profitability (Kumbiria & Webb, 2010). The Net Non-Performing Loan Ratio (NNPLR), Asset Quality Ratio (AQR), Loan Loss Provision to Total Loans Ratio (LLPTLR) and Loan Loss Provision to Total Equity (LLPTER) were utilized as indicators to gauge effect of credit risk on financial performance of Microfinance Banks (MFBs) as similar proxies used were in other past empirical studies to determine credit risk (Kumburia & Webb, 2010; Mennawi, 2020; Isse & Dhaliwal, 2018; Bagh, Khan & Razzaq, 2017; Wood & McConney, 2018; Afolabi, Obamuyi & Egbetunde, 2020; Mennawi, 2020; Ekinci & Poyraz, 2019).

The Net Non-Performing Loan ratio (NNPLR) was expressed as percentage of net non-performing loan against gross loan. The Asset quality ratio (AQR) indicates the proportion of entire MFB's total loan portfolio which clients are not making repayment. The NNPLR and AQR indicate the loan default risk exposure hence the expected to adversely affect financial performance (Bagh, Khan and Razzaq, 2017; Wood & McConney, 2018; Afolabi, Obamuyi & Egbetunde, 2020; Mennawi, 2020; Ekinci & Poyraz, 2019). The NNPLR and AQR are expected to have a negative relationship with financial performance of MFBs. The lower the ratio of NNPLR and AQR the better the asset quality and lower doubtful lower the level of credit exposure.

The Loan Loss Provision to Total Loan Ratio measure the proportion of total customer advances and loans set aside but not charged off (Kumburia & Webb, 2010: Isse & Dhaliwal, 2020; Mennawi, 2020). The LLPTLR expected relationship with financial performance of MFBs is Negative. The Loan Loss Provision to Total Equity Ratio (LLPTER) the ratio measures the percentage of doubtful customer advances against banks total equity. The LLPTER is expected to have a negative influence on financial performance.

2.3.2 Operational Risk

According to Gadzo et al. (2019), operational risk is a loss arising from inadequate or flawed internal processes. The operational risk exposure includes legal risk arising from internal and external fraudulent activities, bank products and procedural practices, system breakdown, failure of physical assets, and process management. They further argue that operational risk exposure leads to banks' financial performance volatility; therefore, dire needs be addressed to mitigate the adverse effects on Bank's net worth. The Management Expense Ratio (MER), Operational Efficiency Ratio (OER), Ratio of Overheads to Total Earning (OTE) and Cost Income ratio (CIR) were adapted as measures of operational risk of MFBs against financial performance. The indicators for operational risk have been identified from past empirical literature that have utilized them to determine the relationship between operational risk and financial performance (Wood & McConney, 2021; Ali & Oudat, 2021; Bagh, Khan & Razzaq, 2017; Onsongo, Mwangi & Muathe, 2019).

The Management Expense Ratio (MER) is ratio of operating expense divided by total assets. MER determines the ability to manage bank’s expense in relation to assets. The MER is expected to have negative influence on financial performance. The Operational Efficiency Ratio (OER) expresses the proportion of operating expense in proportion to loan portfolio. OER indicate how management proficiency to managing operating expense while engaging in their central role of financial intermediary. When the OER ratio is high, it indicates possibility of operational risk exposure, therefore the OER is expected to have a negative relation with financial performance of MFBs. The Ratio of Overheads to Total Earning (OTE) indicates the proportion of overhead cost in generating bank’s earning. The OTE expected impact on financial performance of Bank (Olalere, et al., 2018). The Cost Income Ratio (CIR) reflects how banks manage their expense relative to earnings. The lower the ratio, it signifies prowess expense management, less operation cost results to enhance financial performance. The negative impact of CIR on financial performance (Wood & McConney, 2021; Ali & Oudat, 2021; Bagh, Khan & Razzaq, 2017; Onsongo, Mwangi & Muathe, 2019).

2.3.3 Liquidity Risk

According to CBK (2016), a bank's liquidity depicts the ability of an organization to meet the fluctuations in the demand for customer deposits and increases in assets. Liquidity is a crucial financial stability pointer since the steep fall of liquidity cause systemic crises such as cash crunch in the mainstream banking system due to the interrelatedness of operations within the sector. The credit risk is defined as the ability of MFBs to meet customer withdrawal and loan demands promptly (Hacini, Boulenfad & Bahou, 2021). The Liquidity Ratio (LRt), Bank Liquidity Ratio (BLR), Liquid Asset to Total Deposit ratio (LATDR) and Customer Deposit to Total Asset Ratio (CDTAR) have been used has proxies of liquidity risk in line with past studies on effect liquidity to financial performance (Kumbirai & Webb, 2010; Hacini, Boulenfad & Bahou 2021; Wood & McConney, 2018; Ali & Oudat, 2020; Bagh, Khan & Razzaq, 2017; Mennawi, 2020).

The liquidity ratio indicates the proportion of liquid assets in banks' assets. The liquid assets, the cash and cash equivalents, enables bank to meet customer contractual obligation and caution the bank from liquidity shortfall (Mennawi, 2020). The ratio anticipated to have a positive impact on financial performance of MFBs. The Bank Liquidity ratio (BLR) measures the proportion of total deposit utilized for customer advances (Wood & McConney, 2018). When the ratio is high it indicates the vulnerability of MFBs to honour unforeseen customer demands and hence high exposure to liquidity risk (Ali & Oudat, 2020; Bagh, Khan & Razzaq, 2017; Mennawi, 2020). The expected influence on financial performance negatively.

The Liquid Assets to Total Deposit Ratio (LATDR) reflects the ability to honours short-term customer obligation with bank's liquid asset based in scenario where there is sudden cash withdrawals and new loan demand (Kumbirai & Webb, 2010; and Hacini, Boulenfad & Bahou 2021). It expresses bank's liquid asset as percentage of customer deposits. If the proportion of funds locked in cash and cash equivalents increase, the banks' liquidity declines. Moreover, the LATDR is anticipated to exert a negative relationship to financial performance. The Customer Deposit to Total Asset ratio (CDTAR) represent the proportion of total deposit covered by bank's

total assets. The high the ratio, the lower the liquidity risk in MFBs, hence the anticipated impact on financial is negative.

2.3.4 Firm Size

The firm size variable is operationalized as a natural logarithm of the total assets (Tafri, et al., 2009). The log of banks total assets in relation to financial performance has been used in several past empirical studies (Onsongo, Mwangi & Muathe, 2019; Ekinci & Poyraz, 2019; and Isse & Dhaliwal, 2018). The moderating effect of firm size is anticipated to positively related to financial performance of banks (Tafri, et al., 2009; and Otieono, Nyagol & Onditi, 2016). Moreover, Large sized banks tend to attain lower cost operation and generate superior profits as a result of economies of scales in their operation. Banks with considered large in relation to total assets have attributes of well diversified portfolios and variety of products (Kwashie, Baidoo & Ayesu, 2022). The size of the Bank plays a crucial role in supporting the organization's functions and financial sustainability, as well as attracting economic opportunities and low-cost external finance.

2.3.5 Financial Performance

Theoretically measures of financial performance are Return on Assets (ROA) and Return on Equity (ROE) (Tafri et al., 2009). The Return on Asset (ROA) is calculates as net profit after tax to total assets of MFBs, it reflects the prowess of management to utilize assets at their disposal to generate profit (Tafri, et al., 2009; and Kumbiria & Webb, 2010). The ROA indicate how effective management utilizes each dollar of asset to generate earnings. On contrary, the Return on Equity (ROE) reflect how management effectively use every dollar of the shareholders equity invested to generate earnings. The ROE is percentage of return of each dollar of the shareholder’s equity investment to the bank. The ROE is expressed as a ratio of net profit after tax to total assets. The study adopted ROA as measure of financial performance in line with similar past empirical studies in area effect of financial risk on financial performance of banks (Kuambirai & Webb, 2010; Wood & McConney, 2018, Tafri,et al., 2009, Ali & Oudat, 2020; Onsongo, Mwangi & Muathe, 2019; Al-Yatama et al., 2020; Afolabi, Obamuyi & Egbetunde, 2020; Mennawi, 2020; Ekinci

& Poyraz, 2019). The ROA was considered as the best measure of financial performance because it accurately measures shareholder wealth maximization and avoids distortions (Kwashie, Baidoo & Ayesu, 2022).

2.4. Empirical Literature Review

This section discusses empirical literature in relation to the four-study variable. The empirical literature of effect of financial risk components (Credit risk, Operational risk and Liquidity risk) on financial performance

2.4.1 Credit Risk and Financial Performance

Munangi and Sibindi (2020) evaluated the effect of credit risk on financial performance from 2008 to 2018 using a sample of eighteen South African banks. A balanced panel data research design was used in the study. Secondary data that was taken out of financial statements was examined using a panel data approach and a pooled regression model. The ratio of non-performing loans to total equity (NPLR) and the non-performing loan ratio (NPLR) were the credit risk variable indicators, whereas ROA and ROE were the financial performance measurements. The study also looked at the following control variables: leverage, which was defined as the ratio of total debt to total assets; size, which was proxied as the logarithm of total assets; growth, which was calculated as the ratio of total assets to sales; and capital adequacy ratio, which was calculated as the ratio of core capital to risk-weighted assets. The findings of the significance test, which used the F-statistic, indicated that the size of the bank had an inconsequential effect on both ROA and ROE and that non-performing loans to total equity (NPLE) had a statistically significant influence on ROA and a positive significant link with ROE. Leverage and the capital adequacy ratio had negligible detrimental influence on the financial performance. The study found that credit risk and South African banks' financial performance are negatively correlated, further demonstrated that expansion had a major impact on banks' financial success.

The association between credit risk management and the financial performance of microfinance firms in Uganda was investigated by Bashabe et al. (2017). The census survey approach was employed in the study; structured questionnaires were utilized to collect primary data, and financial statements were used to gather secondary data. ROE assessed financial performance, whereas credit risk management was proxied by credit risk assessment, appraisal, monitoring, and mitigation. The study discovered a high, positive, and significant correlation between the financial performance of microfinance organizations and all credit risk management metrics**.** In Nigeria, Afolabi et al. (2020) evaluated the relationship between credit risk and financial performance of MFB for 2012-2018, using the panel ordinary least square regression technique. Non-performing loan ratio (NPL) and loan loss provision ratio (LLP) were used as credit risk measures, while ROA was used for financial performance. They also examined the effect of Total loans and advances (TLA) as a control variable. The study found that NPL had a negative and significant influence on ROA, while LLP had a negative insignificant impact on ROA. Further, the control variable had a negative significant effect on the ROA of MFB. The study concluded that credit risk had an inverse relationship with the financial performance of microfinance banks.

Boateng (2020) examined the relationship between credit risk management and profitability in select saving and loan companies employing multiple regression analysis in Ghana. Capital Adequately ratio (CAR), Non-performing Loan Ratio (NPLR), and Loans to Deposit Ratio (LTDR) were used as measures of credit risk management, whereas ROA and ROE were used for profitability. They also investigated the moderating effect of bank size on the relationship between independent and dependent variables. The natural logarithm of the total asset (LNTA) represented the bank size. The results revealed that NPLR had a negative and significant impact on ROA, whereas CAR, LTDR, and LNTA had insignificant influences on ROA. The study further found that CAR had a positive and significant influence on ROE, whereas NPLR had a negative and statistically significant effect on ROE at 1 percent level significance. The study concluded that credit risk management statistically affected profitability in select savings and loan companies.

In Syria, Mousa et al. (2018) studied the impact of credit and capital risk on banks' financial performance proxied by ROE for eight years (2009-2016). The non-performing loan-to-loan and Capital adequacy ratios were credit and capital risk indicators, respectively. Multiple linear regression analysis and t-test statistics were employed to test the hypothesis. The result showed that non-performing loan-to-loan and capital adequacy ratios had a significant inverse association with ROE. The study concluded that credit and capital risk significantly affected a bank's financial performance.

Using general methods of moments (GMM), Otieno et al. (2016a) analyzed the nexus between credit risk management and the financial performance of MFB in Kenya for five years (2011-2015). The study employed a longitudinal research design and purposive sampling; secondary data was extracted from financial reports for a sample of six MFBs. Credit risk was gauged through portfolio at risk (PAR) and Loan loss provision coverage ratio (LLPCR), while Return on adjusted asset (ROAA) and Return on adjusted equity (ROAE) were used as indicators for financial performance. The authors also examined the moderating effect of Bank size, inflation rate, and Gross domestic product growth rate on the relationship between credit risk and the financial performance of MFBS. The study finding was as follows; PAR and LLPCR had significant negative influences on ROAE; LLPCR and PAR had significant positive and negative significant influences on ROAA, respectively; LLPCR, PAR, and GDP had significant impacts on ROAA, while firm size and inflation had insignificant influence on ROAA; and GDP, LLPCR, PAR, and inflation significant effect on ROAE while firm size had non-significant effect on ROAE. This study implied that credit risk significantly influenced the financial performance of MFBs, while firm size had an insignificant impact on the financial performance of MFBs.

Using the panel regression model, Ekinci and Poyraz (2019) conducted a study to examine the effect of credit risk on the financial performance of deposit banks in Turkey from 2005 to 2017. Using a dataset of twenty-six banks, ROA and ROE represented financial performance measures, while Non-performing loans to total loans ratio (NPLs) were credit risk indicators. They further examined group control

variables that included bank-specific, industry-specific, and macroeconomics. The bank-specific indicators were the ratio of equity to total assets (capitalization), the ratio of total loans to total assets (asset quality), and bank size. The proxies of industry-specific variables include ownership dummy, Total assets of the three largest banks over total banking industry assets (concentration ratio), while the macroeconomic variable was represented by GDP growth rate, Cost Price Index Inflation (CPI Inflation), and world financial crisis. The study's finding revealed that credit risk had negative statistically significant effects on ROA and ROE at a 1% significance level. Capitalization, bank size, concentration ratio, and CPI Inflation had a positive significant impact on ROA. In contrast, Asset quality and financial crisis had a negative and significant influence on the financial performance of banks. They concluded that credit risk's negative and significant impact on financial performance was attributable to an increased supply of credit facilities and deteriorating mitigation measures on customer screening and monitoring.

CBK (2013) asserts that banks should define their sector credit allocation, restrictions, and exposures the institution can assume and manage effectively, hence proper diversification of credit issuance activities. The senior management should design the maximum accepted degree of exposure from borrowers, employees, and associates. They should further determine the level of credit portfolio relative to banks' assets, liabilities, and capital. Additionally, extra capital is required when financial institutions enter risk points, thus curbing their risk-taking behavior under capital constraints. Chinoda et al. (2015) observed that capital cushion preserves banks, their clients, and owners against potential losses arising from high bank exposure. The significance of capital requirements is to constrain banks from entering into risky transactions or ventures. Regulators continually monitor and supervise Bank's capital. Recently, markets have realized the significance of bank regulations in mitigating many risks arising from balance sheet imbalance. On the contrary, extreme regulations increase operations costs, resulting in reduced profitability of the banking industry. MFIs utilize two extensive funding options besides debt, which include customers' deposits and shareholder equity. The institutions are shifting from overreliance on donor funds to increased debt capital, mobilizing customer deposits as more MFIs get licensed and supervised by

independent regulators (Armendáriz & Morduch, 2010). This results in the paradigm shift of capital structures to that of typical commercial banks.

Using panel regression analysis, Issei and Dhaliwal (2018) investigated the effect of credit risk management on the financial performance of Ethiopian commercial banks between 2001 and 2017. The loan and advanced to total deposit ratio (LDR), the loan loss provision ratio (LLPR), and the CAR were metrics used to control credit risk, while the commercial banks' financial performance was indicated by ROA. The impact of yearly inflation (INFL) and the real gross domestic product growth rate (GDP) on financial performance were also examined in the study. They discovered that ROA was significantly and inversely impacted by LLPR. Conversely, the performance of commercial banks was positively and significantly impacted by CAR, GDP, and INFL. They used both descriptive and explanatory research designs. Secondary data from bank financial statements were examined in a study employing panel multiple linear regression analysis. While the Non-performing Loan Ratio (NPLR) and Loan Loss Provision Ratio (LLPR) were utilized as measures of credit risk, ROA reflected financial performance. The moderating effects of bank asset size and the capital adequacy ratio (CAR) were examined in the study. They discovered that whereas CAR, the moderator variable, showed a positive significant association with the financial performance of commercial banks, NPLR had a negative significant effect on ROA.

In exploring whether capital and financing structure has any relevance on the financial performance of MFIs using a panel dataset of 782 MFIs drawn from 92 countries for a period of eight years between 2000 to 2007, Kar (2012) observed from an agency theoretic standpoint that Leverage enhances profit-efficiency. The study used ROA, ROE, and operating expenses per dollar lent as financial performance indicators while using capital-asset ratio, debt-equity ratio, loans-asset ratio, and PAR 30 as capital structure indicators, further finding that cost efficiency declines with lower leverage levels. In addition, it was established that Leverage negatively impacted the depth of outreach of MFIs. However, capital structure has no significant effect on the breadth of outreach. The debt-equity ratio is commonly a measure of the capital adequacy of MFIs, which is an indicator of Leverage in

financial institutions (Lislevand, 2012). Armendáriz and Morduch (2010) argue that MFIs utilizing donor funds fail to respond to burdens to function effectively and thus may deliberately pursue outreach over financial sustainability through serving women, people experiencing poverty, and financially excluded clients. By serving poorer or rural clients with higher delivery costs). Low-cost external finance attracts inefficient MFIs, dependent on implicit subsidies to meet their soaring operating costs (Ghosh & Tassel, 2011).

Credit risk mitigation has come to be the key leading objective of all banks across the globe. The aim of CRM is to maximize a bank's risk-adjusted rate of return by keeping the degree of risk exposure within favorable parameters (BCBS, 2012). According to Afriyie and Akotey (2012), a number of bank regulatory agencies take into account the credit risk level of banks as a performance indicator of a financial institution's capital. They go on to say that a bank's future expansion and performance depend heavily on its use of efficient CRM tools and tactics. It is a methodical strategy to managing uncertainty that involves assessing risk, creating management plans, and deploying managerial resources to mitigate risk. When faced with a high credit default rate, CRM methods and techniques encompass shifting risk to other parties or completely avoiding it, as well as defusing unfavorable outcomes within the bank (Afriyie & Akotey, 2012).

Mennawi (2020) used a panel dataset from a sample of 13 banks from 2008 to 2018 to examine the effects of credit, liquidity, and financial leverage risks on the financial performance of Islamic banks in the Sundanese banking sector. The study used balanced panel data analysis and a longitudinal research approach. NPL and Loan Loss Provision (LLP) were used to monitor credit risk, while the ratios of ROA and Net Profit Margin (NPM) were used to assess the Islamic banks' financial performance. The study's use of robust random effects regressions (Generalized Least Squares) showed that credit risk proxies significantly and negatively impacted banks' financial performance. The study came to the conclusion that credit risk significantly affects banks' financial performance.

For five years, from 2009 to 2014, Getahun et al. (2015) looked into the relationship between credit risk management and the financial performance of Ethiopia's commercial banks. They found a significant correlation between credit risk and commercial banks' performance using panel data from the latter. ROA and ROE were used as performance indicators for commercial banks. Simultaneously, the capital adequacy ratio (CAR), non-performing loan ratio (NPLR), loan provision to total loan ratio (LPTLR), loan provision to non-performing loan ratio (LPNPLR), and loan provision to total asset ratio (LPTAR) served as indicators for credit risk management. The relationship between credit risk management practices and loan performance was examined using a multiple regression model on cross-sectional data from Pakistan's microfinance banks. Ahmed and Malik (2015) discovered that while credit risk control and collection policy had a positive but insignificant impact on the dependent variable, credit terms and client assessments, as indicators of credit risk management practice, had a positive and significant influence on loan performance.

Chege (2010) studied every MFI that was registered with AMFI in order to determine how credit risk management practices affected MFI performance. The study used data from both primary and secondary sources. Regression models and inferential statistics were used to examine data gathered from financial statements and questionnaires. The results showed that credit risk management strategies affected MFIs' financial performance, which in turn affected the profitability of the institution. It also discovered that the institutions implemented loan issuance and monitoring practices increased investment, and the adoption of an electronic payment system decreased loan defaults, increasing MFI profitability.

Gyamfi (2012) posit that small MFIs were more exposed to credit risk in Ghana than large firms. The investigation found that MFIs mainly considered borrowers' character, saving culture, cash flow, and collateral. The study found that institutions with more than 70% loan repayment levels had increased capacity from 16% to 58%. The study also established a significant influence of institutions' credit risk management on profitability. In Vietnam, MFIs using credit risk management systems have higher profitability as indicated by ROA, according to Ayayi (2011).

Furthermore, the research indicates that appropriate governance frameworks inside the establishments result in reduced credit risk, lower loan write-offs, and improved portfolio quality. The impact of credit risk management techniques on SACCO profitability in Kenya's Nakuru East sub-county was examined by Tanui et al. (2015). A descriptive survey that focused on credit managers and officers handling deposits served as the basis for the study. The study found a substantial correlation between financial success and credit risk management techniques, including credit scoring and credit administration. Murui (2011) studied the factors that influence MFI profitability in Sub-Saharan Africa using unbalanced panel data from 210 MFIs between 1997 and 2008 and the Generalized Method of Moments (GMM) framework. The study employed write-off ratio (WOR), risk coverage ratio (RC), loan loss reserve ratio (LLR), PAR-30, and write-off ratio (WOR) as indicators of credit risk and ROA and ROE as measures of profitability. The study did discover proof of credit risk's substantial and detrimental effects on profitability. According to the report, MFIs that are exposed to credit risk are less profitable. The study concluded with recommendations for enhancing information capital to enhance client screening practices and lessen issues related to adverse selection.

Kaimu and Muba (2021) evaluated the relationship between credit risk and the financial performance of commercial banks in Tanzania, covering the period 2005 to 2019. They adopted explanatory research design and descriptive research design. In a study that used panel multiple linear regression analysis, secondary data obtained from the financial statements of banks were analyzed. ROA represented financial performance, while the Non-performing loan ratio (NPLR), Loan loss provision ratio (LLPR) were used as indicators for credit risk. The study investigated the moderating effect of capital adequacy ratio (CAR) and bank asset size. They found that NPLR had a negative significant effect on ROA, whereas CAR as the moderator variable had a positive significant association with commercial banks' financial performance.

Ongore and Kusa (2013) investigated the factors influencing the financial performance of Kenyan commercial banks using an explanatory study approach. Publicly available financial statements were the source of panel data for the years 2001 to 2010. The financial performance indicators that were employed were ROA,

ROE, and NIM. The parameters of the predictor variables were simultaneously determined to be capital adequacy (CA), asset quality (AQ), management efficiency (ME), liquidity ratio, GDP, and average annual inflation rate (INF). The moderating impact of ownership identification was further assessed in the study. The results showed that ME had a positive and statistically significant effect on ROE while CA, AQ, and INF had a negative significant impact on ROE; on NIM, CA and ME had a positive significant relationship while AQ, GDP, and INF had a negative significant association. On ROA, CA and ME had a positive significant influence, whereas AQ and INF had a negative significant relationship on ROA. The relationship between the financial performance of commercial banks and its drivers was shown to be unaffected by ownership identity. The analysis came to the conclusion that the Bank's financial performance was highly impacted by capital sufficiency, asset quality, and managerial effectiveness. The liquidity ratio effect, on the other hand, did not significantly correlate with financial performance.

In Nigeria, Adegbie and Otitilaiye (2020) did an empirical study on credit risk and financial performance in deposit money bank for the period 2006-2018. The study utilized expo-facto research design and regression analysis to determine the relationship. The return on Capital employed (ROCE) was employed as proxy for financial performance while non-performing loans, capital adequacy ratio, Loan loss provision and Loan to deposit ratio were used as indicators of credit risk. The natural logarithm total assets was adopted as control variable. The result of regression analysis indicated that Non-performing loans had a positive and significant impact on financial performance of Deposit money banks. Additionally, the Capital adequacy ratio, Loan Loss provision and loan to deposit had a negative and statistically impact on financial performance. Therefore, the study concluded that the credit risk had statistically insignificant impact on Deposit banks in Nigeria. Dunyoh, Ankamah and Kosipa (2022) conducted a study on the impact of credit risk on financial performance in rural and community banks in Ghana for the period 201-2018. The Return on Asset (ROA) and Return on Equity (ROE) were used as measures of financial performance while Non-performing loan ratio, Total Loan to Total Assets were used as a proxy for credit risk. The natural logarithm on total asset and bank age were used as control variables. The regression models and overall multiplicative

cobb functional relationship was utilized. The finding of the study were; the bank size and bank age had statistically insignificant impact on financial performance while non-performing loan ratio and Total Loan to Total Assets had a negative and statistically significant influence on Return on Assets and Return on Equity ratio at 5 per cent statistical significance of the study concluded that credit risk had significant effect on financial performance of rural and community banks in Ghana.

Utilizing Panel regression analysis, Tamakloe et al. (2023), conducted as an investigation on the effect of risk management performance of commercial banks in Ghana for the period 2008 to 2018. The study utilized non-performing loans to total loans or advances, ratio of operating expenses to total revenue, ratio of liquid assets to deposits and short-term funding and net interest margin as proxies for credit risk, operational risk, liquidity risk and market risk respectively. The Return on Assets (ROA) was used as measure of the financial performance. They established that credit risk, liquidity risk and market risk had a positive and statistically insignificant impact on Return on assets while operational risk had a inverse and statistically significant effect on financial performance of commercial banks. They concluded that banks should emphasis on mitigating operational risk. Natufe and Evbayiro-Osagie (2023) carried out a study to examine the effect of credit risk management on financial performance in Nigeria for the years 2010 to 2021. The secondary data was analyzed through panel regression analysis. The Capital adequacy ratio (CAR), Liquidity ratio (LQR), Loan-to-Deposit (LDR), Risk Asset Ratio (RAR), Non-performing loans Ratio (NPLR) and Loan Loss Provision Ratio (LLP) were used as indicators of credit risk. The Return on Equity (ROE) was used as proxy of financial performance. The firm size and Capital Adequacy ratio had significant and positive effect on financial performance while the Non-performing loan ratio negative significant impact. Further, the study established that Loan to Deposit ratio, Loan loss provision ratio and liquidity ratio had negative insignificant effect on financial performance of deposit money banks in Nigeria.

Tomomewo, Falayi and Uhuaba (2023) carried out an investigation on credit risk management of non-performance loan deposit money banks in Nigeria using cross-sectional and time series data. The measures of credit risk were non-performing loan

to cash reserve ratio, Non-performing loan to total loan ratio, Loan Loss provision, Loans and Advances, Capital adequacy and Loan to total asset ratio. The bank size was used as moderating variable. The finding of the study found that capital adequacy had a significant positive impact on non-performing loan to total loan ratio while Loan Loss provision and Loan to total asset ratio had an insignificant positive influence. Further, the Loan and Advances had insignificant inverse impact on Non-performing loan to total loan ratio.

Kwashie, Baidoo and Ayesu (2022) investigated on the influence of credit risk on financial performance of commercial banks in Ghana utilizing panel estimation technique. The Return on Asset (ROA) and Economic value-added (EVA) were used as measures of financial performance while non-performing loans, capital adequacy ratio and loans and advances ratio as proxies of credit risk. Natural logarithm of total assets was used as an indicator of firm size. The non-performing loan ratio had a negative insignificant impact while Loans and Advances ratio, Capital adequacy and firm size had positive and insignificant on ROA. The non-performing loan ratio had negative Economic value-added ratio. Therefore, they concluded that credit risk had significant impact on financial performance of commercial banks. Muriithi, Waweru and Muturi (2016) investigated the effect of credit risk on financial performance of banks in Kenya utilizing the Generalized Methods of moments (GMM) to analyze Secondary data was collected for 43 commercial banks for the period covering 2005 to 2014. The credit risk indicators were Capital to Risk Weighted Asset Ratio (CRWAR), the Loss Loan Provision Ratio (LLPR), Asset Quality Ratio (AQR) and Loan and Advance Ratio (LAR) while financial performance was measured by Return on Equity ratio (ROE). They established that Capital to Risk Weighted Asset Ratio, Asset Quality Ratio had a significant impact on financial performance of banks while the Loan and Advance Ratio had negative insignificant impact. They concluded that credit risk had significant impact on financial performance of commercial banks.

2.4.2 Operational Risk and Financial Performance

Using the partial least squared structural equation model (PLS-SEM) technique, Gadzo et al. (2019) investigated the effects of credit risk and operational risk on the financial performance of universal banks in Ghana. The study design used was causal. Financial success was assessed by NIM and ROAE. Bank leverage and portfolio concentration were operational risk indicators, while the non-performing loan ratio and capital adequacy ratio were credit risk indicators. The moderating impact of the following variables was also investigated in the study: asset quality ratio, cost-to-net income ratio, equity ratio, and liquidity ratio. Operational risk was quantified by Bank Leverage (BL) and Portfolio Concentration (PC), while financial performance was evaluated using NIM and ROAE. The findings demonstrated a statistically significant inverse link between portfolio concentration and BL and financial success. The findings also showed a statistically significant negative relationship between credit risk and operational risk and bank financial performance. The research findings indicate that heightened exposure to operational risk leads to a notable decline in earnings.

Lin and Chang (2015) investigated the correlation between operational risk and operational performance of independent banks and the financial holding subsidiary banks. Earnings per share, operating expense ratio, and revenue growth rate were used as proxies for operational performance. In contrast, credit and market risk management factors were used as the independent variables. Credit risk capital requirements, Standard method, Capital adequacy, and coverage ratio of allowances for bad debt represented credit risk management factors. Market risk capital requirement was proxied by the Standard method, interest rate sensitivity gap, and net worth ratio.

In contrast, operational risk was indicated by the basic indicators approach and employee turnover rate. On Independent banks without financial holdings, the study found that interest rates sensitivity gap and net worth ratio and operational risk capital requirements; the Basic indicator approach had a positive significant impact on operating expense ratio while credit risk capital requirements; the Standard

method had a negative and significant influence on operating expense ratio. The study further established that the coverage ratio of allowance for bad debt, market risk capital requirements; Standard method and operational risk capital requirements; Basic indicators approach positively influenced earnings per share of independent banks without financial holdings. The study concluded that various risk dimensions had a statistically significant impact on the operational performance of independent banks.

Using a descriptive research approach, King'ori et al. (2017) carried out a study to look at the factors that affect MFB financial performance in Kenya. A measure of financial performance was ROA. Simultaneously, factors that were found to influence the financial performance of MFBs were operating efficiency, capital sufficiency, liquidity position, credit risk, and business size. Operating efficiency was represented by the operational efficiency ratio; liquidity situation was proxied by the loan to asset ratio; capital sufficiency was assessed by the equity to total asset ratio; credit risk was indicated by the loan to asset ratio; and company size was proxied by the natural log of total assets. A linear regression technique was used to evaluate secondary data from 2011 to 2015 in order to determine the association between explanatory factors and financial performance. According to the study, the ROA of MFBs was directly and significantly influenced by operational efficiency, capital sufficiency, and firm size. They concluded that the financial performance of MFB in Kenya was highly influenced by operational risk and capital adequacy.

Using descriptive research design, Toroitich (2018) assessed the effect of operation risk exposure on the financial performance of commercial banks in Kenya from 2008 to 2017. Secondary data for 42 banks obtained from financial reports were considered using panel data regression. ROA and ROE measured financial performance, while Credit exposure, liquidity volatility exposure, and operating efficiency exposure were considered independent variables. The study further examined the moderating effect of interest rates cap and inflation cap. The study established that liquidity volatility and operating expense exposure had a negative and statistically significant effect on ROA using the Z test.

In contrast, operating efficiency exposure had a positive significant influence on ROA. The study findings further revealed that moderating effect of interest rates and inflation rates on the association between operational exposure and ROA was significant. The study concluded a statistically significant relationship between bank financial performance and operational risk exposure exists. Onsongo et al. (2019) examined the relationship between firm size, operational risk, and financial performance of commercial banks and service firms listed on the Nairobi Securities Exchange using an explanatory study approach. From 2013 to 2017, secondary data was gathered from yearly reports that were released. The data were subjected to a panel regression model that compared operational risk and financial performance. Whereas ROA proxied financial performance, the cost-to-income ratio reflected an operational risk. Using the cost to income ratio and return on assets (ROA) as proxies, the study discovered that operational risk had a beneficial influence on financial performance. The association between operational risk and financial performance was shown to be highly impacted by business size as a moderator, according to the results. The study suggests that the financial performance of commercial and service organizations is unaffected by operational risk.

The impact of credit, operational, and liquidity risks on the financial performance of insurance businesses listed on the Kuwait Stock Exchange between 2009 and 2017 was examined in Kuwait by Al-Yatama et al. (2020). The following proxies were used: ROA and ROE for financial performance; total debt to total asset ratio for credit risk; total costs to total revenue for operational risk; and current liabilities to current assets for liquidity risk. According to the study, operational risk was found to have a negative insignificant relationship with financial performance, liquidity had mixed results, having a positive insignificant impact on ROE but a negative and statistically significant relationship with ROA, and credit risk had a negative and statistically significant relationship with the performance of Kuwaiti insurance companies. The results imply that operational risk has a small but detrimental impact on financial performance.

Chen et al. (2009) employed structural equation modeling to examine the impact of operational risk and capital structure on the profitability of the life insurance market in Taiwan from 1993 to 2003, using a sample of 13 insurance companies. In order to conduct an empirical study, secondary data was gathered. Profit margin and ROA were used to quantify profitability, while portfolio concentration and insurance leverage were used as stand-ins to assess operational risks. The findings showed that operating risk significantly and negatively impacted insurance firms' profits. The study also showed that capital structure has a major and negative impact on profitability. Thrikawala et al. (2015), in their study on empirical analysis of corporate governance impact on the outreach of microfinance institutions, used operational self-sufficiency (OSS), Return to Asset (ROA), yield to Gross loan portfolio, operating cost ratio, capita asset ratio, and portfolio at risk (PAR) more than 30 days as the measurement metrics for Financial performance. According to Strøm et al. (2014), OSS is used to measure the ability of MFIs to cover operational costs such as loan losses, salaries, and other organizational and administrative costs.

Utilizing the Generalized Methods of Moments (GMM) and Pooled IV method, Nyoka (2017) conducted a study to evaluate the relationship between bank capital and the profitability of commercial banks in South Africa. ROE and ROA were measures for profitability, whereas the independent variable, bank capital, represented the capital asset ratio (CAR). The study also considered bank size, GDP, and operating expense ratio to total assets (OE) as predictor variables. The result showed that CAR, GDP, and bank size positively impacted ROA and ROE. In contrast, OE had a negative and statistically significant relationship with ROA and ROE of South African banks from 2006 to 2015. The study concluded that bank capital was significantly associated with commercial banks' profitability.

In Tunisia, Hakimi and Boukaira (2020) evaluated the interactional relationship between operational risk, credit risk, Liquidity risk, and bank performance from 2000 to 2017. Ten bank-level data were collected, and static panel data analysis was applied. Bank performance was proxied with net interest margin while independent variable operational risk was measured by basic indicator approach; credit risk by total loans to total asset ratio; Capital adequacy by ratio of total equity to total assets;

size by Napierian Logarithm of total assets; liquidity risk by loans to deposit ratio; Gross domestic product by Growth rate of GDP and inflation rate by customer index. The study's findings established that operational risk, credit risk, and GDP had a positive significant relationship with banks' performance. In contrast, liquidity risk and inflation rate had inverse and statistically significant impacts on NIM. The results further revealed that Firm size and capital adequacy had an insignificant negative impact on bank performance. The study implied that operational risk and credit risk interaction positively and significantly influenced a bank's performance.

Olalere et al. (2018) used a sample of 16 commercial banks in Nigeria to investigate the impact of operational risk on bank performance from 2009 to 2015. Using secondary data gathered from bank annual reports, they performed panel data analysis. The financial performance was measured by net interest margin, while the operational risk was approximated by the ratio of total operating expenditures to total assets and the cost-to-income ratio. Firm size and GDP were also evaluated in the research as control variables. The results showed that the GDP and cost-to-income ratio significantly and negatively impacted the performance of banks. The study also discovered that, whilst company size had an inconsequential impact, the ratio of operational expenditures had a favorable and statistically significant impact on banks' performance. The size of the bank positively and marginally impacted NIM. The study came to the conclusion that two important factors influencing a firm's success were operational risk and GDP growth rate.

In order to ascertain the impact of credit, operational, and liquidity risks on the financial performance of insurance businesses listed on the Kuwait Stock Exchange between 2009 and 2017, Al-Tatama et al. (2020) carried out a research in Kuwait. As metrics for financial success, ROA and ROE were implemented. Concurrently, the ratio of current liabilities to current assets, total debt to total assets, and total spending divided by total revenue served as stand-ins for operational, credit, and liquidity risks, respectively. The link between the explanatory and dependent variables was represented using a multivariate linear regression model. The empirical results showed that: credit risk had a significant positive relationship with ROA and ROE; operational risk had a statistically significant inverse association with ROA

and ROE; and liquidity risk had a negative and insignificant effect on ROA but a positive and insignificant effect on ROE. The study found a substantial direct correlation between operational risk and insurance firms' financial success.

Fadun and Oye (2020) examined the effects of operational risk management procedures on the financial performance of commercial banks in Nigeria over a ten-year period (2008-2017) using a longitudinal study approach. The research made use of secondary data that was taken out of bank financial statements and subjected to linear multiple regression analysis. Whereas ROA served as a gauge of financial success, the cost to income ratio (CIR) was used as a stand-in for operational risk management. The income ratio, non-performing loan ratio, and net interest margin served as surrogates for the operational, credit, and market risks, respectively. Liquidity and loan-to-deposit ratios, on the other hand, served as indicators of liquidity risk. The research control variables were credit, market, and liquidity risk. The impact of each explanatory variable on banks' performance was assessed using a multiple linear regression model and t-static in this study. According to the study, there is a considerable negative correlation between ROA and operational risk. Furthermore, the performance of the bank was considerably and favorably impacted by the control variables market and liquidity risks while credit risk showed a strong inverse relationship. The study's findings indicate that operational risk management procedures significantly improve commercial banks' financial results.

A study on the effect of corporate governance on financial performance in North Central Nigeria MFBs, using the Pearson correlation, established a significant relationship between earnings per share (EPS) and corporate governance practices (Gadi, Ebelechukwu, & Yakubu, 2015). Additionally, the study established no significant relationship between corporate governance and a bank's financial performance (ROA & ROE). The study utilized secondary data gathered from annual reports of the 23 MFBs out of the total 158 MFBs. An investigation conducted on the effect of the board of directors' characteristics (age, gender, and education) on the effective performance of board roles (monitoring and resource provision) was conducted using a survey with 105 board of directors drawn from 63 MFIs in East African countries (Kenya, Tanzania, and Uganda) (Mori, 2014). The study

established a positive and significant relationship between directors' attributes and boards' productivity. Additionally, revealed that the director's level of education and age yielded positive performance while finding no evidence of the effects on boards' performance with more female directors on boards. The study concluded that directors should be appointed based on personal attributes.

Dube and Kwenda (2023) carried out an empirical research in Southern Africa to ascertain the connection between MFIs' financial performance and credit risk management. The research utilized a dynamic panel data model using the Generalized Methods of Moment (GMM) estimate approach. Microfinance Information Exchange (MIX) was the source of secondary data for MFIs in Southern Africa from 2012 to 2018. While portfolio at risk ratio, risk coverage ratio, and write-off ratio were indicators of credit risk, return on assets (ROA) indicated financial success. The study's control variables were microfinance size, productivity, recorded productivity, and management efficiency. Personnel productivity ratio (PPR) served as a proxy for productivity, while total operating expenditures to gross loan portfolio ratio (Operating Expense Ratio) served as a proxy for managerial efficiency. The financial performance was represented by the ROA and ROE. The portfolio at risk ratio was found to have a significant negative correlation with both ROA and ROE. The operating expense ratio was found to have a significant inverse relationship with ROA, but an insignificant negative impact on ROE. The firm size, as measured by the natural logarithm of total assets, was found to have an insignificant negative correlation with both ROA and ROE. Finally, PPR was found to have a positive significant relationship with ROA. They concluded that MFI's financial performance was adversely and statistically significantly influenced by credit risk and operating efficiency.

Using a panel data regression model, Sharifi et al. (2016) looked at the link between ownership, size, and operational risk management of Indian banks between 2010 and 2013. Excess capital as a proportion of gross income was used to gauge the effectiveness of the operational risk management strategies. In addition, the business log (deposits and advances) served as a surrogate for the bank's size. Three aspects of government (public, private, and foreign bank) were used to classify the ownership,

which was a dummy variable. Among the 205 Indian banks in total, 63 banks were selected as a sample. The empirical finding demonstrated a substantial inverse association between banks' operational risk management procedures and their size. Additionally, a non-significant correlation was found between surplus capital and bank ownership. According to the study's findings, smaller banks have more spare capital on hand than the required minimum to protect themselves against increased risk sensitivity. The connection between capital adequacy and bank profitability in Nigeria was investigated by Olalekan and Adenyinka (2013). The study included primary data from local and international deposit-taking institutions as well as secondary data from annual financial reports from 2006 to 2010. The analysis found no connection between the profitability of banks and capital adequacy. On the other hand, secondary data showed a statistically significant positive association between the factors. The analysis established that the link between capitalization and profitability may be used to determine how well a bank is managed. Primary data analysis was applied.

Lyambiko (2015) looked into how operational risk management procedures affected the financial performance of Tanzanian commercial banks. A descriptive research design was used for the investigation. In order to ascertain the relationship between an explanatory variable and the dependent variable, secondary data for 36 commercial banks was gathered between 2009 and 2013. A linear regression model was then utilized. The ratio of gross loans to total assets, the ratio of liquid assets to current liabilities, and the ratio of operating expenses to net operating income were used as proxies for credit risk, insolvency risk, and operating efficiency, respectively. ROA was used to measure financial performance, and these correlations were both positive and negligible. They came to the conclusion that operational risk management procedures had a major effect on commercial banks' financial results.

There was no discernible difference in MFI performance between boards made up of internal members and those formed of external members, according to Mori and Olomi's (2012) study on the impact of the board of directors on the performance of MFIs in Tanzania and Kenya. Nonetheless, the study found that having local board members on the board of directors had a major influence on financial performance

(ROA and OSS). It contradicts international literature, Marsland et al. (2014) intimated that international boards result in better financial performance. In addition, Chenuos et al. (2014) explored the importance of corporate governance structures in Kenya's young and immature microfinance industry. They observed that better corporate governance structures impacted the organization's performance. In a study exploring the impact of corporate governance practices on commercial banks in Ethiopia, Ferede (2012) observed that large-sized boards and audit committees negatively impact financial performance. Secondly, board members' education qualification and industry-specific experience positively related to ROA, though a negative impact was observed between prior industry experience and net interest margin. Finally, the study established that the percentage of female directors had no significant impact on ROA.

In addition, Moraa (2014) examined commercial banks' profitability using ROA. The study established that capital strength, operations expenses, ownership, diversification, and bank size significantly impact the profitability of the six leading commercial banks. The findings depicted that the regulator creates an enabling environment that fosters commercial banks to increase additional assets and equity to enhance the sector's performance. Murui (2011) examined the determinants of MFI's profitability in Africa. The study explored secondary data from the annual financial reports of 210 MFIs. Using an unbalanced panel data regression model to depict the relationships of independent variables. The study used the ROA and ROE to measure the profitability of the MFIs. The study reported that the equity-to-asset ratio had a significant positive impact on profitability.

Muriuki (2012) investigated the effect of board gender composition on the firms' financial performance using secondary data from public annual reports of listed companies in Kenya from 2007 to 2011. The proportion of female directors on the company's boards served as a measurement indicator for board gender composition, whereas ROA assessed financial success. In order to ascertain the association between the variables, regression analysis and a cross-sectional research methodology were used in the study. The results of the study suggested that a higher proportion of female directors had a detrimental effect on the company's performance

because of the negative relationship between gender diversity and firm financial performance.

Employing the partial least square structural equation modeling method, Annannab et al. (2022) investigated the relationship between risk management and the performance of cooperative microfinance in Thailand. Senior offices were identified using a purposive sampling technique to provide primary data. The internal process, people, and technology risks were operational risk management proxies, whereas cooperative performance was represented by financial and social performance. The study finding showed that operational management had a positive significant correlation with financial performance and social performance of cooperative microfinance. Al-Tamimi et al. (2015) looked at how bank risks affected the Gulf countries' Islamic banks' performance. The years 2000–2012 were the study period. They discovered that financial performance was considerably and adversely impacted by operation risk. The investigation found a correlation between financial success and operational risk. According to Sharifi et al. (2016), the amount of surplus capital kept for operational risk mitigation is negatively correlated with the size of the bank. Because of this inverse relationship between size and operational risk, smaller banks are likely to hold more extra capital over the Basel minimum requirements.

Mrindoko, Macha and Gwahula (2020) did a study to investigate the effect of operational risk on financial performance of banks in Tanzania using longitudinal explanatory design for the period 2006 to 2019. The research utilized the structural equation model and regression analysis to establish the between the credit risk management and financial performance. The portfolio concentration ratio (PCR), Cost to income ratio (CIR), Bank Leverage ratio (BLR) and operating expense ratio (OER). The measure of financial performance were ROA and ROE. The cost income ratio, portfolio concentration ratio had negative significant effect on return on Assets while bank leverage ratio and operating expense ratio had insignificant and negative impact on financial performance of banks.

2.4.3 Liquidity Risk and Financial Performance

Using a sample of 135 deposits taking SACCOs, Gweyi et al. (2018) assessed the effect of liquidity risk on the financial performance of deposit-taking SACCOs in Kenya. The study adopted a descriptive research design. Panel data analysis was applied to secondary data collected for six years (2010-2015) to determine the relationship between the predictor and dependent variable. ROA and ROE were used as financial performance proxies, while cash reserve adequacy ratio, liquidity reserves, and compliance ratio represented Liquidity risk. The result indicated that liquidity risk had a significant inverse relationship with ROE at a 5 percent significance level. Thus, concluding that liquidity risks significantly decrease financial performance.

In Kosovo, Rudhani and Balaj (2019) did a study on the effect of liquidity risk on financial performance of commercial banks between 2010 to 2015 using linear regression analysis. The return on assets and return on equity were used as proxies of financial performance. The liquid assets to total assets ratio, liquid assets to liquid liabilities and loans to deposits and short-term liabilities were utilized as financial indicators of liquidity risk. The study established that liquid assets to total assets ratio had negative significant effect on ROA and ROE while Liquid assets to short-term liabilities and Loans to deposits and short-term liabilities ratio had a significant positive effect on ROA and ROE. The study concluded that liquidity risk had a positive and statistically significant impact on financial performance of commercial banks in Kosovo.

Chaudhary and Sapkota (2023) looked at the impact of liquidity risk on the financial performance of Nepali commercial banks between 2011/2012 and 2020/2021 using a pooled ordinary least square estimator. Ten commercial banks' worth of balanced panel data were gathered and examined. ROA and ROE were used to measure bank performance, the dependent variable. On the other hand, the ratios of total liquid assets to total assets, non-performing loans to gross loan ratio, capital adequacy ratio, and loan-to-deposit ratio served as surrogates for liquidity risk. The logarithm of total assets was used in the study as a proxy for business size as a control variable. The

empirical findings showed that: total liquid assets to total asset ratio had statistically insignificant and inverse influence on ROE while having insignificant positive relationship with ROA; non-performing loan to gross loan had a positive and statistically significant effect on ROE while having an insignificant positive impact on ROA; bank performance was negatively impacted by the loan to deposit ratio; and firm size of the bank was found to have a positive insignificant relationship on ROA while on ROE it had a negative insignificant impact. The study came to the conclusion that banks' financial performance was highly impacted by liquidity risk.

The nexus between liquidity risk and the financial performance of microfinance banks in Kenya was investigated by Otieno et al. (2016) from 2011 to 2015. The study adopted a longitudinal research design and panel data regression analysis. The dependent variable was proxied by Return on Average Assets (ROAA) and Return on Average Equity (ROAE). At the same time, liquidity risk management was measured by the financial gap ratio (FGR) and capital adequacy ratio (CAR). Bank size, inflation rate, and GDP growth rate were used as moderating variables. Generalized methods of moments (GMM) system dynamic panel data estimation was employed to infer the relationship between regressors and regressand. The study used z-statistic to test the hypothesis and found as follows; FGR and CAR had a positive significant impact on ROAA and ROAE; the firm size denoted by the natural Logarithm of the assets had a negative insignificant influence on ROAA and ROAE; GDP growth rate had a positive and significant moderating effect on ROAA and ROAE; and inflation had a significant direct relationship with ROAE. The study concluded that liquidity risk management had a positive and significant association with the financial performance of MFBs.

In Sudan, Mennawi (2020) conducted a study to ascertain the impact of liquidity, credit, and financial Leverage risk on the financial performance of Islamic banks from 2008 to 2018. Robust random effects (GLS) regression was applied to test the hypothesis; ROA and net profit margin (NPM) represented financial performance while cash to total deposit ratio (CTDR), Liquid assets to total asset ratio (LQTA), and total financing to total deposit ratio (FIDP) were proxies for Liquidity risk. Non-performing loan ratio (NPL) and loan loss provision ratio (LLP) were indicators for

credit risk, whereas debt to equity ratio measured Financial Leverage. The study result revealed that; FIDP had a direct significant influence on ROA and NPM, while NPL and LLP had a significant inverse relationship with ROA and NPM. The result further revealed that CADP had a negative insignificant association with ROA and NPM, whereas FIDP had a positive and insignificant influence. The study concluded that banks maintain high liquid assets to honor depositors' obligations.

Using a static panel, Moussa (2015) conducted research in Tunisia to determine the factors influencing bank liquidity from 2000 to 2010. The ratio of total loans to total deposits and total liquid assets to total assets was used to calculate the dependent variable. The following were regarded as explanatory variables: growth rate of the gross domestic product, inflation rate, ratio of operating expenditure to total assets, equity to total asset ratio, ROA, ROE, NIM, and total loans to total assets ratio. The findings demonstrated that, while ROE and GDP growth rate had a positive significant impact, the ratio of total liquid assets to total assets was significantly impacted by ROA, NIM, bank size, equity to total asset ratio, total loan to total asset ratio, ratio of operating expense to total assets, and inflation. Additionally, the ratio of total loans to total deposit was significantly impacted by all of the aforementioned factors. On the other hand, there was a substantial positive correlation between the inflation rate and the ratio of total loans to total assets.

Utilizing a survey research design, Kimathi et al. (2015) sought to determine factors influencing liquidity risk management practices in MFIs in Kenya. They collected the primary data through a semi-structured questionnaire and multiple regression analysis to determine the relationship between the predictor and dependent variables. Internal control systems, institutional policies, board/ management oversight, and risk monitoring strategies were independent variables, whereas liquidity risk management practices were the dependent variable. The results indicated that internal controls, institutional policies, and liquidity monitoring had a positive significant impact on liquidity Management practices while board/ management had a positive insignificant impact. The study concluded that proper internal controls, policies, and liquidity monitoring mitigate liquidity risk in MFIs. According to Muiruri (2015), liquidity is necessary to meet regular or daily banks' financial

obligations, especially without exhausting their reserves. The author further notes that when banks hold more liquid assets, they incur opportunity costs at the expense of long-term investments, which can generate higher returns. BIS (2013) assert that tight balancing of return and liquidity risk is demonstrated by observing that increases from short-term securities to long-term securities or debt instruments raise a bank's yield at the expense of increases in liquidity risks, and vice versa is true. Therefore, excess liquidity is discouraged because the margins on liquid investments are significantly lower than those earned on the loan portfolio.

Olalere et al. (2019) conducted an empirical study using a sample of 63 commercial banks to assess the impact of interest-rate risk and liquidity risk on profitability and firm value across banks in ASEAN-5 nations over a nine-year period (2009-2017). Firm value was determined by dividing enterprise value by operational performance, and bank profitability was estimated using ROE and ROA. The ratios of the Bank's total loans and advances to total deposits and liquid assets to total assets were used to calculate liquidity risk. Firm size, GDP growth, and inflation were chosen by the research as its control variables. Utilizing the panel data estimate approach, secondary data analysis was conducted. The study's findings showed that the ratio of the Bank's total loans and advances to total deposits had a significant positive impact on ROA and firm value, while ROE had a negative relationship; the ratio of liquidity assets to total assets had a significant negative relationship with firm value, ROA, and ROE; the size of the firm had a significant negative relationship with both ROA and ROE, while inflation had a significant positive influence on both ROA and ROE; and the GDP growth rate had a significant positive relationship with ROA. The analysis suggests that exposure to liquidity risk has a major impact on the size and profitability of banks.

The influence of liquidity risk management practices on the financial performance of licensed deposits taking SACCO in Kenya was investigated by Kagunda (2018), employing a descriptive research design. Panel data regression was used for analysis. ROA was used to measure financial performance, while asset quality, capital adequacy, and capital leverage ratios were used as proxies for liquidity risk management. The study found that asset quality and capital adequacy ratio had a

positive and significant impact on the financial performance of SACCOs in Nairobi County. The study concluded that asset quality management and capital adequacy ratio practice significantly influenced the financial performance of licensed deposit-taking SACCOs.

Utilizing explanatory research design, Ismail and Ahmed (2023) assessed the effect of liquidity, credit, and operational risks on financial stability in conventional banks in Jordan over five (5) years from 2016 to 2021. A panel data regression model was employed to determine the causal effect between unsystematic financial risks and financial stability. The non-performing loan to gross loan ratio, total current assets, current liabilities ratio, and total income for the last three years*15% were used as proxies for credit risk, Liquidity risk, and operational risk, respectively. Z Score of ROA (ZROA) was used to indicate financial stability. At the same time, the rate of exchange of bank total assets (Bank size) and the year 2020 (COVID-19) were incorporated in the study as control variables. The study result revealed that credit risk, operational risk, and the year 2020 had a significant inverse relationship with bank stability using t-statistic to test the hypothesis.In contrast, liquidity risk had an insignificant direct relationship with ZROA. The finding further showed that bank size had a negative insignificant relationship with the bank's stability. The research implied that effective risk management strategies are crucial to mitigate the direct significance of credit and operational risks on a bank's stability.

The effects of liquidity and capital adequacy on the operating efficiency of commercial banks in Kenya were evaluated by Odunga et al. (2013) using panel data from financial statements of 40 commercial banks for the period 2005-2011. The study found bank’s performance was significantly influenced by efforts to implement superior operational strategies. Additionally, commercial banks with high liquidity levels inspire confidence in customers because of their ability to meet short-term financial needs. In their study on liquidity management and corporate profit, Owolabi and Obida (2012) asserted that profitability is enhanced by managers' ability to develop, adopt and implement superior credit procedures, short-cash conversions cycle, and efficient cash flow management. The study used descriptive design to analyze data from 12 selected manufacturing companies listed on Nigeria's securities

exchange. They further concluded that an efficient cash optimization mechanism in all profit-oriented organizations was essential and, therefore, exists of significant impact between liquidity and corporate profits.

Ogboi and Unuafe (2013) sought to investigate the relationship between capital adequacy and the financial performance of commercial banks in Nigeria. The panel data model was employed to estimate the relationship between ROA as a proxy of financial performance and Capital adequacy ratio. Secondary data from a Sample of six commercial banks was gathered between 2005 and 2009. The study findings showed that the capital adequacy ratio denoted by equity capital to total asset had a statistically significant positive influence on ROA at a 5% significance level. This study implies that capital requirements significantly impact the financial performance of commercial banks. In Japan, Yahaya et al. (2016) examined the impact of financial performance and economics on the capital adequacy ratio (CAR) over ten years from 2005 to 2014. Secondary data for 64 regional banks was gathered from World Bank data and annual bank financial statements. The panel data regression and correlation analyses were applied to determine the nexus between financial performance and CAR. The result showed that total assets, ROE, total loans, total deposits, and deposit-to-asset ratio had a positive and statistically significant association with capital adequacy ratio at 1% significance.

Using a descriptive study approach, Domoita et al. (2021) assessed the impact of operational and liquidity risks on the financial performance of microfinance banks in Kenya. Regression analysis using panel data was used to examine secondary data that was gathered over a five-year period, from 2016 to 2020. ROA served as a stand-in for MFBS's financial performance, while the operational risk was indicated by the gross income-to-capital and operating cost-to-income ratios. Liquid assets calculated the current ratio and the liquidity risk relative to total assets. The study's findings, which employed ANOVA statistics to assess significance, showed that operational and liquidity risks were significantly correlated negatively with MFBs' financial performance.

Utilizing Longitudinal research design, Agbada and Osuji (2013) examined Nigeria's efficiency in liquidity management and banking performance. The study used a survey design and a structured questionnaire to collect data from 300 employees. They found that liquidity management had a positive significant impact on banking financial performance in Nigeria. They concluded that a bank should maintain optimal liquidity to influence its Return on capital employed. In examining the relationship between commercial banks' profitability and liquidity management on 15 Nigerian banks using panel data drawn from financial statements between 2010 to 2012, Bassey and Moses (2015) suggested that liquidity management had a notable impact on Return to shareholders as an indicator of banks financial performance while having insignificant on ROA. Despite the huge end-of-year profits declared by commercial banks, liquidity management was not an indicator of optimal utilization of assets.

Mugambi *et al*. (2015) explored the impact of cash management on the financial performance of deposit-taking SACCOs in the Mount Kenya region. The study adopted a descriptive survey design and inferential statistics. They observed that cash management played a crucial role as a liquidity management tool in deposit-taking SACCOs, concluding that superior cash management policies should be developed and implemented to attain optimal financial performance. Godfrey (2015) investigated the connection between liquidity and bank performance of South African banks between 1998 and 2014 using Autoregressive distributed lag (ARDL) and ordinary least square. The study focused on three independent variables: credit risk, fund liquidity, and market liquidity. Net interest margin (NIM) was used to gauge the bank's performance. The study showed that the performance of the bank was not significantly impacted by liquidity.

Njue (2020) used a longitudinal study approach to investigate how liquidity management affected MFIs' financial performance in Kenya between 2012 and 2016. The study used capital adequacy, asset quality, and maturity gap as independent variables, and profit after tax (PAT) and return on equity (ROE) as stand-ins for financial performance. The findings showed that while capital sufficiency had a large positive influence on ROE, the maturity gap had a strong adverse association with it.

ROE was negatively, although not significantly, impacted by asset quality. According to the report, MFI's profitability was greatly influenced by excessive liquidity risk. The t-statistic was used in the study to test significance.

Utilizing the ordinary least square method and multiple regression analysis, Ikpefan (2013) evaluated the influence of capital adequacy, management, and performance of commercial banks in Nigeria from 1986 to 2006. F-statistic, T-statistic, and related probabilities were used to test the result's significance, reliability, and validity. ROA measured performance, whereas the ratio of bank loan to total assets (BLoan) and the ratio of operating expense to total assets (EOM) were indicators for management. Bank's liquidity position was gauged by the ratio of the bank's Loans and advances to bank deposits (B deposits) and liquidity assets to deposits (LAD). In contrast, the ratio of shareholders' funds to total assets (CAP) was the proxy for capital adequacy. The findings were that BLoan, EOM, and LAD had a positive and statistically significant relationship with the financial performance of commercial banks.

Maaka (2013) conducted a study to examine the relationship between liquidity risk and the financial performance of commercial banks in Kenya, adopting a correlation research design from 2008-2012. Multiple regression was applied to analyze secondary data collected for 39 banks to determine the association between liquidity risk and financial performance. The profit before tax was used as the measure of financial performance. In contrast, the level of customer deposit, cash balance, liquidity gap leverage rate, and non-performing loan were used as independent variable indicators. The study result showed that non-performing loans and the level of customer deposits significantly positively influenced profit before tax. In contrast, cash balance had an inverse significant relationship. The leverage ratio and liquidity gap had an insignificant impact on profit before tax. The study concluded that liquidity risk significantly influenced the financial performance of commercial banks.

The relationship between liquidity and profitability of banks listed on the Ghanaian Stock Exchange was analyzed by Lartey et al. (2013). They employed a longitudinal time dimension model to analyze secondary data from annual financial reports

obtained between 2005-2010. Using the panel method, time series analysis and financial ratios of financial data obtained from financial statements observed a positive and significant relationship between liquidity and the bank's profitability. In addition, Imad et al. (2011) investigated the relationship between liquidity and profitability of Jordanian banks. The bank's liquidity had a statistically significant impact on profitability measured in terms of ROA and ROE. The study used balanced panel data from 2001 to 2010

Using the linear regression model, Saleem and Rehman (2011) examined the influence of liquidity on profitability. The profitability was measured through Return on Investment (ROI), ROE, and ROA, while independent variable liquidity was measured by current ratio, acid test ratio, and liquidity ratio. The study revealed that liquidity strongly influenced ROA and ROI while having an insignificant impact on ROE. Zygmunt (2013) analyzed the association of liquidity with the profitability of all Polish-listed companies between 2003 to 2011. Employing Pearson's Product Moment Correlation and OLS regression model established a strong relationship between liquidity and profitability. However, Niresh (2012) observed that liquidity had an insignificant impact on profitability. The study used correlation analysis and descriptive statistics on secondary data obtained from 31 manufacturing companies listed on Colombo Stock Exchange.

Hacini et al. (2021) did a study to ascertain the impact of liquidity risk management on the financial performance of Saudi Arabian Banks from 2002 to 2019. Panel data regression was used to analyze secondary data collected from the Bank's annual financial reports. Cash to-total deposit ratio (CTD) and loan-to-deposit ratio (LTD) were used as measures of liquidity risk, while ROE was the proxy for the Bank's financial performance. Equity to asset ratio (ETA) was adopted as a control variable. Bhattacharyya and Sahoo (2011) assert that "Liquidity management by Central banks typically refers to the framework, set of instruments, and the rules that the monetary authority follows in managing systemic liquidity, consistent with the ultimate goals of monetary policy. In this regard, central banks modulate liquidity conditions by varying short-term interest rates and influencing the supply of bank reserves in the interbank market." Despite the long-range impact on price levels and the real sector,

the regulator's liquidity management has a short-lived effect on capital markets. Well-functioning liquidity management is a key banking component that leads to long-term profitability and reduces illiquidity exposure or a bank's insolvency. To promote high public confidence, banks should embrace strategic management that facilities the maintenance of cash and near-cash assets that meet customer obligations (Bhattacharyya & Sahoo, 2011).

Using a balanced panel data regression approach, Gilbert (2013) assessed financial risk management in South African banks from 2006 to 2011. The influence of explanatory factors on capital, liquidity, and credit risk was examined in the study. Liquidity, credit, and capital concerns were represented by the net loan to total asset ratio, equity to total assets ratio, and total debt to total assets ratio, respectively. Among the independent variable indicators were ROA, ROE, net loans to total assets ratio, bank size, gearing ratio, networking capital, operating efficiency ratio, and loan loss reserve ratio. Ownership was taken into account as a dummy variable in the study. According to the study's findings, bank size and loan loss reserve ratio positively and significantly correlated with capital risk, while net loan to total asset ratio significantly and negatively correlated with capital risk; bank size and networking capital positively and significantly correlated with liquidity risk, while gearing ratio negatively and significantly correlated with credit risk; gearing ratio, bank size, and net loan to total asset ratio positively and significantly correlated with credit risk. According to the study, business size has a major and favorable impact on banks' financial risk management.

2.4.4 Firm Size

Past research findings have observed that a financial institution's size does matter (Murui, 2011; Demirgüç-Kunt & Klapper, 2012; Cull *et al.*, 2015). The large sized financial institutions portray economies of scale and scope. An institution's economies of scale and synergies arise up to a certain level in size; past the level, financial organizations become extremely sophisticated to run and hence experience diseconomies of scale. According to Amdemikael (2012), the natural Logarithm of the total assets of MFIs is commonly used as a proxy of size. In addition, he

contends that the total asset of a firm deflates the financial performance as a dependent variable measured by ROA, thus appropriate to Log the Firm's total assets in the regression model.An analysis of the association between liquidity risk and the financial performance of MFBs in Kenya conducted by Otieno et al. (2016b) adopted bank size measured as a log of the firm's total assets as the moderator variables. They observed that the size variable negatively impacted the Return on asset adjusted and return on adjusted equity with a coefficient of -.0359129 and -.0272131, respectively. However, they noted that both effects are insignificant. They corroborated that bigger banks experience diseconomies of scale past a certain level.

Javaid et al. (2011) examined factors that affected Pakistani commercial banks' profitability from 2004 to 2008 using the pooled ordinary least square (POLS) model. They looked at how the bank's debt, assets, owners' equity, and deposits from customers affected its return on assets (ROA). The outcomes demonstrated that every independent variable had a significant impact on the bank's profitability. Additionally, they noted that a bank's overall asset level does not always translate into better profitability due to scale-related diseconomies. In Bahrain, Ali and Oudat (2020) did an investigation on the impact of financial risk on the financial performance of commercial and investment banks listed at Bahrain securities exchanges for the period between 2014 to 2018. The study adopted descriptive survey research design and regression analysis to examine and establish the relationship between capital risk, exchange rate risk, liquidity risk and operational risk as financial risk components on ROA and ROE as proxies of financial performance of the financial institutions. The firm size as control variable was gauged as total assets and deposits of the bank. The study established that capital risk, liquidity risk, operational risk had a positive insignificant influence on ROA and ROE. The results further demonstrate that firm size exerted a positive and statistically insignificant impact on ROA while on the ROE it had a negative insignificant impact.

A study on the effect of firm size on the profitability of manufacturing companies listed in the Nigerian Stock Exchange between 2000-2009 conducted by Babalola

(2013) found that total assets and total sales as proxies' firm size had a positive significant impact on ROA as a measure of the profitability of the 80 manufacturing firms analyzed through data analysis using data obtained from annual financial reports. Likewise, Kigen (2014) established no relationship between profitability and size measured in terms of total assets of Kenya insurance companies regulated by the Insurance Regulatory Authority (IRA) for periods between 2009-2013. However, the study further established that firm size measured in the form of market share had a significant positive relationship with insurance profitability measured through ROA. In a study on the effect of internal determinants of profitability of Kenya's six commercial carried out by Onuonga (2014) between the years 2008 -2013, using the generalized least squares method established that a bank's size, capital strength, ownership, operating expense, and diversification significantly influence ROA as a measure of Bank's profitability. They argue that commercial banks should invest more in advanced technologies and management expertise, which minimizes operating costs, positively impacting their growth and sustainability. Therefore, it is imperative to consider the moderating effect of MFBs firm size considering the background that the institutions are categorized into three types (Large, Medium, and Small), which may or may not influence the effects of predictor variables selected and evaluated for the study on the dependent variable.

Fanta, Kemal and Waka (2013) carried out a study to determine the impact of corporate governance on banks financial performance in Ethiopia covering the period 2005-2011, utilizing multivariate analysis to demonstrate the relationship. The predictor variables were Loan to Deposit ratio and Loan Loss Provision ratio, while the ROA and ROE were the proxies for Bank's financial performance. The bank size as control variable was expressed as log of the total assets. They established that Loan Loss Provision ratio and Loan to Deposit ratio had insignificant influence on bank's performance exerted significant positive impact on ROA and ROE. The positive influence of firm size implies better performance and superior profits for large-sized banks which is attributable to economies of scales.

Dogan, (2013) posits that firm size will positively influence a firm's financial performance. Further, suggesting that firm size measured by total asset and total

sales positively affects return on assets as a measure of profitability from the investigation of listed firms in the Istanbul stock exchange between 2008-2011. Strøm et al. (2014) argue that the MFI size significantly positively affects its financial performance. The essence of the variable is to measure the effect of economies or diseconomies of scale. The consensus is that a firm's economies of scale and size arise at a specific level. Beyond the specific point, corporations become extremely complex to run and thus arise diseconomies of scale (Amdemikael, 2012).

2.5 Critique of Existing Literature

King'ori et al. (2017) conducted a study on the factors influencing the financial performance of microfinance banks in Kenya using a descriptive research approach. Multiple linear regression analysis was used in the study to evaluate secondary data that was gathered from microfinance institutions' financial statements between 2011 and 2017. They discovered that the Return on Asset ratio (ROA), which is a proxy for financial success, was positively and significantly impacted by operational efficiency, capital sufficiency (equity to total assets), and business size (natural log total assets). On the other hand, the non-performing loan ratio and loan-to-asset ratio, which represent liquidity risk and credit risk, respectively, had a negligible and adverse impact on MFBs' financial performance. However, this analysis lacks theoretical support and is unable to account for endogeneity. A longer term would also result in a more useful research conclusion.

Lelgo and Obwogi (2018) investigated the effect of financial risk on the financial performance of microfinance institutions in Kenya. The study adopted a quantitative research design. Secondary data for financial institutions for five years between 2013 and 2017 were collected and analyzed using multiple linear regression analysis. The study examined credit risk, liquidity risk, interest rate risk, and exchange rate as proxies for financial risk and ROA as a proxy of financial performance. The study established that credit risk had a positive and statistically significant impact on the financial performance of microfinance institutions. In contrast, liquidity risk, interest rate risk, and exchange rate risk had insignificant positive relationships with the

ROA of MFI. The study, however, needs several methodological drawbacks; firstly, it considers cross-sectional data of MFIs, which is prone to endogeneity problems. Secondly, the five-year study period is short, so the data needs to be more meaningful to draw accurate inferences. Finally, the study model does not consider the impact of an omitted variable.

Adopting a descriptive research design, Bundi et al. (2021) examined the influence of financial risk management practices and the financial performance of microfinance banks in Kenya. The structured questionnaire was utilized to collect primary data from managers, and secondary data for six years between 2015 to 2020 was collected using a secondary data schedule. Financial risk management practices variable includes credit risk management practices, operational risk management practices, liquidity risk management practices, and market risk management practices. In contrast, financial performance was measured by ROE and ROA. The study finding established that all financial risk management components had positive and statistically significant with the financial performance of microfinance banks in Kenya. Employing multiple linear regression analysis to determine the relationship between an explanatory variable and dependent variable; the research suffers from methodological weakness because the multiple linear regression model omits fixed effects, and omitting fixed effects risks omitted variables. Further, the study fails to expunge endogeneity; thus, the results may need to be more accurate.

Nderitu (2017) investigated the effect of financial risk management practices on the efficiency of microfinance institutions in Kenya. The study's objectives were to identify the financial risk management practices of MFIs in Kenya. Level of efficiency in MFIs and how financial risk management practices influence the efficiency of MFIs in Kenya. The study found that credit risk management systems, behavioral detection and predictive analysis systems, finance systems, and risk management systems had positive and significant impacts on efficiency that were gauged using Data Envelopment Analysis (DEA). This study, however, poses theoretical and methodological weaknesses. The study adopted a descriptive research design.

Gathuku (2010) conducted a study on the response of MFIs to regulation through the Microfinance Act 2006. The study targeted 45 MFIs members of AMFI-K. Using a cross-sectional survey design found that the organization had adopted various strategies in response to regulation. The study found that MFIs adopted new strategies such as strategic partnerships with telecommunication companies, introducing new products and human resources, and shifting from donor funds to debts. The research failed to observe the effect of regulations on financial performance. M'mukiri (2013) studied the impact of government regulations on the financial sustainability of MFIs in Kenya, focusing on the influence of three regulatory requirements: capital adequacy, liquidity, and loan provision. The researcher used multiple linear regressions to establish the impact of the exogenous variables on operational self-sufficiency as a key indicator of financial sustainability. The research demonstrated that capital adequacy and liquidity requirements positively impacted financial sustainability, while loan provision had a negative significance. However, the study needs to establish the relationship between the regulation stipulations on financial performance.

Ouko (2014) aimed to evaluate the impact of regulation and supervision of MFIs in developing financial inclusion in Kenya. The results suggested that high capital requirements for deposit-taking microfinance lock out potential MFIs, which can operate on a small scale, thus hampering financial inclusion. It also finds that the regulatory system tends to diminish the charity aspect of MFIs. This work still needs to consider the specific aspect of regulations such as corporate governance, credit risk management, liquidity management, and capital requirement on the financial performance.

Ewool and Quartey (2021) examined the effect of risk management practices on the performance of microfinance in ten microfinance institutions in Kumasi Metropolis, Ghana. The study was carried out over seven years, considering risk identification, risk control, risk monitoring, risk appraisal, and often practiced risk management as the independent variable. The study found that all independent variables had statistically insignificant impacts on ROA and ROE. This study was limited in scope since it only focused on a very small sample, thus making results unreliable and

biased. Hence broader scope with larger samples may lead to different conclusions. Further, this study did not evaluate the influence of specific financial risk on the financial performance of Microfinance Institutions.

The effect of financial risk management practices on the efficiency of Microfinance Institutions in Kenya was investigated by Nderitu (2017), adopting a descriptive research design. The study examined credit risk management systems, behavioral detection and predictive analysis systems, structured finance system, and risk management systems as independent variables while explained variable efficiency was measured by the ratio of weighted sum outputs that included financial revenue and gross loan portfolio to a weighted sum of inputs that consist total assets and total expenses. All systems were found to have a positive and statistically significant impact on the influence efficiency of microfinance institutions. This research needs to demonstrate how financial risks impact the financial performance of MFIs.

Obota (2016) used the PEARLS ratios provided by WOCCU to determine the effects of the Microfinance ACTs, 2006 requirements on the financial performance of Deposit Taking Microfinance (DTMS) in Kenya. The objective was to determine the financial performance of DTMs both before and after the prudential regulations were put in place. The study also examined the financial results of MFIs that just provide credit and are subject to self-regulation. The results showed that rules had no discernible effect. This study does not demonstrate the accuracy and precision of the results using a statistical model. Second, the research only gathers adequate amounts of data during a two-year period, which is rather brief. The investigation must, at last, manage endogeneity.

2.6 Research Gap

The factors affecting the social performance of MFIs were investigated by Withaka (2013). The research sought to demonstrate the relationship between directors' characteristics, leadership characteristics, involvement of stakeholders, institution's accountability practices, and the moderating effect of a firm's size and age on social performance measured through MFIs' targeting and outreach, appropriateness of products and service; benefits to clients and social responsibility. The study

excluded the effects of independent variables on financial performance measured through ROA and ROE. The relationship between commercial banks' regulatory requirements on financial performance in Kenya was examined by Muiruri (2015). The research evaluated the independent variables; corporate governance, capital requirement, credit risk management, and liquidity management. The study has a major shortcoming because it needs to relate the effects of changes in specific regulatory requirements to create avenues for comparison and deduce impact. Additionally, the researcher recommended further research on banking institutions in Kenya's banking sector, such as the SACCOs, FSA, credit Only MFIs, and MFBs.

In an investigation of factors influencing the financial performance of deposit-taking microfinance in Kenya, Monyi (2017) mainly evaluated the impact of financial Leverage, non-performing loans, capital structure, and market structures on financial performance measured through net income, ROA, and ROE. Yenesew (2014) also examined the determinants of MFIs' financial performance. The study probes firm-specific factors such as gearing ratio, efficiency, portfolio quality, operational ratio, capital asset ratio, size, and age and external factors such as GDP and market concentration on the financial performance of MFIs measured through ROA. Similarly, using the two-step system-generalized method of moments (GMM) model, Murui (2011) sought to evaluate the profitability of MFIs operating across 32 African countries for 12 years. The work used an unbalanced data set. The GMM estimators enabled control for possible endogeneity. In conclusion, these studies strive to identify factors that impact the financial performance of MFIs. However, they need to depict the relationship between financial performance on financial risk components such as credit risk, operational risk and liquidity risk variables to be considered in this study.

The majority of the past studies reviewed on the nexus between financial risk and financial performance have mainly focused on commercial banks (for example, Kioki et al., 2019; Muriithi, 2016; Gilbert, 2013, Maniagi, 2018; Olalere et al., 2020; Akong'a, 2014; Mafu, 2017; Juma, 2018; Okehi, 2014; Wanjohi, 2018; Abu-Rumman et al., 2021; Muteti, 2014; Mwangi, 2014; Namasake, 2016; Kwakwala,

2015; Anguka, 2012; Ali & Oudat, 2020; Al-Tamimi et al., 2015; Odhiambo, 2019; Githinji, 2016; Wood & McConney, 2018; Bagh et al., 2017; Htay & Salman, 2013; and Ikponmwosa, 2020; Abu-Alrop, 2020), on Deposit money banks (for example Okere et al., 2018; Aruwa & Musa, 2014; Olumayokun & Adekoya, 2020; and Abubakar et al., 2020), On Deposit Taking Saccos (for example Gweyi, 2018; Kinyua & Warui, 2020; Mwandu, 2014; Jagongo & Nthimaba, 2015; Momanyi & Njiru, 2016; Mwaura & Njoka, 2020) and commercial and service companies (for example Onsongo et al., (2020). However, there has yet to be a comprehensive study of this relationship in the microfinance bank sector, such that a knowledge and research gap exists about the effect of financial risk and the financial performance of microfinance banks. Therefore, this study aims to address these gaps. This study stretches these previous studies in commercial banks and SACCOS to microfinance banks in Kenya.

Empirical studies on financial risk in the banking sector have concentrated on the influence of individual risk separately on a bank's financial performance. Concerning the impact of credit risk on financial performance of banks, several studies have been carried out in commercial banks and they include (Boateng, 2020; Al-Yatama et al., 2020; Isse & Poyraz, 2019; Mennawi, 2020; Munagi & Sibindi, 2020; Otieno et al., 2016; Bashabes et al., 2017; Afolabi et al., 2020; Kumar & Meena, 2022; Joshua et al., 2021; Hossian & Golder, 2022; Kaimu & Muba, 2021). A couple of researchers have evaluated the influence of operational risk on the financial performance of Banks (Annannab et al., 2022; Toroitich, 2018; Santika et al., 2022; Lyambiako, 2015; Adegoke, 2020; Lin & Chang, 2015; Gadzo et al., 2019; Hakim & Boukaira, 2020; Fadun & Oye, 2020; Cheng et al., 2020; and Sharifi et al., 2016). In regards to the effects of liquidity risk on financial performance, the following empirical were carried out in the banking sector, and they include; (Hacini et al., 2021; Domoita et al., 2021; Njue, 2020; Maaka, 2013; Olarewaju & Adeyemi, 2018; Moussa, 2015; Olalere et al., 2019; Gweyi et al., 2018; Kimathi et al., 2015; Kangunda, 2018; Olalere et al., 2019; Mananga, 2012; Otieno et al., 2016; Mwangi, 2014). Finally, concerning the influence of capital risk on the financial performance of microfinance banks, few researchers have been conducted relating to the microfinance sector; most empirical studies have been conducted in commercial banks, and they include (

Mousa, 2018; Abubakar, 2015; Ikpefan, 2013; Aymen, 2013; Orichom & Omek, 2020; Ezike & Oke, 2013; David & Muendo, 2018; Yahaya et al., 2016; Ogboi & Unuafe, 2013; Chinoda et al., 2015; Nyoka 2017; Kipruto et al., 2017; Khoza, 2020). The reviewed empirical studies need to demonstrate the joint relationship between credit risk, operational risk and liquidity risk on the financial performance of microfinance banks, creating a knowledge gap that this study aims to fill. Further, the reviewed studies documented conflicting and inconclusive findings. Several types of research that sought to determine the impact of corporate governance on MFB's financial performance were conducted by Mwasi (2011), Moenga (2015), Olick (2015), Zakaria (2012), Thrikwala et al. (2015), Zegeye (2015), fail to explore the compounded effect of predictor variables under consideration in this study and the moderating effect of firm size.

Afude (2017) explored the effect of financial regulation on the performance of MFIs in Kenya. Adopting capital adequacy, liquidity management, and management efficiency as financial regulations requirements while clientele outreach, financial sustainability, loan repayment, asset quality, and solvency as performance indicators of MFIs. Nevertheless, the research was limited to only three requirements ignoring credit risk management requirements. Secondly, results failed to point out the effect of MFI's size as moderating variable. Finally, due to the apparent difference in the methodological approach in terms of gauging the financial performance of MFBs using ROA and ROE, therefore, this study seeks to fill the research gap by addressing and establishing statistical relationships of credit risk, operational risk, liquidity risk and financial performance. Nzomo (2015) explored the relationship between management information systems, competition, government regulations, and the sustainability of MFIs in Kenya. Adopting a quantitative approach as a research design fails to test and point out specific government regulation(s) besides concluding that government regulation has a negative statically significant impact on financial sustainability. This study aims to shed more insight into the effect of financial risk on the financial performance of microfinance banks (MFBs) with firm size as moderating variable.

In a case study at Hawassa City, Alemayehu and Lemma (2014) sought to find out factors influencing the performance of MFIs. Using descriptive and exploratory research methodology, reported that institutional factors and political factors affect the MFI's performance. However, the results must depict the association between variables, needing more statistical precision. In conclusion, no other research exists probing the interaction of the variables in consideration of this study in the microfinance sector. Conversely, the study aims to fill the gap by examining the combined impact of financial risks on MFBs' financial performance. Similarly, the findings of this research will add value to existing bank sector literature.

2.7 Summary

This chapter first reviews the four relevant theories, which include credit risk, agency, stakeholder, and liquidity preference theories, that conjecture the independent and dependent variables. Secondly, the chapter explored the conceptualization of credit risk, operational risk and liquidity risk as the independent variables on financial performance as the dependent variable. Thirdly, the empirical review was carried out to identify the underlying measurement of dependent and independent variables, parameters, methodologies used, and findings relating to the banking and the microfinance sector. Fourthly, the critique of the literature section reveals the strengths and weaknesses of the research methodologies and approaches of past studies in the area of financial risk in the microfinance banking sector. Finally, the chapter identifies a research gap that past studies should have covered. The study will aim to fill the research gap of interrelated independent (credit risk, operational risk and liquidity risk) on the dependent variable (financial performance) of MFBs as with moderating effect of the MFBs size.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter encapsulates the research methodology utilized to establish the impact of financial risk on financial performance of microfinance banks in Kenya. It consists research philosophy, the research design, target population of study, sampling and sampling technique, data collection procedures, data processing and analysis and study empirical model.

3.2 Research Philosophy

Research philosophy reflects the framework for knowledge advancement and the nature of knowledge (Collis & Hussey, 2014). There generally five main philosophies which can guide a research study. These are positivism, critical realism, interpretivism, postmodernism and pragmatism research philosophy (Saunder, Lewis & Thornhill, 2012). The following research paradigm features inspired the research; Ontology, which implies the researcher's perspective on the social phenomenal; secondly, epistemology relates to nature of knowledge, basis for researcher's assumptions that constitute knowledge and knowledge dissemination to others; lastly, Axiology pertains the researcher's view on the role of values and ethics during research process (Sekaran, 2009). The study is based on positivism research philosophy because it is an empirical analysis on the impact on financial risk on financial performance of Microfinance banks in Kenya, with underlying theories, models and hypothesis to be tested.

The study is underpinned by positivist research philosophy. The positivist approach concentrates on hypothesis testing and statistical analysis to derive causal relationship from a social reality. It is scientific and uses large sample size with aim to establish accurate, objective and quantitative (Collis & Hussey, 2014). The research philosophy positivist consists of hypothesis development from existing theories, which are later tested and interpreted to determine their conformation to

theoretical evidence with aim of making conclusion. The positivism and deduction approach normally gather both quantitative and qualitative data with aim to gain in-depth understanding of social reality, they give priority to establishment of casual relationship among variables (Cooper & Schinder, 2006). The positivist approach is deemed suitable to a study that is quantitative in nature and value free (Saunder et al., 2007)

Marashdeh (2014) note that, the philosophy is advantageous firstly, because its informed by scientific principles and is used to testing hypothesis rather than building a new theory. Secondly it identifies causal relationship amongst variables rather than clarifying the research context. Thirdly, it uses quantitative data and is more structured approach than inductive approach. Finally, the independence of the researcher is maintained as the study relies mainly on analytical procedures rather than consideration of experiences and opinions. The research philosophy of this study is informed by the fact that the study does not seek to produce a new theory but to test existing hypotheses based on analysis of quantitative data, thus the deductive approach is more appropriate for this research.

The study was underpinned on positivist approach since financial risk, firm size and financial performance in microfinance banks are external and independent of the researcher. The approach facilitated the establishment of the association among credit risk, operational risk, liquidity risk, firm size and financial performance of microfinance banks through conducting analytical analysis to quantitative data collected from banks' financial statements for a period from 2011 to 2021 to test hypotheses and make conclusion. This positivist research approach fosters prediction and generalization.

3.3 Research Design

Getahun et al. (2015) refers to research design as a plan that provides guidelines to researchers in the practice of collecting, evaluating and inferring the data. Thus, the study's goal and nature of identified problem influence the research design adopted. The selection of research design points to the priority of a researcher concerning the perspective of the research methodology. In particular, the study employed both

mixture of descriptive research design and explanatory research design. The descriptive research design is adopted in order to determine and describe characteristics of variables under consideration (Monyi, 2017). Therefore, the descriptive research design approach was used to describing the financial risk parameters and financial performance of MFBs. On the other hand, explanatory research design helps in identification and evaluation of casual relationships between the different variables under consideration (Kibede, 2016). Thus, the explanatory research design was used to depict the relationship between predictor variables and response variable.

Quantitative research approach based on secondary data was employed. This approach is considered relevant because it employs statistics which is a comparative methodological discipline that utilize mathematical techniques for descriptive data analysis, deduction of inferences and hypothesis testing (Koops, 2009). In addition, the study also used panel data (longitudinal data) analysis to analyses the secondary data that was collected from financial statements of MFIs. Nyamsogoro (2010) argue that, the use of longitudinal data improves tracking of fluctuations in constructs and relationships overtime. It allows to control for certain unobserved characteristics of individual firms (MFBs) and enables causal inference in positions where inferring causality would be very challenging in case we had only one-year (single cross section) data. Gujarati et al. (2017), assert that by examining the repeated cross-section of observations, enables panel data to be the preferred in ascertaining dynamic changes.

3.4 The Target Population

According to Mugambi et al., (2015), population is a well-defined set of people, services, elements, events, group of things or households that are being investigated. The unit of analysis for study was the MFBs registered and licensed by CBK at the end of December 2021. The target population compromised all the fourteen (14) MFBs registered and licensed. The registered and licensed MBFs were selected because they were compliant to stipulation of Microfinance Act, 2006, which is the basis of Central Bank regulatory authority. In addition, the MFBs were considered

due to availability and reliability of financial statements since they are subjected to disclosure by regulating authority and mandatory external audit.

Table 3.1: Target Population

Types of MFBs	No of Members
Large	3
Medium	5
Small	6
Total	**14**

Source (CBK, 2021)

3.5 Data Collection Instrument

According to Studenmund (2006) data collection entails method(s) that a study adopts to acquire data so as to attain answers on research problem. The study utilized secondary data extracted from CBK Bank Supervision Annual Reports and audited financial statements. The panel data extracted from individual banks was validated through cross-checking published and audited financial reports for each MFBs.

The study utilized secondary data acquired from audited financial statement for the period between year 2011-2021.The panel data was collected for eleven years audited MFB's financial statements using secondary data instrument specified in Appendix IV. The data played a key role in aiding the researchers to deduce very important relation between the variables.

3.6 Sample and Sampling Techniques

The study employed census method. The Census method gives an opportunity of an in-depth enumeration for the target population elements (Kothari, 2004). According to Mugenda and Mugenda (2003) census approach is preferred where the population is small and manageable. Hafizah and Mutia (2014) asserts that census techniques to be appropriate since it minimizes biases in a study through allowing all elements equal opportunity for participations. Further, the approach will enhance validity on

data collected by minimizing errors associated with sampling techniques (Saunders, Lewis & Thornhill, 2009). The census techniques was preferred since it enhance accuracy and confidence interval when the target population is small and heterogeneous.

3.7 Data Collection Procedure

An introductory letter was obtained from the chairperson of Business Administration (BA) department authorizing data collection. In addition, data collection procedure of the panel data was sourced from the CBK Bank Supervision Annual Reports for the period of eleven years, between 2011-2021. The CBK Bank Supervision Annual Reports was accessed from the CBK website. Secondary data component obtained, for each bank and for each year was keyed into Secondary data collection instrument. To confirm authenticity of secondary data collected, financial information from CBK Bank Supervision Annual Report was counter-checked with financial information of audited and published financial statements of individual MFBs, obtained from institutions official website.

In case where discrepancies arise, information from audited financial statements was given preference due to the fact that the information was published to general public. Further, ratio analysis was used to measure the variables from financial statements over the eleven-year period. This was achieved through keying collected data into Microsoft Excel program and transformed it into ratios. Finally, the ratios were transformed into panels.

3.8 Data Processing and Analysis

According to Gujarati (2023) panel data is a composite of cross-sectional and time series data. Muiruri (2015) notes that panel data having both dimensions of cross-sectional and time series components minimizes possibility of biasness in parameter estimator as well as aiding the control of unobserved heterogeneity. The study utilized descriptive and inferential statistics to explore the data gathered from the MFBs. Advanced statistical tool, STATA version 16 was employed to carry out panel regression. The relationship between the independent variables and the

dependent variable was tested using Pearson correlation. On the other end, T-statistic was used to test the significance of regression coefficients impact of independent variables on financial performance. In addition, F-test was used to test whether the model is fit or not. Ratio analysis was employed to calculate the credit risk, operational risk, liquidity risk and financial performance among MFBs, then data was analyzed using multiple linear regression analysis and random effects panel data analysis.

3.8.1 Empirical Model

According to Marashdeh (2014), there exists generally cross-section, time series and panel data for empirical analysis. In the cross-section data, observations of one or more variables are gathered from a variety of sample entities at a single point of time. In time series data values of one or more variables is observed over a period of time. In panel data, the same cross-sectional unit is observed over time. Consequently, panel data will be considered as appropriate since it measures and demonstrates effects that hardly detectable through use of cross-sectional data or time series data. (Pascal, 2012; Gujarati & Porter, 2017). Additionally, Gujarati (2023), argues that panel data enhances variability, efficiency and minimize collinearity due to provision of more information on data analysis.

Based on the assumption of the error term, there exist majorly two panel regression model namely the fixed effects model and random effects model. The fixed effects model holds the assumption that error term is constant. However, individual effect under the random effects model is assumed to be a random disturbance drawn from probability distribution. Thus, the fixed effects model shrinks to zero the random effects (Marashdeh, 2014). Consequently, random effects model specification is suitable in scenarios where one wants to control omitted variable that is across units or entities under observations (MFBs) but demonstrate variance over period of time (Greene, 2012). The benefit of random effect models is that it reveals unobserved heterogeneity while in the case of fixed effect model its absorbed by the intercept (Greene, 2012; Gujarati & Porter 2009).

In order to explore and demonstrate the relationship between explanatory variables and predictor variable, panel regression analysis was used. This study adopted modified model similar to that used in various studies on relationship between financial risk and financial performance of financial institutions (Muiruri, 2015; Murui, 2011; Mwangi, 2014; Mureithi, 2012). The following general empirical research model is developed (Bollen & Brand 2010, Pascal 2012, Muiruri, 2015):

$$Y_{it} = \alpha_i + X'_{it}\beta + \varepsilon_{it} \quad \text{(3.1a)}$$

Where:

Y_{it} is the dependent variable (i = entity) and (t= time)

β is the coefficient for independent variable

X represents one independent variable

α_i (i= 1…n) is unknown intercept for each entity (n entity specific intercepts)

ε_{it} is the error term

This Equation was transformed to Random Effects model as shown in Equation 3.1b.

$$Y_{it} = \alpha_i + X'_{it}\beta + \mu_i + \varepsilon_{it} \quad \text{(3.1b)}$$

Where:

μ_i is group specific random element.

Equation 3.1 will be expanded to obtain equations 3.2 which will be used as the general multiple regression model for estimation.

$$ROA_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 OP_{it} + \beta_3 LR_{it} + \mu_{it} + \varepsilon_{it} \quad \text{(3.2)}$$

Where

ROA_{it} is Return on Asset for MFB i at time t

β_0 is the constant or intercept

$\beta_i; (i = 1,2,3)$ is coefficient of regression

CR_{it} is independent variable, Credit Risk of MFB *i* at time *t*

OP_{it} is independent variable, Operational Risk for MFB *i* at time *t*

LR_{it} is independent variable, Liquidity Risk of MFB *i* at time *t*

μ_{it} is the individual level effect.

ε_{it} is the idiosyncratic error

3.8.2 Moderating Effect Model

In order to examine the moderating effect of firm size on the impact between independent variables (Credit Risk, Operational Risk and liquidity risk) and financial performance among MFBs, the study was estimated the following equations.

$$ROA_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 OP_{it} + \beta_3 LR_{it} + \beta_4 M + \beta_{1m} CR_{it} M + \beta_{2m} OP_{it} M + \beta_{3m} LR_{it} M + \mu_{it} + \varepsilon_{it}$$

..... (3.3)

Where;

M is the moderating variable- firm size

$\beta_i: (i = 1,2,3)$ is coefficient of regression

$\beta_i m: (i = 1,2,3)$is regression coefficient with moderating effect

A statistical test was done to examine whether data violates the random effect model assumptions. The Hausman test was used to discriminate between random effect model and fixed effect model. The test determined if to accept or otherwise the null hypothesis that random effect models is the preferred model for the study.

3.9 Diagnostic Test

The study carried out several diagnostic test to ascertain non-violation of Classical Linear Regression Model (CLRM) assumptions. It's important to conduct diagnostic tests before statistical and econometric tests to minimize errors that give biased and inconsistent parameter estimates (Mwangi, 2014). Gujarati et al. (2017) asserts that diagnostic test enhances statistical soundness of regression models through non-violation of CLRM. In determining statistical significance t-test and F-tests were carried out. The following pre-estimations test were carried out: linearity, Autocorrelation, Normality, Multicollinearity and Heteroscedasticity.

3.9.1 Test of Linearity

According to Saunders, Lewis and Thornhill (2009) linearity refers to the degree to which change in outcome variable is associated to change in the predictor variables. Therefore, before undertaking linear regression analysis, its deemed appropriate to ascertain that a model can accurately estimate the relationship between explained and explanatory variables in linear nature (Gujarati, 2023; Field, 2009). If a non-linear relationship exists between explained and explanatory variables the results of regression analysis will be spurious. The study used Q-Q plots, to test linearity. The violation of linearity assumption was treated by dropping outliers (Bai & Perron, 1998). In addition, to test the strength of association between the independent and dependent variable Pearson's correlation coefficient will be used.

3.9.2 Test of Autocorrelation

Autocorrelation/ serial correlation occurs when idiosyncratic error terms of different time periods are correlated to one another (Gujarati et al., 2017). The study employed Wooldridge F-statistic on each of the independent variables. The null hypothesis is that there no serial correlation and vice versa. Detection of autocorrelation was dealt by employing Feasible General Least Square (FGLS) estimation or use of robust standard errors approach depending on the nature of the estimated effects.

3.9.3 Test of Normality

According to Singh (2006) normality test is carried out to test if data is normally dispersed in a population or data follows a Gaussian distribution. To assess whether data is normally distributed, Shapiro-Wilk test and Kolmogorov-Smirnov test was used. The study tested a null hypothesis (H_0) that data is normally dispersed in the population and alternative hypothesis (H_1) that data is not normally dispersed in the population. The significance level of the study will be $\alpha = 5\%$ therefore, H_0 will be rejected if $p \geq 0.05$. A non-parametric analysis technique will be adopted in case

deviation the normality assumption is observed. Additionally, to test residual normality, Jarque-Bera (J-B) test will be carried out. Baltagi (2008) alluded the importance for adjustment of error terms deviation from normality in econometric models. The H_0 for J-B test hold that observed data is normally dispersed while H_1 states that observed data is not normally dispersed. The Jarque-Berra critical value should be greater than 5% level of significance to accept the H_0.

3.9.4 Test of Multicollinearity

According to Greene (2012), multicollinearity is a situation in which independent variable interrelate. The study employed correlation matrix and Variance Inflation Factor (VIF) to test for multicollinearity. A VIF $\geq$ 10 indicates existence of multicollinearity (Greene, 2012). Additionally, correlation coefficient less than 0.8 points out that less severe multicollinearity problem exists and hence ignored.

However, correlation coefficient of more than 0.8 indicates presence of high level of multicollinearity among predictor variables and hence calls for model correction (Guajarati et al., 2017).

3.9.5 Heteroscedasticity Test

Heteroscedasticity depicts a situation in which random disturbance within the relationship between predictor variable and explained variables varies across all values of the predictor variables (Saunder, Lewis & Thornhill, 2012). If the residual or error terms have constant variance are said to be homoscedastic. The Breusch-Pagan test and Levene test was used to test for heteroscedasticity. The null hypothesis (H_0) will be that disturbance terms are homoscedastic while the alternative hypothesis was that disturbance terms are heteroscedasticity. If null hypothesis were to be rejected, then heteroscedasticity is present, thus the non-violation of homoscedastic assumption will be accounted by using FGLS model.

3.9.6 Hausman Test

A Hausman specification test is usually conducted to determine validity of fixed effects model or a random effects model (Greene, 2008). It tests whether residual terms are correlated with the co-variates. If Hausman specification test, Chi-square statistic $p < 0.05$, then it indicates that errors are correlated with the predictors and thus random effect (RE) model, while on the other end Chi-square statistic $p > 0.05$, then shows that disturbance terms are not correlated with predictor and FE results are more appropriate than RE results. The Hausman test was employed to determine the suitable model for the study.

3.9.7 Hypothesis Testing

Inferential analysis of predictor variables and response variable was carried out by subjecting the variables to stepwise multiple regression and OLS panel regression analysis. The F-test and the p-value will be employed to assess the level of the significance for the overall regression equation. The t-test and the p-value was applied to assessing statistical significance of coefficient of interaction terms

between predictor variables and explained variable. The significance level of F statistic and t-test was conducted at 95% confidence level ($\alpha = 0.05$).

The study also employed the following statistic; Coefficient of determination (R-square) to measure the degree of variation in the outcome variable as explained by explanatory variables of the study. Additionally, Pearson's correlation coefficient was used to ascertain the strength and nature of linear relationships among variable. A positive correlation coefficient points to direct influence relationship among response variable and covariate variable(s) in contrast negative correlation coefficients indicates inverse relationship among measurement variable and predictor variable (s) (Saunders, Lewis & Thornhill, 2012).

3.10 Operationalization of Variables

According to Ochieng (2016) Operationalization is the process of assigning numerals, numbers and other symbols to study variables. Operationalization involves the explicit specification of a variable in such a way that its measurement is possible

Table 3.2: Operationalization of Variables

Variables	Measurement	Notation
Independent variables		
Credit risk (CR)	a) $Net\ Non-performing\ Loan\ ratio = \frac{Net\ Non-performing\ Loans}{Gross\ Loans}$	NNPLR
	b) $Asset\ Quality\ Ratio = \frac{Non-performing\ Loan}{Gross\ loans}$	AQR
	c) $Loans\ Loss\ provision\ to\ total\ loans\ ratio = \frac{Loan\ Loss\ Provision}{Total\ loans}$	LLPTLR
	d) $Loan\ Loss\ Provision\ to\ total\ equity\ ratio = \frac{Loan\ Loss\ Provision}{Total\ Equity}$	LLPTER
Operational Risk (OR)	a) $Management\ Expense\ ratio = \frac{Operating\ Expense}{Total\ Assets}$	MER
	b) $Operational\ Effeciency\ Ratio = \frac{Operating\ Expense}{Gross\ loans}$	OER
	c) $Ratio\ of\ Overheads\ to\ Total\ Earning = \frac{Overheads\ Costs}{Total\ Earning}$	OTE
	d) $Cost\ Income\ Ratio = \frac{Operating\ Expense}{Total\ Earning}$	CIR
Liquidity Risk (LR)	a) $Liquid\ Assets\ Ratio = \frac{Cash\ and\ Cash\ Equivalents}{Total\ Assets}$	LRt
	b) $Bank\ Liquidity\ Ratio = \frac{Gross\ Loans}{Total\ Customer\ Deposits}$	BLR
	c) $Liquid\ Asset\ to\ Total\ Deposit\ Ratio = \frac{Cash\ and\ Cash\ Equivalents}{Total\ Deposit}$	LATDR
	d) $Customer\ Deposit\ to\ Total\ Asset\ Ratio = \frac{Customer\ Deposit}{Total\ Assets}$	CDTAR
Moderating variable		
Firm size	Natural logarithm of total asset	FSIZ
Dependent variable		
Financial performance	a) $Return\ on\ Asset\ Ratio = \frac{Net\ Profit\ After\ Tax}{Total\ Assets}$	ROA

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter provides the findings obtained from the analysis and interpretation of the results in pursuit of the relationship between financial risk and the financial performance of microfinance banks in Kenya. The study employed various approaches methodologies to gather insight from secondary data. The study was guided by positivist research philosophy and adopted explanatory research design. Panel regression analysis was conducted to satisfy the out of three empirical research model. The descriptive analysis was conducted in two stages to describe the population, then followed by correlation analysis, diagnostic tests and fixed effect regression and hypothesis testing.

4.2 Descriptive Statistics

Descriptive statistics were used to encapsulate unbalanced panel data and to identify patterns. Descriptive statistics summarized measures of dispersion such as standard deviation, minimum and maximum observations; measures of central tendency such as the mean; and measures of distribution such as skewness and kurtosis were used. Though descriptive statistics do not allow coming up with a conclusion, the nature of data was presented in terms of their maximum and minimum, mean, standard deviation, skewness, and kurtosis statistic in Table 4.1.

4.2.1 Credit Risk Descriptive Statistics

Table 4.1: Credit Risk Descriptive Statistics

Variable	Min	Max	Mean	St. Dev.	Skewness	Kurtosis
NNPLR	-200	57.246	5.929	26.874	-5.016	36.878
AQR	0	1600.000	36.03	146.094	10.439	112.247
LLPTLR	-100	93.750	10.671	17.659	-0.521	19.07
LLPTER	-177.778	900.000	25.163	87.858	8.242	83.627
CR	-28.098	325.521	19.501	37.512	6.378	48.369

The result in Table 4.1 indicates Net non-performing loan ratio (NNPLR) ranged from -200 to 57.246 with a mean value of 5.929. The finding implies that in every shilling lent, 5.929 percent constituted a non-performing loan. The standard deviation 26.874 signifies large variations in the NNPLR for MFBs in Kenya. Further, the result reveals that Asset Quality Ratio (AQR) had a mean of 36.03 percent while the minimum and maximum are 0 and 1600.0 percent, respectively. It implies that some MFBs are 100% effective in debt collection, therefore, have no outstanding non-performing loans. The AQR has a high standard deviation of 36.03 percent, implying that most MFBs faced a high level of Credit risk due to a large proportion of non-performing loans per every shilling lent.

The result in Table 4.1 indicates that loan loss provision to total loan ratio (LLPTLR) ranged from 100 to 93.75, with a mean of 10.671 percent. The MFBs suffered loan loss on average of 8.653 percent of all loans disbursed, with a moderate variation of 9.813. Consequently, the result further indicates that loan loss provision to total equity ratio (LLPTER) fluctuated between -177.778 to 900 with an average and standard deviation of 25.037 and 87.858, respectively. The result implies that 25.037 percent of every shilling invested in MFBs capital was apportioned for loan loss due to high credit facility defaults. In addition, the result showed that NNPLR, AQR, LLPTLR, and LLPTER had positive Kurtosis. NNPLR and LLPTLR had negative skewness, while AQR and LLPTER had positive skewness.

4.2.2 Operational Risk Descriptive Statistics

Table 4.2: Operational Risk Descriptive Statistics

Variable	Min	Max	Mean	Std. Dev	Skewness	Kurtosis
MER	5.301	66.071	19.275	11.648	1.687	5.982
OER	6.943	3600.000	78.597	332.913	10.109	107.049
OTE	31.076	1250.000	126.684	183.89	3.868	19.219
CIR	34.066	1433.333	168.029	243.398	3.605	16.639
OR	20.584	1338.508	94.024	154.784	5.445	39.065

From Table 4.2, the management efficiency ratio (MER) fluctuated between a minimum and maximum of 5.301 and 66.071 percent, respectively, with a mean value of 19.275 percent. It could imply that MFBs incur relatively high operational risk with little deviation from the mean at 11.648 percent. A maximum value of 66.071 indicates that for every shilling invested in Assets, 66.071 percent cater for operating expenses in MFBs. The acceptable international ratio is 20%, indicating that average MFBs are grappling to maintain efficient operations. The MER had a positive skewness and kurtosis of 1.687 and 5.982 respectively.

The result in Table 4.2 further showed that the operating efficiency ratio (OER) had a mean of 78.597 percent, with minimum and maximum of 6.943 and 3600.000 respectively. There is high variation in OER reflected in standard deviation of 332.913, the high standard deviation implies that it does deviates more than its average, suggesting high operational risk exposure that the microfinance institutions are experiencing. It indicates that MFBs in Kenya are incurring high operation cost per dollar advanced to customers therefore its needful for the management to be more efficient and mitigate high operational risk exposure The OER had a positive skewness and kurtosis of 10.109 and 107.049 respectively.

Table 4.2 reveal that ratio of overheads to earnings (OTE) had a minimum and maximum of 31.076 percent and 1250 percent respectively. Additionally, the OTE had an average of 126.684 percent and standard of deviation of 183.89. The OTE had high standard variation implying that MFBs were experiencing high variability of overheads against the earning. The OER was observed to have a positive skewness and kurtosis of 3.868 and 19.219 respectively. Further, the table 4.2 indicate that cost-income ratio (CIR) had a mean of 78.597 percent with a maximum and minimum of 126.684 percent, and 168.029 percent, respectively. The mean signifies that in every shilling that MFBs earnings, 78.597% of it covers operating expense. The CIR had variation from the mean as reflected by a standard deviation of 243.398 with positive skewness and kurtosis of 3.605 and 16.639 respectively. The high mean of CIR implies that Microfinance banks in Kenya were facing high operational risk exposure, therefore suggesting lower management proficiency to controlling operating expenses in banks.

4.2.3 Liquidity Risk Descriptive Statistics

Table 4.3: Liquidity Risk Descriptive Statistics

Variable	Min	Max	Mean	Std. Dev	Skewness	Kurtosis
LRt	3.333	74.365	23.162	13.39	1.442	5.514
BLR	0	9.625	1.513	1.337	3.032	15.864
LATDR	3.883	1610.000	73.521	153.99	8.558	84.422
CDTAR	4.619	255.556	51.912	31.566	2.816	17.759
LR	15.984	422.246	37.527	38.742	8.421	82.803

The results in Table 4.3 show that the Liquidity Ratio (LRt) ranged from 3.333 percent to 74.365 percent, with a mean of 23.162 percent. The maximum value of 74.365 percent of LRt implies that most MFBs maintain high liquidity levels attributable to higher growth in total liquid assets than short-term liabilities. It also indicates MFB's ability to honor obligations as they fall due and fund asset increases. The average LRt was 23.162 percent which is higher than the statutory minimum requirement of 20 percent; however, a high variation of 13.39 was observed, pointing to the fact that few MFBs might be struggling to maintain consistent Liquidity Management requirements. The Liquidity ratio had a positive skewness and kurtosis 1.443 and 5.514 respectively.

The finding in Table 4.3 indicates liquid asset to total deposit ratio (LATDR) had a mean of 73.521 percent while the minimum and maximum are 3.883 and 1610.0 percent, respectively. The mean implies that most MFBs rely on customer deposits as the main source of liquidity. On the other hand, this may imply over-reliance on customer deposits to issue loans and meet obligations which are scary. Thus, any default may trigger a bank run. The LATDR had high variation from the average microfinance banking sector reflected by standard deviation of 153.99. A positive skewness and kurtosis of 8.558 and 84.422 respectively, was observed for the ratio. Further, Table 4.3 depict that Customer Deposit to Total Asset Ratio (CDTAR) ranged from as low as 4.619 to 255.559 with an average and variation of 51.912

percent and 31.566, respectively. The average implies that 51.912 percent of every shilling in MFB's assets arises from customer deposits. The ratio, CDTAR, had positive skewness and Kurtosis of 2.816 and 17.759 respectively.

4.2.5 Summary Descriptive Statistics

Table 4.4: Summary Descriptive Statistics

Variables	Min	Max	Mean	Std. Dev	Skewness	Kurtosis
CR	-28.098	325.521	19.501	37.512	6.378	48.369
OR	20.584	1338.508	94.024	154.784	5.445	39.065
LR	15.984	422.246	37.527	38.742	8.421	82.803
ROA	-54.217	3.904	-7.464	12.761	-1.844	5.897
FSIZ	3.807	10.378	6.968	1.916	0.401	1.942

The results in Table 4.4 shows that the mean and the standard deviation for ROA are quite high. The average ROA is negative 7.464 percent with a standard deviation of 12.761 percent. The maximum and minimum were 3.904 percent and negative 54.217 percent, respectively. The high standard deviation of ROA indicates high volatility of returns regarding profitability. Thus, the negative ROA implies that MFBs reported low profitability or losses during the period under consideration. The findings are supported by Murui (2011), who found that African microfinance institutions post negative ROA and ROE. Further, the high variations from the means prompt the adoption of robust regression methods to check on robustness to outliers. It was established that ROA had negative 1.844 and 5.897 respectively.

From Table 4.4, the average credit risk of MFBs in Kenya was 19.501 percent, with a standard deviation of 37.512 percent. The minimum and maximum values were negative, 28.098 percent and 325.521 percent, respectively. It suggests that banks were facing a high risk of credit default. High levels of credit risk imply that the institutions have a high appetite to offer credit facilities to low-income earners without stringent credit risk management and effective loan evaluation processes, thus resulting in low returns. The MFBs' higher levels of credit risk might further

indicate MFB's inadequacy of credit policies, techniques, and tools to curb default rates.

The results in Table 4.4 depict that mean of operational risk was 94.024 percent with a standard deviation of 154.784. The minimum and maximum values were 20.584 percent and 1338.508 percent, respectively. The high operational risk during the study period implies high operating expenses and overheads incurred by the MFBs in Kenya to sustain their operations. Further, the high dispersion from the mean may imply slow technology uptake in their operations. The results established that operational risk had a positive skewness and Kurtosis of 5.445 and 39.065, respectively.

Table 4.4 reveal that liquidity risk had a mean of 37.527 percent with a corresponding standard deviation of 38.742 percent. The minimum and maximum values were 15.984 percent and 422.246 percent, respectively. Therefore, this implies that MFBs in the period maintained high liquidity levels. The results are supported by Muriithi (2016), who found that commercial banks maintained high liquidity levels to satisfy the cash need of their client base. The results also established that operational risk had a positive skewness and Kurtosis of 8.421 and 82.803, respectively. The results output in Table 4.4 also reveals that firm size as the moderating variable had a mean of 3.807 percent and a corresponding standard deviation of 1.916 percent. It signifies a minimal variation of firm size in MFBs throughout the study. It implies that MFBs maintained or moderately increased their assets from 2011-2021. The firm size had positive skewness of 0.401 and 1.942 respectively. In Appendix V, descriptive statistics were presented for all independent variables, independent variable constructs, moderating variables, and dependent variable.

4.3 Correlation Matrix

This section contains findings of correlation tests to establish the association between the study variables. The pair-wise correlation was used to assess collinearity inherent within explanatory variables adopted in the study. The study presents in Table 4.5 and Table 4.6 the Pearson correlation coefficients. The tables present all variables

used in the determination of the relationship between the financial risk (proxied by credit risk, operational risk, liquidity risk) and financial performance measured by Return on Asset (ROA) of MFBs in Kenya.

Table 4.5: Overall Correlation matrix ROA as the dependent

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) ROA	1.000					
(2) NNPLR	0.230**	1.000				
(3) AQR	-0.054	0.421***	1.000			
(4) LLPTLR	-0.405***	-0.214**	0.439***	1.000		
(5) LLPTER	-0.229**	0.055	0.127	0.199*	1.000	
(6) MER	-0.848***	-0.059	0.069	0.378***	0.026	1.000
(7) OER	-0.658***	-0.213**	-0.080	0.187*	-0.088	0.627***
(8) OTE	-0.766***	-0.230**	-0.094	0.187*	-0.028	0.729***
(9) CIR	-0.750***	-0.202*	-0.115	0.100	-0.058	0.727***
(10) LRt	0.007	0.014	-0.105	-0.164	0.031	-0.169*
(11) BLR	0.197*	0.564***	0.289***	-0.098	-0.065	0.002
(12) LATDR	0.051	0.203**	0.007	-0.107	-0.067	-0.057
(13) CDTAR	-0.274***	-0.410***	-0.039	0.277***	0.201*	0.089

*** p<0.01, ** p<0.05, * p<0.1*

Variables	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) ROA							
(2) NNPLR							
(3) AQR							
(4) LLPTLR							
(5) LLPTER							
(6) MER							
(7) OER	1.000						
(8) OTE	0.753***	1.000					
(9) CIR	0.725***	0.459***	1.000				
(10) LRt	0.268***	0.096	0.099	1.000			
(11) BLR	-0.211**	-0.224**	-0.166	-0.242**	1.000		
(12) LATDR	0.098	0.003	0.067	0.648***	0.355***	1.000	
(13) CDTAR	0.124	0.114	0.018	-0.038	-0.697***	-0.547***	1.000

*** p<0.01, ** p<0.05, * p<0.1*

The results of the pairwise correlation presented in Table 4.5 show that Net Non-Performing Loan Ratio (NNPLR) has a positive significant relationship with the Return on Asset (ROA). This implies that an increase of NNPLR ratio will cause

increment of financial performance. The NNPLR had a correlation of r = 0.230 ($p<0.05$). The Asset Quality Ratio (AQR) had a correlation coefficient of r = 0.054 ($p>0.05$), hence it had a negative relationship with ROA, but the association was statistically insignificant. The negative relationship indicates that deterioration of loan portfolio of MFBs will cause suppressed financial performance. From Table 4.5, it was further observed that Loan Loss Provision to Total Loan Ratio (LLPTLR) had a moderate negative significant relationship with financial performance with MFBs with correlation coefficient of r = - 0.405 ($p<0.05$). The influence inverse between LLPTLR ratio and financial performance imply that increment of loan defaults will adversely affect the MFBs main stream of earning, interest income. Furthermore, in Table 4.5 it was found that the Loan Loss Provision and Total Equity Ratio (LLPTER) had an inverse influence on financial performance of MFBs, with correlation coefficient of r = - 0.229 ($p<0.05$), significant at 5 percent level of significance. The negative relationship between LLPTER and financial performance signifies that increase of Loan loss provision in proportion MFB's equity point to presence high degree credit risk exposure. The LLPTER had correlation coefficient of r = -0.229 ($P<0.05$).

The results in table 4.5 further depict a strong significant negative correlation between the indicators of operation risk and financial performance (ROA) of MFBs. As shown in table 4.5, the Management Efficiency Ratio (MER) had statistically significant negative correlation with financial performance with a correlation coefficient of r= - 0.848, $p<0.05$). Increment of operating expense against total assets imply poor management in MFBs and therefore depressed return for each dollar invested in asset. Conversely, the Operational Efficiency Ratio (OER) had correlation coefficient of ratio r= - 0.658, $p<0.05$, imply that OER and Financial Performance (ROA) had inverse interaction statistically significant at 5 per cent level of significance. High OER adversely affects financial performance of MFBs, imply in high cost of advancing credit to MFBs clients. Further, table 4.5 demonstrate that the Ratio of Overheads to Total Earnings (OTE) had a negative impact on financial performance of MFBs with correlation coefficient of r= - 0.766 ($p<0.05$). The OTE and ROA had a negative and statistically significant interaction at 5 percent level of significance. Lower OTE ratio, as result of management proficiency in managing

MFBs overheads, will cause increment of financial performance. The results output in Table 4.5, established that the Cost Income Ratio (CIR) had a correlation coefficient of r = - 0.750 ($p<0.05$). The CIR had strong negative correlation with financial performance of MFBs with statistical level of significance at 5 percent. The increase percentage operating expense for each dollar earned in MFBs operation activities adversely affects financial performance.

Table 4.5 shows that Customer Deposit to Total Asset Ratio (CDTAR) had a negative significant correlation with MFBs financial performance, with correlation coefficient of r = - 0.750 ($p<0.05$). The inverse association between CDTAR and ROA imply that increment of ratio will result to decrease of financial performance of MFBs, though there is a weak and significant influence at 5 per cent. Contrary, the results revealed that Liquidity ratio (LRt) and MFB's financial performance had insignificant positive relationship. The indicator had a weak positive correlation coefficient of r = 0.007 ($p>0.05$) with ROA. Similarly, the results output displayed in table 4.5 further denote that Bank Liquidity Ratio (BLR) had positive significant negative correlation with ROA, with correlation coefficient of r = 0.197 ($p>0.05$). The BLR ratio results demonstrate that increase of overreliance on customer deposit to advance customer loans will lead to increment of financial performance of MFBs at the expense of increased exposure to high degree of liquidity risk. Finally, the Liquid Assets to Deposit Ratio (LADR) had positive and insignificant association with financial performance on MFBs, with correlation coefficient of r = - 0.051 ($p<0.05$). The Pearson correlation matrix results in Table 4.5 demonstrate that indicators of explanatory variable all had a correlation coefficient of less than 0.80. It is clear that there is no perfect nor severe multicollinearity among the explanatory variables. Moreover, multicollinearity problem is greatly minimized by use of panel data estimation, because it offers more degrees of freedom (Murui, 2011)

Table 4.6: Correlation Matrix of Composite Independent Variables ROA as the dependent

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) ROA	1.000					
(2) CR	-0.125	1.000				
(3) OR	-0.785***	-0.180*	1.000			
(4) LR	-0.028	-0.071	0.097	1.000		

**** p<0.01, ** p<0.05, * p<0.1*

Table 4.6 shows that Operational risk had a significant strong negative correlation with the financial performance (ROA) of MFBs. The coefficient estimate of the correlation of Operational risk is r = -0.785 ($p<0.05$), thus indicating that risk is inversely related to the financial performance of MFBs. It signifies that for MFBs to improve their performance, must reduce operating expenses and adopt efficient processes. The results in Table 4.6 also reveal that credit risk (CR) had a negative association with MFB's financial performance, with correlation coefficients estimates of r = - 0.125 ($p>0.05$). This indicate that high degree of default risk will result to decline of financial performance of MFBs though the association is weak and statistically insignificant. Moreover, the Liquidity risk (LR) had a weak negative and statistically insignificant correlation with ROA with correlation coefficient estimates of r = - 0.028 ($p>0.05$). The increase of liquidity risk exposure will result reduction financial performance of MFBs in Kenya. The credit risk, operational risk and liquidity risk as proxies of financial have an inverse correlation with financial performance which is consistent with finding past empirical studies that established that financial risk have negative impact on financial risk (Muriithi, 2016; Maniagi, 2018; Gweyi, 2018: and Aruwa & Musa 2014).

4.4 Diagnostic Test of Statistical Assumption

4.4.1 Test of Normality

Kolmogorov-Smirnov goodness of fit test, Shapiro-Wilk test, and Jacque-Bera test was employed to carry out the normality test of variables in the study.

Table 4.7: Kolmogorov-Smirnov test, Shapiro-Wilk test and Jacque-Bera Test

Variable	KS	P (KS)	SW	P(SW)	JB	P-value (JB)
Credit risk (CR)	*.039*	*.200[c]*	*.973*	*.058*	*1.673*	*0.450*
Operational Risk (OR)	.058	*.200[c]*	.992	.876	1.761	0.563
Liquidity Risk (LR)	.080	*.178[c]*	.974	.068	1.01	0.674
Moderating variable						
FSIZ	.081	*.194[c]*	.975	.079	*1.095*	*0.806*
Dependent variable						
ROA	.088	*.071[c]*	.956	.187	1.563	0.915

The test results in Table 4.7 indicate that the p-values of Kolmogorov-Smirnov test for credit risk, operational risk, liquidity risk, firm size and ROA were greater than greater than 5%, implying that there was no violation of normality assumption thus data conformed to normality test. Moreover, table 4.7 reveal that Shapiro-Wilk test for all study variable had their p value greater than 5 percent, therefore data was found to normally dispersed. Additionally, Jacque-Bera Test results have their p values greater than 5 per cent thus data normally dispersed. The

all of all three methods employed, signifying that the data followed a normal distribution. The more robust JB test concludes that normality is violated if the p values for JB statistic differ from zero at a 5 percent significance level. From the output, the study concludes that the data of variables follow normal distribution inferring that the variables are independently distributed.

4.4.2 Unit Root Testing

The study tested for unit roots using second-generation panel unit root tests. Second-generation panel unit root tests are more flexible and provide for cross-section dependence which is common in panel data. The augmented Dickey-Fuller (ADF) Test was used to test variables for stationarity.

Table 4.8: Unit root test

Assumptions:
Unit root test

Augmented Dickey-Fuller (ADF) Panel Unit Root test

Ho: Panels contain unit roots **Number of panels = 119**

Ha: Panels are stationary. **Number of periods = 11**

	At levels			first difference			Order of integration
Variables	**Tstat**	**prob**	**remarks**	**Tstat**	**prob**	**remarks**	
ROA	-2.116	0.088	Non-stationary	-3.997	0.0001	stationary	I(1)
CR	-2.219	0.077	Non-stationary	-3.691	0.0003	stationary	I(1)
OR	-2.341	0.092	Non-stationary	-3.7	0.0003	stationary	I(1)
LR	-2.314	0.102	Non-stationary	-4.277	0.0000	stationary	I(1)
Firm size	-1.76	0.474	Non-stationary	-4.178	0.0001	stationary	I(1)

The test results in Table 4.8 indicate that the Augmented Dickey-Fuller (ADF) test showed that all variables have unit roots, therefore, were Non-stationary At levels and became stationary after first differencing. The finding implies that the alternative hypothesis was rejected, and variables were used in their first difference.

4.4.3 Test for Autocorrelation

The study tested for autocorrelation on the differenced transformed logarithm series using the Wooldridge test for autocorrelation. The test's null hypothesis was that the error terms relating to any two observations were mutually independent. The results of the test are provided in Table 4.9. Serial correlation occurs when idiosyncratic terms are highly correlated with each other (Gujarati et al., 2017). The study utilized the Wooldridge test for autocorrelation in panel data to gauge the presence of autocorrelation in panel data. The null hypothesis is that there was no first-order autocorrelation.

Table 4.9: Serial Correlation Test

H_0: no first-order autocorrelation

Test	F	Prob > F	Conclusion
Wooldridge test for autocorrelation	0.2336	0.792	Autocorrelation not present

The results presented in Table 4.9 indicate that the serial correlation test was not violated since the Wooldridge test was insignificant at 0.05.

4.4.4 Test for Multicollinearity

Multicollinearity exists where two or more of the explanatory variables in a model are highly correlated (linearly related). The presence of multicollinearity means that the statistical inferences about the data may not be reliable (Gujarati et al., 2017). Tolerance of a respective independent variable is calculated from 1 - R^2. Tolerance with a value close to 1 means little multicollinearity, whereas a value close to 0 suggests that multicollinearity may be a threat (Gujarati & Porter, 2009). The reciprocal of the tolerance is known as Variance Inflation Factor (VIF).

Table 4.10: VIF (tolerance) test

Variable	Tolerance	VIF
Credit risk (CR)	0.972	1.029
Operational Risk (OR)	0.632	1.582
Liquidity Risk (LR)	0.898	1.114
FSIZ	0.669	1.494

Table 4.10 indicates the test results for multicollinearity, using both the VIF and tolerance. With VIF values being less than 5, it was concluded that there was no multicollinearity in this study since credit risk, operational risk liquidity risk and firm size had test output of 1.029, 1.582, 1.114 and 1.494 respectively. The VIF shows us

how much the coefficient estimate variance is inflated by multicollinearity. Additionally, Table 4.10 depict that credit risk, operational risk, liquidity risk and firm size had tolerance value estimate of 0.972, 0.632, 0.898, and 0.669 respectively. The tolerance value potrayed are close to 1, therefore indicating non- existence of multicollinearity problem in data.

4.4.5 Test for Heteroscedasticity

Heteroscedasticity happens when the variance of the errors varies across observations (Long & Ervin, 1998). Where the variance varies from one observation to another, this situation is said to have non-constant variance. Thus, the condition of heteroscedasticity exists. However, researchers observe that heteroscedasticity is to be found in cross-sectional data rather than time series data due, for instance, to scale effects (Gujarati et al., 2017). Breusch-Pagan and Levene's tests were used to carry out the Heteroscedasticity test of study variables. A large chi-square value greater than 9.21 would indicate that heteroscedasticity was present.

Table 4.11: Breusch-Pagan test and Levene Test

	Breusch-Pagan test		**Levene test**	
Variable	**Chi-square**	**Prob > Chi2**	**Statistic**	**Pr > F**
Credit risk (CR)	2.176	*.140*	1.891	*0.072*
Operational Risk (OR)	0.009	*.926*	1.443	*0.191*
Liquidity Risk (LR)	0.011	*.917*	0.662	*0.723*
Firm Size	0.170	*.680*	0.241	*0.981*

The test results in Table 4.11 indicate no evidence of Heteroscedasticity in the variables data. The Credit risk, Operational risk, Liquidity risk and Firm size had a Chi-square of 2.176, 0.009, 0.011 and 0.170 respectively, therefore the Chi-square values were less than 9.21and their p-values were greater than 5 percent hence there exist no heteroscedasticity problem. Similarly, all the Levene's test estimate output were 1.891, 1.443, 0.662 and 0.241 for Credit risk, Operational risk, Liquidity risk and Firm size respectively, were less than 9.21 and all p-value were greater than 5

percent, hence no violation of heteroscedasticity assumption. It is therefore concluded that the Breusch-Pagan statistics and the Levene test Statistics for all attributes of study variables were higher than the threshold (p>0.5).

4.4.6 Test of Linearity

Figure 4.1 shows a Q-Q plot conducted to test linearity in explanatory and explained variables. The Q-Q plot are ideal for visualizing linearity and eliminating outliers (Schreiber-Gregory, 2018).

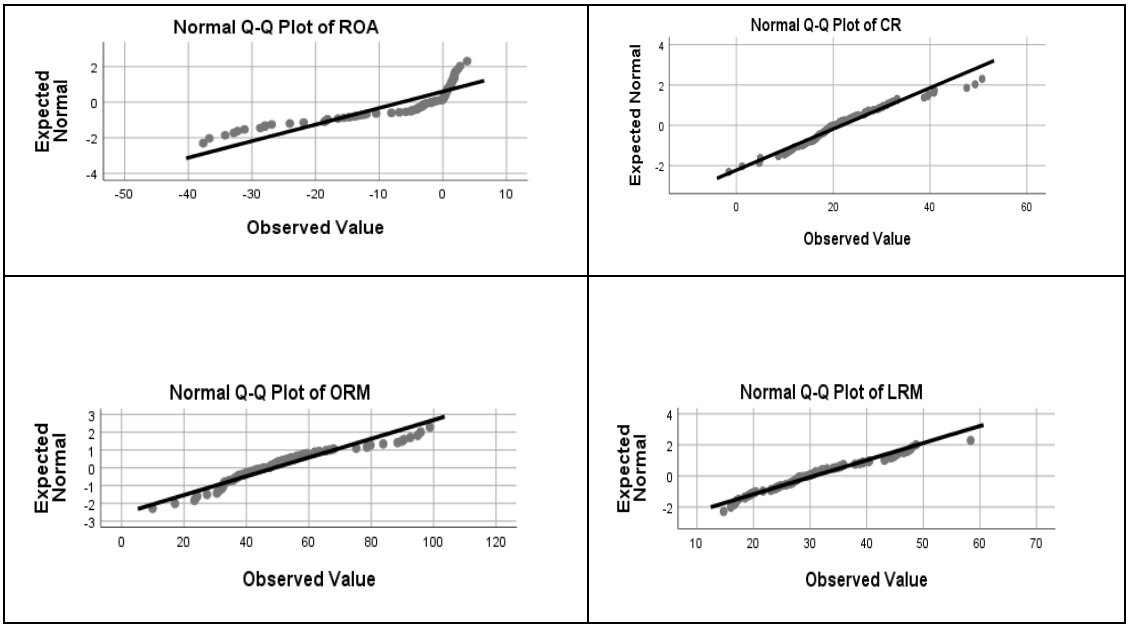

Figure 4.1: Normal Q-Q Plot

The results in Figure 4.1 showed the linearity of points, suggesting that the linearity assumption was met. The scatter plot graphs in figure 4.1 demonstrate that regression standardized residual points align together along the straight line plotted. Further, the finding in Figure 4.1 indicates that the data is normally distributed.

4.4.7 Hausman Specification Test

Hausman test for specification was conducted to determine whether to use the random or fixed effects models. Hausman tests the null hypothesis that the preferred

model is random effects versus the alternative to fixed effects. The test rejects the null when the p-value is less than 0.05.

Table 4.12: Hausman Specification Test for the Model

Hausman (1978) specification test (model)	Chi-square test value	P-value	conclusion
ROA	15.04	0.004	Fixed effect model

Table 4.12 shows that the Hausman specification test favors the Fixed effect model for ROA (chi-square = 15.04, $p<0.05$), at a 5% level of significance. The diagnostic tables and the conclusion are all based on the fixed effect panel regression model.

4.5 Panel Regression Analysis

4.5.1 Credit Risk and Financial Performance

The first objective aimed at ascertaining the nexus between credit risk and the financial performance of Microfinance banks in Kenya. The measure of financial performance as the dependent variable was Return on Asset (ROA). In contrast, the independent variable is credit risk determined by Net Non-Performing Loan Ratio (NNPLR), Asset Quality Ratio (AQR), Loan Loss Provision to Total Loan Ratio (LLPTLR), and Loan Loss Provision to Total Equity Ratio (LLPTER). The study fitted fixed effect panel regression estimates to model to address the following hypothesis:

H_{01} – The Credit Risk has no Significant Effect on the Financial Performance of Microfinance Banks in Kenya.

Table 4.13: Fixed Effect Panel Regression Estimates of Credit Risk on ROA.

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
NNPLR	0.007	0.041	0.16	0.874	-0.075	0.089	
AQR	-0.005	0.008	-0.60	0.548	-0.02	0.011	
LLPTLR	-0.037	0.047	-0.79	0.434	-0.13	0.056	
LLPTER	-0.035	0.007	-4.85	0	-.049	-0.02	***
Constant	-6.065	1.015	-5.97	0	-8.079	-4.051	***
Mean dependent var		-7.467	SD dependent var			12.815	
R-squared		0.206	Number of obs			119	
F-test		6.604	Prob > F			0.000	
Akaike crit. (AIC)		762.739	Bayesian crit. (BIC)			776.634	

**** p<.01, ** p<.05, * p<.1*

Table 4.13 depicts that Loan Loss Provision to Total Equity Ratio (LLPTER) significantly affects the Return on Assets (ROA) of MFBs in Kenya. The LLPTER measures the funds a bank sets aside to cover credit defaults in proportion to equity held by the financial institution. The ratio indicates risk exposure of anticipated loan losses relative to banks' capital. An increase in Loan provision causes deterioration of the bank's capital. LLPTER has a coefficient of -0.035 with p-values less than 0.01. Therefore, the coefficient is significant at one percent. LLPTER significantly negatively impacts the financial performance of MFBs in Kenya. The results implied an inverse relationship of the explanatory variable indicator with financial performance; thus, a unit increase of LLPTER would lead to a 0.035 decrease in ROA, holding other factors equal constant.

The results in Table 4.13 show that the Net Non-performing Loan ratio (NNPLR) had a coefficient of 0.007 with a corresponding p-value of 0.874. The NNPLR has a direct and insignificant relationship with ROA. The regression coefficient imply that a unit increase of NNPLR triggers 0.007 increment of financial performance, though the increment was found to be statistically insignificant at 5 percent level of significance. The findings are inconsistent with the finds of Ekinci and Poyraz (2019), who employed a panel regression model in evaluating the effect of credit risk on the financial performance of deposit banks in Turkey and found that credit risk

proxied by NPL had a negative and significant relationship with ROA. The relationship could be attributed to; increased credit supply, poor management and screening of credit clients, and an increase in unsecured assets (Ekinci & Poyraz, 2019). The finding further contradicts the findings of Isse and Dhaliwal (2018), that found NNPLR to have a negative statistically significant effect on the ROA of commercial banks in Ethiopia.

Table 4.13 results indicate Loan Loss Provision and Total Loan Ratio (LLPTLR) had a negative and insignificant relationship with the financial performance of MFBs in Kenya. The coefficient of LLPTLR was β= 0.037 with a p-value of 0.434 and insignificant at a 5 percent significance level. Therefore, a unit rise in the LLPTLR would result in 0.037 units increment in the financial performance of microfinance banks in Kenya, ceteris paribus. Further, table 4.13 depict that Asset Quality Ratio (AQR) had a negative and statistically insignificant impact on the ROA of MFBs of Kenya. A unit decline of AQR triggers rise of financial performance of MFBs holding all other factors constant. These findings are inconsistent with Ekinci and Poyraz (2019), who found that asset quality ratio negatively and significantly impacted ROA at a 1 percent significance level, suggesting that banks with high liquidity have diminished profitability. Further, the results contrast Aurwa and Musa's (2014) who found that AQR had a positive insignificant relationship with ROA.

The fixed effect panel regression estimates provided in Table 4.13 shows that credit risk components jointly explain up to 20.6 percent of variations in the ROA of MFBs in Kenya. It is based on the resultant coefficient of determination (R^2) value equivalent to 0.206. The remaining percentage of variation in ROA may result from variables not included in the model. The model F statistic indicated a strong statistical significance at a 5% significance level (F-statistic =6.604, P<0.05). It implies that the Credit risk components affect the financial performance (ROA) of microfinance banks (MFBs) in Kenya. Based on these findings, the study rejected the null hypothesis that ***H_{01}*** *-the credit risk has no significant effect on the financial performance (ROA) of Microfinance Banks in Kenya*. Therefore, the null hypothesis

that credit risk has no significant effect on the financial performance of MFBs was rejected.

4.5.2 Operational Risk and Financial Performance

The Second objective aimed to analyze the effect of operational risk on the financial performance of Microfinance banks in Kenya. The measure of financial performance as the dependent variable was Return on Assets (ROA). In contrast, the independent variable is operational risk determined by the Management Expense Ratio (MER), Operational Efficiency Ratio (OER), Ratio of Overheads to Total Earnings (OTE), and Cost Income Ratio (CIR). The fixed effect panel regression outputs were fitted in the model to address the following hypothesis:

H_{02} – The operation risk has no significant effect on the financial Performance of Microfinance banks in Kenya.

Table 4.14: Fixed Effect Panel Regression Estimates of Operation Risk on ROA.

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
MER	-0.63	0.081	-7.78	0	-0.791	-0.469	***
OER	-0.001	0.002	-0.46	0.65	-0.004	0.003	
OTE	-0.016	0.009	-1.71	0.091	-0.035	0.003	*
CIR	0.003	0.008	0.31	0.756	-0.014	0.019	
Constant	6.339	1.61	3.94	0	3.146	9.532	***
Mean dependent var		-7.467	SD dependent var			12.815	
R-squared		0.455	Number of obs			119	
F-test		21.326	Prob > F			0.000	
Akaike crit. (AIC)		717.820	Bayesian crit. (BIC)			731.716	

*** p<.01, ** p<.05, * p<.1*

The coefficient results in Table 4.14 demonstrate that the Management Efficiency Ratio (MER) significantly predicted the ROA of Microfinance banks in Kenya at a 1% significance level. The coefficient of MER was found to be β= -0.63. The coefficient was statistically significant with the t-statistic and p-values of – 7.78 and 0.0, respectively. The negative effect shows a negative relationship between MER and ROA. This value β= -0.63 shows that holding all other variables in the model constant, one unit increase of MER would lead to a 0.63 unit decrease of ROA.

Therefore, MFBs strive to reduce their operating expense relative to total assets to boost their financial performance.

From the regression results in Table 4.14, the OER and CIR coefficients were β = -0.001 (p= 0.091) and β = 0.003 (p= 0.756) respectively and statistically insignificant at 5 percent level of significance. A unit decrease of OER will triggers an increment of 0.001 financial performance and the rise is statistically insignificant. The CIR has an insignificant inverse impact on financial performance of MFBs. Table 4.14 portrays that the CIR has a positive and statistically insignificant effect on financial performance of MFBs. Holding other factors equal, a unit increase of CIR triggers a rise of the financial performance by 0.003, even though the increment is statistically insignificant. The findings were corroborated by Ali and Oudat (2020) found that CIR had positive and insignificant impact on financial performance of commercial and investment banks in Bahrain. Contrary, findings were inconsistent with Wood & McConney, (2018), Onsongo, Mwangi & Muathe (2019) and Al-Tamimi et al. (2015) who established that operational risk (CIR) had a negative and significant impact on banks.The OTE had β = -0.016 (p = 0.091), thus having a negative and statistically insignificant impact on the financial performance of MFBs in Kenya at 5% level significance. One unit increase of OTE leads to a 0.016 decrease in MFB's ROA, holding other factors constants. These results were corroborated by King'ori et al. (2017), that observed that operational efficiency had a positive and significant influence on the ROA of MFBs.

The fixed effect panel regression estimates reported in Table 4.14 shows that model R-squared 45.5 percent; this implies that 45.5 percent variability of ROA is a result of operational risk while the remaining percentage of 44.5 percent of the variation in ROA is explained by other factors, not included in the model, holding all other factors constant. The model F statistic indicated a strong statistical significance at a 5% significance level (F-statistic =21.326, P<0.05). It implies that the operational risk affects the financial performance (ROA) of microfinance banks (MFBs) in Kenya. Therefore, the null hypothesis that $\boldsymbol{H_{02}}$ *-the Operational risk has no significant effect on the financial performance (ROA) of Microfinance Banks in Kenya* is rejected.

4.5.3 Liquidity Risk and Financial Performance

The third objective aimed at analyzing the effect of Liquidity risk on the financial performance of Microfinance banks in Kenya. The Return on Asset (ROA) measures the financial performance as the dependent variable. In contrast, the independent variable is Liquidity risk determined by Liquid Assets Ratio (LRt), Bank Liquidity Ratio (BLR), Liquid Asset to Total Deposit Ratio (LATD), and Customer Deposit to Total Asset Ratio (CDTAR). The study fitted fixed effect regression otputs to the model to address the following hypothesis:

H_{03} *– The Liquidity risk has no significant effect on the financial Performance of Microfinance banks in Kenya.*

Table 4.15: Fixed Effect Panel Regression Estimates of Liquidity Risk on ROA.

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LRt	-0.057	0.077	-0.74	0.464	-0.21	0.097	
BLR	-2.032	0.759	-2.68	0.009	-3.537	-0.527	***
LATD	-0.006	0.006	-0.99	0.327	-0.017	0.006	
CDTAR	-0.071	0.029	-2.44	0.016	-0.129	-0.013	**
Constant	1.038	3.112	0.33	0.739	-5.133	7.21	
Mean dependent var		-7.464	SD dependent var			12.761	
R-squared		0.086	Number of obs			120	
F-test		2.438	Prob > F			0.004	
Akaike crit. (AIC)		784.855	Bayesian crit. (BIC)			798.793	

**** p<.01, ** p<.05, * p<.1*

The resulting output in Table 4.15 reveals that BLR had a coefficient of β=-2.032 with corresponding t-value and p-value of -2.68 and 0.009, respectively. BLR had a negative and statistically significant association with the financial performance of ROA. The results imply that one unit increase of BLR will lead to a 2.68-unit decrease in ROA, holding other factors constant. The findings that LATD has a negative and insignificant impact on ROA support previous empirical studies like Isses and Dhaliwal (2018). The research findings on the influence of bank liquidity ratio on ROA are inconsistent with the observation by Ebenezer et al. (2019), who established that banks' total loans and advances to total deposits had a significant positive influence on the ROA of banks in ASEAN-5 countries. Similarly, the

finding on the positive and insignificant effects of liquidity ratio on ROA is inconsistent with Ebenezer et al. (2019), who observed an insignificant negative interaction between variables.

The Customer Deposit to Total Asset Ratio (CDTAR). of microfinance banks in Kenya was found to be significant and negatively related to the financial performance of microfinance banks in Kenya. The coefficient of CDTAR was β= -0.071, p=0.016, and significant at a 5% significance level. It implies that a unit increase in the CDTAR would result in a 0.071 unit decrease in the financial performance (ROA) of microfinance banks in Kenya. It implies that an increased liquidity risk gauged by CDTAR will result in a marginal decrease in MFBs' performance. The other liquidity risk indicators were found to be statistically insignificant, therefore, do not reliably predict the ROA of MFBs in Kenya. The Liquidity ratio (β= -0.057 p=0.464) and Liquid Asset to Total Deposit Ratio (β=-0.006, p=0.327) had a statistically insignificant association with ROA.

The fixed effect panel regression results reported in Table 4.15 shows that model R^2 was 0.086, which implies that 8.6 percent of the ROA variability was a result of joint Liquidity risk components. The remaining percentage of variation in ROA may result from variables not included in the model. The model F statistic demonstrates that liquidity risk is statistically significant (F-statistic =2.438, P>0.004). It implies that the joint effect of liquidity risk components statistically significantly influences the financial performance (ROA) of microfinance banks (MFBs). Based on these findings, the study the null hypothesis ***H_{03}*** *– The Liquidity risk has no significant effect on the financial Performance (ROA) of Microfinance banks in Kenya.* was rejected.

4.6 Moderating Effect of Firm size

The sixth objective of the study investigated the moderating effect of firm size on the relationship between predictor variables and explained variables. The hypothesis was tested to ascertain the influence of moderator variables within the panel regression model.

The study adopted two steps in testing the moderating effect of firm size. In the first step, panel regression was carried out between independent variables and dependent variables, ignoring the moderating variable, thus yielding the study's multiple general regression models. Step two, testing the moderating effect, involved a panel regression model with independent variables (Credit risk, Operational risk and Liquidity risk), Moderating variable (Firm Size) as the independent variable, and dependent variables of financial performance of firms (ROA), therefore yielding moderating effect model.

4.6.1 Step One: Relationship between Independent and Dependent Variables.

The first step of testing moderating effect involves fitting a model for explanatory and dependent variables while ignoring the moderating variable. The study fitted a fixed effect model to test the relationship between the composite of Credit risk, Operational risk, liquidity risk and the financial performance of MFBs using ROA. The regression estimates were fitted in model 3.2 to demonstrate the relationship between the explanatory variables and predictor variables.

Table 4.16: Joint Fixed Effect Panel Regression Estimates of Independent Variables on ROA.

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
CR	-0.048	0.021	-2.23	0.028	-0.09	-0.005	**
OR	-0.007	0.007	-1.05	0.297	-0.02	0.006	
LR	-0.085	0.043	-1.96	0.053	-0.171	0.001	*
Constant	-2.751	1.731	-1.59	0.115	-6.185	0.682	
Mean dependent var		-7.467	SD dependent var			12.815	
R-squared		0.148	Number of obs			119	
F-test		4.444	Prob > F			0.000	
Akaike crit. (AIC)		771.028	Bayesian crit. (BIC)			784.923	

*** p<.01, ** p<.05, * p<.1

Table 4.16 presents the FE panel regression results of the models fitted to test the relationship between the composites of independent variables and the financial performance of MFBs (ROA). As indicated by model R-squared, the ROA

changeability of 14.8% results from financial risk parameters captured in the model, holding all other factors constant. The remaining percentage of variation of ROA may be due to variables not included in the model. The Model F statistic indicated a strong statistical significance at a 5% level of significance (F-Statistic = 10.182, $p<0.000$). The F statistic implies that financial risk factors significantly affect the financial performance of the ROA of MFBs in Kenya.

Table 4.16 reveal the regression coefficient of credit risk and liquidity risk had a statistically significant relationship with financial performance MFBs (ROA). The regression coefficient of credit risk was $\beta=-0.048$, $p=0.028$, and significant at a 5 percent significance level. The results imply that the credit risk had a negative and statically insignificant relationship with the financial performance (ROA) of MFBs. The results agree with previous studies by, Lelgo and Obwogi (2018); Wood and McConney (2018); Olumayokun and Adekoya (2020), who confirmed that the relationship between credit risk and ROA was negative and statistically significant. Contrary, Kioko et al. (2019) observed that credit risk had an insignificant negative impact on ROA.

Further, table 4.16 reports that the regression coefficient of liquidity risk was $\beta= -0.085$, $p= 0.001$, and insignificant at a 5 per cent significance Level. The results in Table 4.26 imply the relationship between liquidity risk and ROA of MFBS statistically insignificant holding all other factors constant. The results on the relationship between liquidity risk and ROA align with finding by Kioko, Olweny, and Ochieng (2019) observed that liquidity risk had an insignificant negative relationship with ROA. Similarly, Wood and McConney (2018) that established a negative and statistically significant effect of liquidity risk on the performance of commercial banks. The findings are variant with the observation by Ali and Oudat (2020) that established liquidity and ROA had a positive insignificant relationship, while Olumayokun and Adekoya (2020) also established that liquidity risk had an insignificant positive effect on the ROA of selected deposit money banks in Nigeria.

Table 4.16 depict that operational risk had a negative insignificant relationship with the financial performance (ROA) of MFBs in Kenya. The regression coefficient of

operational risk was (β= -0.007, p= 0.297); the research finding concurs with Ali and Oudat (2020), who found that operational risk directly affected ROA. The study finding was in contradiction with observations from Kioko et al. (2019), King'ori et al. (2017), and Wood and McConney (2018) that established operational risk had an adverse significant effect on the ROA of commercial banks in Kenya listed in the Nairobi securities exchange. Wood and McConney (2018) observed that the relationship was due to the recent advancement and uptake of technology in the banking sector, causing benefits to accrue from innovation in the long run.

The FE regression estimate was fitted in equation 3.2 as follows:

$$ROA_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 OR_{it} + \beta_3 LR_{it} + \varepsilon_{it}$$

$$ROA_{it} = -2.751 + \ -0.048 CR_{it} + \ -0.007 OR_{it} + -0.085 LR_{it}$$

4.6.2 Relationship between Independent, Moderating and Dependent Variables.

Step two, in testing for moderating effect of firm size, involved fitting a model to link independent and dependent variables in the presence of moderating variables. The results from fixed effect panel regression estimates will be fitted to equation 3.3.

Table 4.17: Moderated Fixed Effect Panel Regression Estimates overall model on ROA.

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
CR	0.24	0.105	2.28	0.025	0.031	0.448	**
OR	-0.079	0.054	-1.46	0.146	-0.185	0.028	
LR	-0.147	0.162	-0.91	0.365	-0.469	0.174	
FSIZ	4.985	1.612	3.09	0.003	1.784	8.185	***
CR_FSIZ	-0.056	0.019	-2.99	0.003	-0.094	-0.019	***
OR_FSIZ	0.016	0.011	1.41	0.161	-0.006	0.038	
LR_FSIZ	0.025	0.028	0.90	0.372	-0.03	0.08	
Constant	-41.23	10.491	-3.93	0	-62.052	-20.407	***
Mean dependent var		-7.467	SD dependent var			12.815	
R-squared		0.373	Number of obs			119	
F-test		6.423	Prob > F			0.000	
Akaike crit. (AIC)		744.514	Bayesian crit. (BIC)			772.306	

*** p<.01, ** p<.05, * p<.1*

Table 4.17 presents the FE panel regression results of the models fitted to test the moderating effect of firm size on the relationship between the composites of independent variables and the financial performance of MFBs (ROA). Exogenous and moderator variables considered in the panel regression model resulted in 37.3% variability in financial performance (ROA) as observed from model R-squared. Thus, 62.7% of fluctuations result from variables not included in the model. Comparing R - squared found before the interaction of moderating effect in table 4.17 and the R squared after moderating effect in table 4.17 reveals that the inclusion of the interaction term resulted in R^2 change of {0.373-0.148 = 0.225, [F= 6.423, p<0.05]}. The results show a presence of a significant moderating effect. The moderating firm size variable explains a 22.5 percent variance of ROA above and beyond the variance by financial risk factors. The Model F statistic indicated a strong statistical significance at a 5 percent level of significance (F-Statistic = 6.423, p<0.05). The F statistic implies that moderating effect of the firm size of MFBs significantly affected the relationship between financial risk factors and the financial performance (ROA) of MFBs in Kenya. Thus, the alternate hypothesis was adopted and null hypothesis that ***H_{04}*** *-the firm size has no significant moderating effect on the relationship between financial risk and financial performance (ROA) of Microfinance Banks in Kenya was rejected*. The firm size had significant moderating effect of firm size was relationship between financial risk components and MFBs' Financial performance.

The FE regression estimate were fitted in equation 3.5 as follows:

$$ROA_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 OR_{it} + \beta_3 LR_{it} + \beta_5 M_{it} + \beta_{1m} CR_{it} M + \beta_{2m} OR_{it} M + \beta_{3m} LR_{it} M + \varepsilon_{it}$$

Where:

ROA- Return on Assets

CR – Credit risk

OR- Operational risk

LR- Liquidity risk

M - Moderating variable (Firm size)

β_i – Coefficient of regression

β_{im} – regression coefficient with the moderating effect

$$ROA_{it} = -41.23 + 0.24CR_{it} + -0.079OR_{it} + -0.147LR_{it} + 4.985M + -0.056CR_{it}M + 0.016OR_{it}M + 0.025LR_{it}M$$

The results in Table 4.17 further show that the following variables had negative and insignificant relationships with the ROA of MFBs in Kenya; Operational risk (β= -0.079, p= 0.146), liquidity risk (β= -0.147, p= 0.365). Similarly, the results indicate that the following variables had a positive but statistically insignificant relationship with the ROA of MFBs in Kenya; Moderated Operational risk (β= 0.016, p= 0.161) and moderated Liquidity risk (β= 0.025, p= 0.372). The findings in Table 4.17 additionally portray that the credit risk variable (β= 0.24 (p= 0.025) had a positive and significant influence on ROA. Further, moderated credit risk had a significant negative impact with regression coefficients of β = -0.056 (p= 0.003), It implies that a unit increase in the credit risk would result in a 0.056 decline in the financial performance (ROA) of microfinance banks in Kenya respectively.

Table 4.17 indicates that the firm size had a regression coefficient 4.985 and a corresponding p- value of 0.003. The results indicated that the firm size directly and significantly impacts MFB's financial performance (ROA) at a 1 percent level of significance. The study findings do support previous findings by Ekinci and Poyraz (2019); Fanta et al. (2013); and King'ori et al. (2017), who established that bank size has a highly positive effect on performance. They attribute the results to large-sized banks gaining cost advantage and increasing their earning ability due to economies of scale. Contrary, Ebenezer et al. (2019) established a statistically significant

negative association of firm size on the ROA of banks, suggesting that large size in Asean-5 countries is associated with diminished performance, while Ali and Oudat (2020) found out adverse insignificant nexus between ROA and Bank size.

4.7 Summary of the Hypothesis

The summary results of the objectives and hypothesis tested were presented in table 4.18. The F-test was utilized to test significance of each hypothesis.

Table 4.18: Summary of the Hypotheses

OBJECTIVE	HYPOTHESIS	RESULTS	TABLE	INTERPRETATION
To determine the effect of credit risk on the financial performance of Microfinance Banks in Kenya.	H_{01} -the credit risk has no significant effect on the financial performance of Microfinance Banks in Kenya	Reject	4.13	The joint effect of credit risk components on financial performance (ROA) of MFBs in Kenya is significant. (F= 6.604, $p<0.05$, R^2= 0.206)
To establish the effect of operational risk on the financial performance of Microfinance Banks in Kenya.	H_{02} -the Operational risk has no significant effect on the financial performance of Microfinance Banks in Kenya	Reject	4.14	The joint effect of operational risk components on financial performance (ROA) of MFBs in Kenya is significant. (F= 21.326, $p<0.05$, R^2= 0.455)
To determine the effect of liquidity risk on the financial performance of Microfinance Banks in Kenya.	H_{03} -the liquidity risk has no significant effect on the financial performance of Microfinance Banks in Kenya	Reject	4.15	The joint effect of liquidity risk components on financial performance (ROA) of MFBs in Kenya is significant. (F= 2.438, $p<0.05$, R^2= 0.086)
To determine the moderating effect of firm size on the relationship between financial risk and financial performance of Microfinance Banks in Kenya.	H_{04} -the firm size has no significant moderating effect on the relationship between financial risk and financial performance of Microfinance Banks in Kenya	Reject	4.17	The moderating effect of firm size on the relationship between financial risk and financial performance (ROA) of Microfinance Banks in Kenya is significant. (F= 6.423, $p<0.05$, R^2= 0.373)

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

In this section, study results were summarized from a test of the hypothesis between predictor variables and dependent variables. Further, conclusions, recommendations, and areas of future research were highlighted.

5.2 Summary of Findings

The study's main objective was to determine the relationship between financial risk and the financial performance of MFBs in Kenya. In the study, three independent and moderating variables were adopted to achieve the main objective. The credit risk, operational risk and liquidity risk were variables were the independent; firm size as the moderating variable; and financial performance as the dependent variable. Each predictor variable had a hypothesis tested to ascertain the degree of interaction with financial performance as the dependent variable. The study was underpinned by credit risk theory, agency theory, stakeholder theory and liquidity preference theory.

The study adopted an explanatory research design to determine the causal relationship between financial risk proxies, moderating effect of firm size variable, and the financial performance of MFBs in Kenya. All 14 MFBs approved, supervised, and regulated by CBK were considered, and therefore by default, a census sampling design was utilized. Secondary data on MFBs were collected from financial statements of MFBs' obtained from CBK Bank Supervision and Banking Sector reports and audited financial statements as of 31st December 2021. The mean, maximum, minimum, standard deviation, and kurtosis were considered parameters of descriptive statistics. The diagnostic tests done on the data included a test of linearity, a test of Autocorrelation, a test of normality, a test of multicollinearity and heteroscedasticity, and the Hausman test. STATA software was used for the analysis of the secondary data. Using Quantitative data was analyzed using descriptive and inferential statistics. Fixed effect regression model was utilized after conducting

Hausman test. A panel regression model was used to test the combined effect of all the independent variables.

5.2.1 Credit Risk and Financial Performance of MFBs in Kenya

The study's first objective sought to analyze how credit risk affects the financial performance of MFBs in Kenya. Credit risk was represented through four indicators. The Net Non-Performing Loan Ratio (NNPLR), Asset Quality Ratio (AQR), Loan Loss Provision to Total Loan (LLPTLR) and Loan Loss Provision to Total Equity (LLPTER) were adopted as proxies for credit risk. The finding of the study revealed the following; LLPTER exerted a negative significant impact on ROA at a 1 percent level of significance, while NNPLR, AQR, and LLPTLR exerted a non-significant impact on ROA. Therefore, LLPTER had a negative significant effect on financial performance of Microfinance Banks. The results signify that increase of doubtful loans in proportion to MFBs equity will lead increased credit risk exposure hence decrease financial performance. The LLPTLR had inverse insignificant influence on financial performance. The decrease of loan loss provision in proportion customer loans and advances will trigger an increment in financial performance and this rise was found to be statistically insignificant. The Asset Quality Ratio (AQR) had adverse insignificant effect on financial performance of MFBs, signifies that Increase of AQR ration will lead to decrease of financial performance, though the decrease is statistically insignificant. From fixed effect regression analysis, it was ascertained that an inverse and statistically significant relationship existed between credit risk and financial performance of Microfinance banks in Kenya. The results of inverse relationship between credit risk and financial performance signifies that increased degree of credit risk exposure result to suppressed financial performance of MFBs.

5.2.2 Operational Risk and Financial Performance of MFBs in Kenya

The influence of operational risk on the financial performance of MFBs in Kenya was assessed as the second study objective. The Management Expense Ratio (MER), Operational Efficiency Ratio (OER), Ratio of Overheads to Total Earnings (OTE), and Cost Income Ratio (CIR) were indicators adopted to determine the operational risk. The findings of the study revealed the following; MER had a negative and

statistically negative relationship with ROA of MFBs; OER and OTE had an inverse and insignificant relationship with ROA while CIR positive insignificant impact. The study established that operational risk had a negative statistically significant relationship with the financial performance of MFBs. Therefore, the study concluded an inverse relationship exists between operational risk and financial performance of MFBs.

5.2.3 Liquidity Risk and Financial Performance of MFBs in Kenya

The third objective sought to determine the relationship between liquidity risk and the financial performance of MFBs in Kenya. Liquidity ratio (LRt), Bank liquidity ratio (BLR), Liquidity asset to total deposit ratio (LATDR), and Customer deposit to total asset ratio (CDTAR) were employed as proxies for liquidity risk. The results revealed that BLR and CDTAR had a negative and significant relationship with ROA. The Fixed Effect regression output result depicted that liquidity risk had statistically insignificant and negative relationship with the financial performance of MFBs. Low degree of liquidity risk exposure causes an increment MFB's financial performance, though the increment is statistically insignificant.

5.2.4 The Moderating Effects of Firm Size

The final objective examined firm size as the moderator variable on the interaction between financial risk and financial performance of MFBs in Kenya. The study outputs depicted that MFB size as the moderator variable had a statistically significant influence at a 5 percent level of significance on the relationship between financial risk and financial performance. The study results on the financial risk on financial performance (proxied by ROA) of MFBs revealed that all independent variables had a non-significant impact on ROA, except for moderated credit risk. All others had statistically insignificant influence. Additionally, moderated credit risk had an inverse and statistically significant association with financial performance while the rest of moderated independent variable had insignificant impact.

5.3 Conclusions of the Study

The conclusion of the study is underpinned on results of the null hypotheses tested.

5.3.1 Credit Risk and Financial Performance

In evaluating the impact of credit risk on the financial performance of MFBs in Kenya, the study concluded that credit risk exerted a statistically significant negative influence on the financial performance of MFBs Kenya. LLPTER, as one indicator measure of credit risk, negatively and significantly influenced ROA. The AQR and LLPTLR exerted statistically significant and negative associations on financial performance on MFBs. Conversely, NNPLR had a positive and insignificant effect on financial performance. The results imply that credit risk has a major effect on the financial performance of MFBs in Kenya, depending on credit risk policies in place. These finding of the study supports the credit risk theory that MFB's financial performance is adversely affected by credit default risk exposure.

5.3.2 Operational Risk and Financial Performance

The second objective examined how operational risk influenced the financial performance of MFBs in Kenya. The study statistically revealed that the management expense ratio, an indicator utilized for operational risk, negatively and significantly influenced the ROA. These finding support the agency theory that managers are motivated to satisfy their interest at expense bank wealth maximization goal, through maintaining high wage bills and operating expense. The composite of operational risk negatively and significantly influenced the financial performance of MFBs. The implication is that MFBs need to seek optimal levels of operating expenses since the increase in operating expenses reduces the profit margins of MFBs while straining the existing physical assets of the banks. The result finding

5.3.3 Liquidity Risk and Financial Performance

The third objective sought to establish the relationship between liquidity risk and financial performance. The study concludes that liquidity risk had a negative and insignificant impact on the ROA of banks. The results imply that increased liquidity

risk exposure in MFBs causes reduction in the financial performance. The results support the liquidity preference theory that argue bank's preferences to advance credit from main customer deposits, will impact negatively financial performance if management does not embrace proper liquidity risk strategies and diversify the asset portfolio.

5.3.4 The Moderating Effects of Firm Size

The fourth objective examined the moderating effect of firm size on relationship between financial risk and financial performance of the MFBs in Kenya. The study concluded that firm size exerted a positive significant financial performance of MFBs. The positive effect signifies that large sized banks enjoy low cost of operation which is attributable to economies of scale and variety of products. Moreover, large sized MFBs are deemed to have a well-developed risk management system, advanced technology and better operational processes. The implication of these results is that as the increased firm size enhance financial performance of MFBs. The finding supports the stakeholder theory that argue bank's management to achieve enhanced performance they embrace proactive risk management system to manage the competing interest of the stakeholders.

5.4 Recommendations of the Study

Based on established findings and objectives the study makes the following recommendations:

5.4.1 Credit Risk and Financial Performance

Objective one aimed at determining the degrees of association between credit risk and financial performance of MFBs in Kenya. The study finding depicts a significant inverse relationship between credit risk and the financial performance of MFBs. The bank's manager should adopt strategies and policies that ensure proper vetting and issuance of credit facilities to credit-worthy clients. Since credit risk adversely affects the financial performance of MFBs, managers should ensure regular monitoring of policy and credit allocation procedures to minimize the growth of non-

performing loans. The managers should thoroughly evaluate borrowers' character and capacity to minimize credit risk exposure. Further, the MFB's should regularly review and implement stringent credit risk management practices minimize or eliminate non-performing loans hence enhanced financial performance. The MFBS' managers should put in place more stringent policies for evaluation of collateral documentation before disbursement of credit facilities. Microfinance Banks in Kenya should invest in training their staffs on risk management especially credit officers who are intensively involved in evaluation, disbursement, monitoring and recovery of loans. These strategies will reduce non-performing loan hence enhanced MFB's financial performance.

The management and policy makers should innovative and invest in modern technology for credit appraisal of credit client attributes and determination of the degree of credit default risk with objective of detecting and eliminating bad credit customers. Additionally, MFBs should collaborate with the credit reference bureaus to evaluate and rate credit seeker before disbursement of loans. A continuous review of Microfinance institution tailored credit risk management systems is imperative to mitigating the degree of credit default risk exposure and improving the MFBs' asset quality and financial performance. The government and policy makers should craft incentives to enhance adoption of robust and efficacious credit management information system within the MFBs as well establishment of more cost friendly credit reference bureaus to aid curbing credit defaults.

The Central Bank of Kenya (CBK) should adopt a policy direction that encourages a thorough evaluation of the creditworthiness of clients by MFBs in Kenya. The regulators, policy makers and management should promote adoption and implementation of customized microfinance banks credit risk assessment framework that reduce defaults risk. The regulator should ensure that the MFBs adhere to credit risk guidelines and reporting to minimize a high degree of credit risk exposure to banks. Further, CBK should keep a keen eye on the risk appetite of MFBs on credit allocation and ensure prudential ratios are adhered upon.

5.4.2 Operational Risk and Financial Performance

The objective two assessed the effect of operational risk on the financial performance of MFBs. The results indicate that operational risk significantly negatively impacts financial performance. It implies that an increase in operational risk exposure results in to proportionate decline in MFBs' performance. The managers of MFBs should embrace policies that improve managerial efficiency by reducing operating expenses. Additionally, the managers should develop policies that enhance the adoption of advanced process management systems geared toward reducing staff costs and internal fraudulent activities. The MFBs' management should ensure continuous training and capacity building operational risk management framework. Focusing to equip the staff with adequate and update skills and knowledge to manage operational risk effectively. Further, the regulator, CBK and policy makers should review and craft risk policies emphasizing operational risk to guide the mitigation of risk in the MFBs. Further, they should also encourage Microfinance banks through regulatory incentive to continuously improve and upgrade Information Communication Technologies (ICT) system to enhance customer data protection and deter infringement and violation of the systems. Mitigation of systems failures, malfunction, and fraudulent activities lead to reduction of the degree of operational exposure and enhance financial performance of MFBs.

5.4.3 Liquidity Risk and Financial Performance

Objectives three ascertained the interaction between liquidity risk and the financial performance of MFBs. The results indicate that liquidity risk exerts an insignificant relationship to the financial performance of MFBs. The Bank liquidity ratio (BLR) and Customer deposit to total asset ratio (CDTAR) exerted an inverse and statistically effect on ROA. The managers should invest in excess liquidity while maintaining the minimum liquidity ratio. The CBK should ensure compliance with the capital adequacy ratio to mitigate the risk of bank failures. The regulator should foster a framework that enhances regular assessment of the preparedness of MFBs to mitigate liquidity risk exposure. Additionally, the microfinance banks should

increase outreach and enhance loan disbursement to fully utilize liquid customer deposits.

5.4.4 The Moderating Effects of Firm Size

The study sought to determine the moderating effect of firm size on effect of financial risk and financial performance of microfinance banks as the fourth objective. The study finding established that firm size had a positive and statistically significant impact on ROA, ROE and financial performance composite. These results signify that MFBs with greater size in assets have superior performance compared to small sized firms. This could be attributed to the fact that large sized microfinance banks enjoy economies of scale of operations. The management should broaden their scope of operational activities across the country through establishing more branches and introduction of customer friendly products to net more clients hence benefit from increased firm size and improved financial performance. The regulators and policy makers provide financial incentive to encourage MFBs expansion meanwhile providing financial risk management frameworks that strengthen MFBs internal control systems and enhance financial performance.

5.5 Suggested Areas for Future Research

Future studies could focus on a comparative analysis of the impact of financial risk on the financial performance of MFBs with other institutions such as commercial banks, SACCOs, and Fintech companies. Secondly, the current study used quantitative measures (financial ratios) to measure financial risk components and financial performance. A similar study could be conducted based on both qualitative and quantitative measures of independent and dependent variables.

Additionally, further research could be undertaken by expanding the scope of moderating variables from firm size to include other types of variables relating to firm-specific (such as ownership, Age, and the number of customers) and macroeconomic factors (such as inflation). The study was based on microfinance banks licensed and regulated by the Central Bank of Kenya. This restriction limits the generalization of findings. Further research should be conducted in microfinance

sectors focusing on testing hypotheses whether they conform to other credit risk, operational risk and liquidity risk theories and models apart from credit risk theory, agency theory, stakeholder theory and liquidity preference theory, for more insights and in-depth understanding of the impact of financial risk on the financial performance of MFIs.

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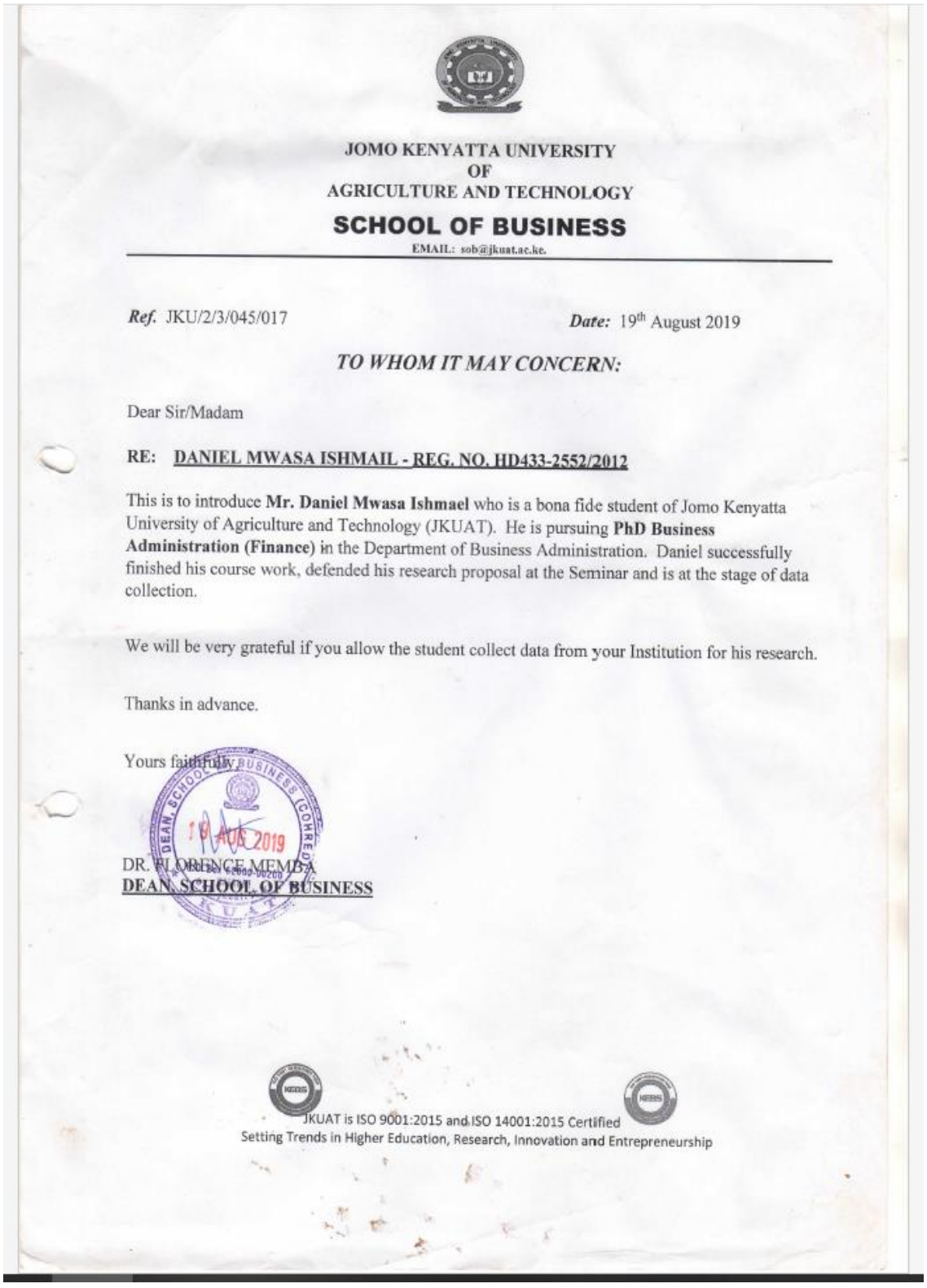
APPENDICES

Appendix I: List of Microfinance Banks Licensed by CBK

S. No.	Microfinance banks	Date licensed
1	Caritas Microfinance Banks Limited	2nd June 2015
2	Century Microfinance Bank	17th September 2012
3	Choice Microfinance Bank Limited	13th May 2015
4	Daraja Microfinance Bank Limted	12th January 2015
5	Faulu Microfinance bank Limited	21st May 2009
6	Kenya women microfinance Bank Limited	31st March 2010
7	Rafiki Microfinance Bank Limited	14th June 2011
8	Remu Microfinance Bank Limited	31st December 2010
9	SMEP microfinance Bank Limited	14th December 2010
10	Sumac Microfinance Bank Limited	29th October 2012
11	U & I Microfinance Bank Limited	8th April 2013
12	Uwezo Microfinance Bank Limited (Salaam Microfinance Bank)	8th November 2010
13	Maisha Microfinance Bank Ltd	21st May 2016
14	Muungano Microfinance Bank ltd	30th October 2019

Source: CBK,2021

Appendix II: Introductory Letter



JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY

SCHOOL OF BUSINESS

EMAIL: sob@jkuat.ac.ke.

Ref. JKU/2/3/045/017 *Date:* 19th August 2019

TO WHOM IT MAY CONCERN:

Dear Sir/Madam

RE: DANIEL MWASA ISHMAIL - REG. NO. HD433-2552/2012

This is to introduce **Mr. Daniel Mwasa Ishmael** who is a bona fide student of Jomo Kenyatta University of Agriculture and Technology (JKUAT). He is pursuing **PhD Business Administration (Finance)** in the Department of Business Administration. Daniel successfully finished his course work, defended his research proposal at the Seminar and is at the stage of data collection.

We will be very grateful if you allow the student collect data from your Institution for his research.

Thanks in advance.

Yours faithfully,

DEAN, SCHOOL OF BUSINESS (COHRED) 19 AUG 2019

DR. FLORENCE MEMBA
DEAN, SCHOOL OF BUSINESS

JKUAT is ISO 9001:2015 and ISO 14001:2015 Certified
Setting Trends in Higher Education, Research, Innovation and Entrepreneurship

Appendix III: NACOSTI Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **988767**

Date of Issue: **20/February/2023**

RESEARCH LICENSE

This is to Certify that Mr.. Daniel Mwasa Ishmail of Jomo Kenyatta University of Agriculture and Technology, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: EFFECT OF CENTRAL BANK REGULATORY REQUIREMENTS ON FINANCIAL PERFORMANCE OF MICROFINANCE BANKS IN KENYA for the period ending : 20/February/2024.

License No: **NACOSTI/P/23/23535**

988767

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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See overleaf for conditions

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

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

CONDITIONS OF THE RESEARCH LICENSE

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

National Commission for Science, Technology and
Innovation(NACOSTI),
Off Waiyaki Way, Upper Kabete,
P. O. Box 30623 - 00100 Nairobi, KENYA
Telephone: 020 4007000, 0713788787, 0735404245
E-mail: dg@nacosti.go.ke
Website: www.nacosti.go.ke

Appendix IV: Secondary Data Collection Instrument

BANK CODE												
Ratios	Indicators	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
		Kshs M	Kshs M	Kshs M	Kshs M	Kshs M	Kshs M	Kshs M	Kshs M	Kshs M	Kshs M	Kshs M
Net Non-Performing Loan Ratio	Net Non-Performing Loans (NNPL)											
	Gross Loans (GL)											
Asset Quality Ratio	Non-Performing Loans (NPL)											
	Gross Loans (GL)											
Loan Loss Provision	Loan Loss Provision											

to Total Loan ratio	(LLP0											
	Total Loans (GL)											
Loan Loss Provision to Total Equity	Loan Loss provision											
	Total Equity (TE)											
Management Expense Ratio	Operating Expense cost (OEC)											
	Total Assets (TA)											
Operational Efficiency	Operating Expense											
	Gross Loan (GL)											
Ratio of Overheads to Total Earnings	Overheads Costs (OHC)											
	Total Earning											
Liquidity	Cash and Cash											

Ratio	Equivalents (CCE)											
	Total Assets (TA)											
Bank Liquidity Ratio	Cash and Cash Equivalents											
	Gross Loan											
Liquid Asset to Total Deposit Ratio	Cash and Cash Equivalents											
	Total Deposit (TCD)											
Total capital ratio	Total Capital (TC)											
	Total Risk Weighted Assets (TRWA)											
Capital Adequacy ratio	Total Equity											
	Total Assets											
Core	Core Capital											

Capital to Total Assets ratio	(CC)											
	Total Assets											
Debt to Equity Ratio	Total Liabilities (TL)											
	Total Equity											
Firm Size	Total Assets											
Return on Asset Ratio	Net Profit After Tax (NPAT)											
	Total Asset											
Return on Equity	Net Profit After Tax											
	Total Equity											

Appendix V: Descriptive Statistics

Variables	min	max	Mean	Std. Dev.	skewness	kurtosis
NNPLR	-200	57.246	5.929	26.874	-5.016	36.878
AQR	0	1600.000	36.03	146.094	10.439	112.247
LLPTLR	-100	93.750	10.671	17.659	-.521	19.07
LLPTER	-177.778	900.000	25.163	87.858	8.242	83.627
MER	5.301	66.071	19.275	11.648	1.687	5.982
OER	6.943	3600.000	78.597	332.913	10.109	107.049
OTE	31.076	1250.000	126.684	183.89	3.868	19.219
CIR	34.066	1433.333	168.029	243.398	3.605	16.639
LR	3.333	74.365	23.162	13.39	1.442	5.514
BLR	0	9.625	1.513	1.337	3.032	15.864
LATDR	3.883	1610.000	73.521	153.99	8.558	84.422
CDTAR	4.619	255.556	51.912	31.566	2.816	17.759
CR	-28.098	325.521	19.501	37.512	6.378	48.369
OR	20.584	1338.508	94.024	154.784	5.445	39.065
LR	15.984	422.246	37.527	38.742	8.421	82.803
ROA	-54.217	3.904	-7.464	12.761	-1.844	5.897
ROE	-1487.5	355.556	-23.479	151.685	-7.68	74.647
FSIZ	3.807	10.378	6.968	1.916	.401	1.942

Appendix VI: Ratio Analysis

Bank code	01	01	01	01	01	01	01	01	01	01	01
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
NNPLR	3.973	3.581	3.958	3.399	7.681	13.938	16.537	16.996	16.583	21.928	23.126
AQR	6.920	6.354	7.293	5.388	11.259	17.088	20.604	21.169	20.757	27.967	31.498
LLPTLR	2.295	2.299	2.692	1.566	2.751	1.819	1.993	1.575	1.500	2.134	3.906
LLPTER	13.351	12.853	13.876	6.513	13.321	8.642	8.371	7.860	7.514	15.460	23.986
MER	17.076	16.606	18.049	16.139	15.232	15.470	17.293	16.946	15.853	15.429	13.575
OER	25.973	26.295	26.293	22.737	21.361	22.009	25.309	24.674	25.196	25.289	23.247
OTE	59.070	33.807	37.674	40.525	41.912	41.353	43.306	50.201	48.193	56.643	50.666
CIR	71.212	67.795	67.538	67.698	65.911	66.117	71.177	84.139	81.208	85.528	64.997
LR	23.732	25.211	20.899	18.403	19.610	19.616	19.636	18.143	19.786	18.521	22.132
BLR	1.583	5.164	2.737	1.119	1.276	1.317	1.207	1.259	1.221	1.047	0.888
LATDR	57.129	206.137	83.321	29.009	35.089	36.763	34.695	33.255	38.399	31.791	33.642
CDTAR	41.541	12.230	25.083	63.439	55.887	53.357	56.597	54.557	51.527	58.260	65.788
Log TA	9.743	9.923	9.987	10.203	10.369	10.378	10.273	10.295	10.329	10.241	10.202
ROA	1.773	0.849	1.798	1.757	1.240	0.697	0.066	-2.796	-1.313	-5.296	0.757
ROE	15.688	7.512	13.497	10.291	8.419	4.710	0.404	-20.314	-10.452	-62.897	7.956

Bank Code	02	02	02	02	02	02	02	02	02	02	02
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
NNPLR	2.409	1.758	2.154	2.379	1.509	5.576	13.063	0.297	-0.733	1.731	-0.412
AQR	5.281	5.294	5.267	4.190	3.636	9.013	16.489	13.070	11.443	19.755	20.950
LLPTLR	2.193	2.081	1.590	1.072	1.479	2.334	1.852	11.710	11.115	15.095	17.752
LLPTER	12.770	16.775	17.669	4.093	5.792	9.880	7.135	64.838	65.493	107.396	93.493
MER	19.062	14.821	10.922	9.444	8.427	8.100	8.407	7.761	7.088	7.480	8.862
OER	30.266	22.873	15.317	13.269	12.677	12.059	12.322	11.016	9.456	10.588	13.168
OTE	40.647	44.964	51.778	49.871	61.561	64.197	57.017	61.309	55.715	65.149	73.284
CIR	77.348	67.062	57.494	49.433	49.001	46.015	45.755	44.048	37.285	42.237	51.068
LR	14.569	18.919	17.726	17.820	22.718	20.717	18.507	21.668	21.761	26.613	28.927
BLR	1.648	1.678	1.232	1.144	1.009	1.058	1.050	1.069	1.107	0.902	0.869
LATDR	38.117	49.000	30.620	28.634	34.470	32.641	28.492	32.880	32.147	33.980	37.335
CDTAR	38.222	38.610	57.890	62.234	65.906	63.470	64.956	65.899	67.691	78.319	77.480
Log TA	8.545	8.941	9.428	9.919	10.140	10.217	10.140	10.212	10.298	10.285	10.232
ROA	0.039	0.759	1.327	1.471	0.454	0.157	0.565	0.665	1.051	-1.363	-1.465
ROE	0.360	9.446	20.677	7.895	2.675	0.990	3.188	5.225	8.263	-13.725	-11.465

Bank Code	03	03	03	03	03	03	03	03	03	03	03
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
NNPLR	0.000	12.795	7.729	6.615	7.816	16.469	22.083	21.096	24.612	25.133	35.343
AQR	0.000	17.913	9.832	8.792	11.611	31.287	51.017	59.715	63.038	58.792	78.964
LLPTLR	0.000	2.362	1.893	2.119	3.546	9.739	14.542	17.585	12.694	9.081	15.662
LLPTER	0.000	8.571	7.725	7.305	15.053	53.020	116.547	45.355	34.886	66.074	97.293
MER	9.070	7.671	10.030	11.113	11.683	13.280	12.651	12.397	12.822	12.673	13.432
OER	38.462	27.756	19.401	19.015	20.398	23.989	25.464	22.700	21.855	16.896	19.148
OTE	75.000	60.177	47.748	53.608	53.237	71.921	88.791	71.233	69.517	62.867	70.477
CIR	200.000	62.389	66.486	68.454	64.964	79.885	107.179	93.400	94.300	85.892	87.791
LR	59.864	59.249	31.992	25.523	35.891	39.948	36.524	28.661	28.138	17.102	30.684
BLR	1.061	1.085	1.347	1.215	1.056	1.359	1.324	1.440	1.352	1.488	1.238
LATDR	269.388	232.692	83.357	53.080	66.189	98.057	97.345	75.556	64.829	33.928	54.167
CDTAR	22.222	25.462	38.380	48.084	54.224	40.740	37.520	37.934	43.404	50.408	56.648
Log TA	6.089	7.516	8.210	8.695	8.953	8.899	8.814	8.708	8.689	8.700	8.681
ROA	-1.814	0.272	0.245	0.351	0.375	-4.067	-4.891	-3.174	-0.051	-0.699	-2.598
ROE	-5.926	3.571	1.931	2.073	2.780	-40.000	-78.897	-14.988	-0.237	-6.785	-23.008

Bank Code	04	04	04	04	04	04	04	04	04	04	04
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
NNPLR	3.391	10.041	2.456	-1.427	1.809	8.620	4.840	1.730	-0.664	0.145	-0.532
AQR	9.827	18.845	11.208	13.266	16.382	18.331	16.809	17.622	20.184	22.485	28.845
LLPTLR	6.021	8.184	7.932	13.584	13.166	8.511	10.798	10.973	14.052	14.845	20.170
LLPTER	34.524	19.194	23.773	46.306	40.620	29.268	40.519	39.571	54.563	70.737	97.933
MER	16.817	17.467	18.956	23.928	20.910	20.384	18.910	17.437	15.600	15.032	13.542
OER	23.253	27.510	24.156	30.074	27.236	29.569	27.500	27.730	26.418	25.048	24.375
OTE	31.076	323.597	40.615	54.434	55.663	63.445	56.838	55.505	52.864	62.903	58.511
CIR	66.932	66.007	76.375	87.003	87.702	95.255	91.829	78.440	61.695	83.548	69.605
LR	24.324	27.817	14.498	16.232	13.580	17.601	16.459	22.400	22.873	20.981	26.286
BLR	1.824	1.434	1.559	1.428	1.546	1.263	1.170	0.976	0.913	0.862	0.794
LATDR	61.364	62.821	28.811	29.132	27.350	32.254	28.002	34.757	35.371	30.150	37.574
CDTAR	39.640	44.279	50.321	55.719	49.653	54.569	58.778	64.446	64.665	69.588	69.959
Log TA	7.600	7.736	7.820	7.774	7.860	7.886	7.914	7.987	8.106	8.145	8.126
ROA	1.301	2.358	0.241	-4.079	-0.039	-5.039	-1.170	-0.748	-0.181	-2.002	-1.360
ROE	10.317	8.710	0.920	-17.477	-0.155	-25.141	-6.387	-4.288	-1.190	-15.899	-11.886

Bank Code	05	05	05	05	05	05	05	05	05	05	05
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
NNPLR	2.439	8.140	14.458	14.737	16.236	17.037	17.131	17.204	24.286	21.854	38.318
AQR	7.317	13.953	19.880	24.211	26.937	30.741	30.677	35.842	0.000	56.954	80.374
LLPTLR	4.878	3.488	3.012	3.158	5.166	9.630	13.147	17.204	24.762	35.099	42.056
LLPTER	2.000	2.941	3.788	2.885	7.179	14.130	19.760	31.373	35.374	49.074	78.947
MER	20.968	18.785	12.463	12.911	18.388	19.337	20.621	16.397	17.488	15.309	16.609
OER	63.415	39.535	25.301	26.842	26.937	25.926	29.084	25.448	33.810	31.126	44.860
OTE	100.000	73.077	67.391	50.725	64.474	57.500	57.971	60.274	67.188	73.684	152.381
CIR	185.714	130.769	91.304	73.913	96.053	87.500	105.797	97.260	110.938	123.684	228.571
LR	53.226	37.017	42.433	42.278	21.914	17.403	19.209	24.480	30.049	28.990	29.758
BLR	2.929	1.410	0.954	1.145	1.715	2.547	2.024	2.268	2.121	2.041	1.338
LATDR	471.429	109.836	82.184	100.602	55.063	59.434	54.839	86.179	123.232	120.270	107.500
CDTAR	11.290	33.702	51.632	42.025	39.798	29.282	35.028	28.406	24.384	24.104	27.682
Log TA	4.820	5.198	5.820	5.979	5.984	5.892	5.869	6.071	6.006	5.727	5.666
ROA	-10.484	-3.867	-1.780	0.759	-3.778	-3.315	-4.802	-3.233	-3.202	-11.075	-17.647
ROE	-13.000	-6.863	-4.545	1.442	-7.692	-6.522	-10.180	-9.150	-8.844	-31.481	-89.474

Bank Code	06	06	06	06	06	06	06	06	06	06
Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
NNPLR		2.778	9.477	12.308	1.241	4.000	29.532	9.546	23.421	24.640
AQR		9.722	15.033	17.143	5.851	8.154	36.049	0.000	30.163	32.121
LLPTLR		5.556	5.556	4.835	4.610	4.154	6.415	6.182	6.742	7.481
LLPTER		6.557	8.995	10.628	10.569	10.757	19.749	24.012	27.066	30.194
MER		21.498	17.179	10.526	11.831	9.675	8.105	6.607	6.494	5.301
OER		30.556	21.895	14.066	16.844	16.923	12.627	10.407	10.646	11.050
OTE		67.500	65.741	57.037	49.751	54.310	36.825	41.005	47.500	50.773
CIR		82.500	62.037	47.407	47.264	47.414	39.365	35.185	37.500	35.541
LR		7.818	7.949	9.704	8.219	20.580	18.301	22.603	25.238	37.142
BLR		2.182	2.391	3.370	2.421	1.574	1.964	2.025	1.441	1.151
LATDR		24.242	24.219	43.704	28.326	56.659	56.000	72.108	59.611	89.100
CDTAR		32.248	32.821	22.204	29.016	36.324	32.680	31.346	42.338	41.686
Log TA		5.727	5.966	6.410	6.688	7.036	7.333	7.607	7.745	8.019
ROA		-3.583	1.026	1.151	1.743	0.440	0.327	0.447	0.303	0.198
ROE		-6.011	2.116	3.382	5.691	1.992	1.567	2.736	1.994	1.662

Bank code	07	07	07	07	07	07	07	07	07	07
Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
NNPLR		1.149	2.521	0.877	10.435	14.167	6.190	13.990	12.500	19.444
AQR		6.897	16.807	42.105	26.957	45.833	23.810	6.218	50.694	64.583
LLPTLR		5.747	10.084	30.702	6.957	14.167	7.143	3.109	20.833	21.528
LLPTER		5.556	15.789	66.038	25.806	130.769	22.727	27.273	-76.923	-67.391
MER		27.439	22.511	34.518	35.111	27.083	19.490	21.839	21.622	15.423
OER		51.724	43.697	59.649	68.696	65.000	40.000	39.378	44.444	43.056
OTE		192.857	125.000	106.977	119.565	171.053	91.463	93.902	115.094	72.289
CIR		321.429	162.500	158.140	171.739	205.263	102.439	92.683	120.755	74.699
LR		9.756	15.152	15.736	6.667	27.778	35.963	15.230	22.635	41.045
BLR		1.582	0.937	1.086	0.816	0.541	0.616	0.754	0.533	0.371
LATDR		29.091	27.559	29.524	10.638	36.036	45.455	20.703	24.815	42.526
CDTAR		33.537	54.978	53.299	62.667	77.083	79.118	73.563	91.216	96.517
Log TA		5.100	5.442	5.283	5.416	5.663	6.066	5.852	5.690	5.996
ROA		-16.463	-14.719	-26.904	-18.222	-21.875	-5.800	-12.356	-20.270	-1.990
ROE		-30.000	-44.737	-100.000	-132.258	-484.615	-37.879	-195.455	153.846	17.391

Bank Code	08	08	08	08	08	08	08	08	08	08	08
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
NNPLR	3.125	2.632	17.949	15.909	20.769	31.447	57.246	49.351	38.202	42.254	
AQR	9.375	21.053	28.205	24.242	33.077	46.541	65.942	61.039	0.000	87.324	
LLPTLR	3.125	15.789	6.410	5.303	25.385	5.031	8.696	12.338	23.596	45.070	
LLPTER	2.128	10.909	7.463	8.537	18.333	0.541	7.101	13.380	17.949	32.000	0.000
MER	23.729	25.641	24.299	20.000	16.372	21.495	25.472	28.889	66.071	25.373	9.700
OER	43.750	52.632	33.333	24.242	28.462	28.931	39.130	42.208	124.719	47.887	
OTE	77.778	50.000	50.000	51.351	46.000	50.000	65.217	93.023	218.605	150.000	866.667
CIR	155.556	83.333	108.333	86.486	74.000	82.143	117.391	151.163	258.140	212.500	1400.000
LR	18.644	25.641	9.346	6.250	42.920	6.542	21.226	11.556	14.286	8.955	74.365
BLR	4.000	2.111	3.250	2.063	3.095	5.483	4.759	9.625	3.560	7.100	0.000
LATDR	137.500	111.111	41.667	15.625	230.952	48.276	155.172	162.500	96.000	120.000	1610.000
CDTAR	13.559	23.077	22.430	40.000	18.584	13.551	13.679	7.111	14.881	7.463	4.619
Log TA	4.078	4.357	4.673	5.075	5.421	5.366	5.357	5.416	5.124	4.898	6.071
ROA	-13.559	-2.564	-1.869	0.625	0.088	1.869	-4.245	-12.000	-18.452	-13.433	-7.159
ROE	-17.021	-3.636	-2.985	1.220	0.111	0.270	-5.325	-19.014	-26.496	-18.000	-8.424

Bank Code	09	09	09	09	09	09	09	09	09	09
Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
NNPLR		2.632	2.299	3.311	2.545	6.667	8.482	3.132	2.095	0.672
AQR		7.895	8.046	7.285	5.091	8.788	10.268	0.824	5.447	4.479
LLPTLR		5.263	3.448	5.960	1.455	1.515	1.116	0.824	2.235	2.352
LLPTER		4.444	3.614	8.411	3.390	3.086	2.959	2.890	8.122	9.502
MER		15.000	14.599	13.587	10.541	14.778	10.674	9.761	6.708	6.163
OER		31.579	22.989	16.556	13.455	18.182	12.723	11.043	7.542	6.943
OTE		50.000	48.148	40.476	50.000	55.882	55.963	53.846	46.667	35.165
CIR		75.000	74.074	59.524	56.061	58.824	52.294	57.265	40.000	34.066
LR		26.250	29.927	15.217	15.670	10.099	11.049	8.647	9.938	10.636
BLR		1.118	2.417	2.559	1.316	1.650	1.572	1.704	0.932	2.227
LATDR		61.765	113.889	47.458	26.316	20.500	20.702	16.671	10.417	26.683
CDTAR		42.500	26.277	32.065	59.544	49.261	53.371	51.865	95.404	39.861
Log TA		4.382	4.920	5.215	5.861	6.006	6.280	6.531	6.691	6.914
ROA		1.250	1.460	3.804	1.994	2.709	1.498	0.583	1.491	2.386
ROE		2.222	2.410	6.542	5.932	6.790	4.734	2.312	6.091	10.860

Bank Code	10	10	10	10	10	10	10	10
Year	2014	2015	2016	2017	2018	2019	2020	2021
NNPLR		0.000	0.000	4.816	3.218	9.542	2.913	32.500
AQR		0.000	0.000	5.666	6.950	1.611	8.672	60.000
LLPTLR		0.000	0.000	0.567	3.346	6.072	4.404	24.000
LLPTER		0.000	0.000	0.733	9.886	20.332	25.391	13.833
MER		37.097	17.422	15.586	14.871	11.507	9.107	8.133
OER		627.273	70.922	38.810	23.810	24.411	14.092	120.000
OTE		460.000	178.947	109.091	77.215	67.699	63.158	56.627
CIR		690.000	263.158	155.682	117.089	87.168	72.982	57.831
LR		69.892	60.976	48.464	28.939	43.458	29.860	27.042
BLR		0.129	0.491	0.625	0.832	0.596	0.760	0.080
LATDR		152.941	121.951	75.398	38.544	54.989	35.100	31.869
CDTAR		45.699	50.000	64.278	75.080	79.030	85.070	84.853
Log TA		5.226	6.353	6.779	7.126	7.445	7.734	7.990
ROA		-32.258	-12.892	-8.077	-6.833	-2.979	0.219	0.576
ROE		-68.182	-27.306	-26.007	-32.319	-21.162	1.953	4.899

Bank Code	11	11	11	11	11	11	11	11
Year	2014	2015	2016	2017	2018	2019	2020	2021
NNPLR		0.000	8.333	0.000	0.000	6.250	-21.429	-26.667
AQR		0.000	11.111	16.667	27.273	12.500	57.143	46.667
LLPTLR		0.000	2.778	13.889	33.333	31.250	57.143	53.333
LLPTER		0.000	2.174	13.514	-36.667	-14.286	-12.308	-8.791
MER		55.844	45.902	44.853	58.163	43.038	46.296	44.444
OER		226.316	155.556	169.444	172.727	212.500	178.571	133.333
OTE		766.667	327.273	200.000	257.143	325.000	244.444	850.000
CIR		1433.333	509.091	321.053	407.143	425.000	277.778	1000.000
LR		18.182	22.951	13.971	15.306	26.582	11.111	13.333
BLR		1.118	0.545	0.444	0.306	0.193	0.143	0.130
LATDR		82.353	42.424	23.457	13.889	25.301	6.122	5.217
CDTAR		22.078	54.098	59.559	110.204	105.063	181.481	255.556
Log TA		4.344	4.804	4.913	4.585	4.369	3.989	3.807
ROA		-37.662	-28.689	-27.941	-42.857	-36.709	-48.148	-53.333
ROE		-50.877	-76.087	-102.703	140.000	82.857	40.000	26.374

Bank Code	12	12	12	12	12	12	12	12
Year	2014	2015	2016	2017	2018	2019	2020	2021
NNPLR		0.000	0.000	-7.937	0.000	-50.000	-200.000	-137.500
AQR		0.000	12.500	17.460	25.926	53.846	1600.000	93.750
LLPTLR		0.000	8.929	15.873	22.222	61.538	-100.000	93.750
LLPTER		0.000	6.098	19.231	52.174	-177.778	2.083	-40.541
MER		50.602	29.444	38.690	31.977	33.835	29.032	20.000
OER		116.667	94.643	103.175	101.852	173.077	3600.000	150.000
OTE		325.000	188.235	205.000	179.167	271.429	825.000	1250.000
CIR		525.000	311.765	325.000	229.167	321.429	900.000	1200.000
LR		7.229	33.333	13.690	15.116	6.767	5.645	3.333
BLR		2.571	0.659	0.663	0.446	0.243	0.010	0.155
LATDR		42.857	70.588	24.211	21.488	8.411	7.216	3.883
CDTAR		16.867	47.222	56.548	70.349	80.451	78.226	85.833
Log TA		4.419	5.193	5.124	5.147	4.890	4.820	4.787
ROA		-54.217	-15.556	-27.976	-18.605	-24.060	-32.258	-25.000
ROE		-67.164	-34.146	-90.385	-139.130	355.556	83.333	81.081

Bank Code	13	13	13	13	13	13	13
Year	2015	2016	2017	2018	2019	2020	2021
NNPLR		0.000	6.173	0.000	1.859	-1.891	3.066
AQR		12.500	9.877	30.952	0.000	33.613	67.453
LLPTLR		8.929	3.704	34.286	30.112	35.504	6.368
LLPTER		5.618	8.955	900.000	10.138	19.560	3.930
MER		30.994	22.517	30.450	6.408	10.090	12.432
OER		94.643	41.975	41.905	30.112	35.294	43.396
OTE		188.235	135.135	147.273	93.103	50.769	113.472
CIR		311.765	183.784	160.000	93.103	43.077	95.337
LR		45.614	18.874	23.875	10.601	11.892	9.730
BLR		0.718	0.701	0.802	0.603	0.609	0.887
LATDR		100.000	24.675	26.336	30.045	25.352	30.126
CDTAR		45.614	76.490	90.657	35.285	46.907	32.297
Log TA		5.142	5.710	5.666	7.142	7.418	7.300
ROA		-18.129	-13.907	-41.176	-3.006	3.904	-12.027
ROE		-34.831	-62.687	-1487.500	-4.756	7.523	-25.910

Bank Code	14	14	14	14	14	14	14
Year	2015	2016	2017	2018	2019	2020	2021
NNPLR						0	0.840
AQR						0	1.681
LLPTLR						0	0.840
LLPTER						0	1.429
MER						18.181	19.048
OER						82.759	30.252
OTE						109.091	100
CIR						218.182	120
LR						49.242	11.111
BLR						0.617	1.280
LATDR						138.298	22.581
CDTAR						35.606	49.206
Log TA						4.882	5.242
ROA						-11.364	-6.878
ROE						-21.739	-18.571