How to Cite:
Nambie, N. B., Akrofi, K. S.-A., & Amoah, R. (2024). Effect of financial regulations, risk management, on performance of microfinance institutions in Sub-Saharan African Countries. *International Journal of Economic Perspectives*, *18*(11), 2283–2310. Retrieved from https://ijeponline.org/index.php/journal/article/view/720

Effect of financial regulations, risk management, on performance of microfinance institutions in Sub-Saharan African Countries

Nicholas Bamegne Nambie
Department of Accounting and Finance, Valley View University, Oyibi, Ghana
Email: nicnam27@gmail.com

Kwaku Sarbeng-Adjebeng Akrofi
Department of Accounting and Finance, Valley View University, Oyibi, Ghana
Email: asksabene@gmail.com

Racheal Amoah
Center for Research and Engaged Scholarship, Valley View University, Oyibi, Ghana
Email: ramoah@vvu.edu.gh

***Abstract*---**The study investigates the complex interplay between the performance of microfinance institutions (MFIs) in sub-Saharan Africa, financial regulation, and risk management. Microfinance institutions are essential for the promotion of financial inclusion and economic development in the region; however, they encounter substantial obstacles in the form of regulatory mandates and risk management. This research employs a two-step system Generalized Method of Moments (GMM) approach to examine the effect of financial regulation on the risk management practices and financial outcomes of microfinance institutions, utilizing panel data from multiple sub-Saharan African countries, and spanning 2002 to 2023. The results suggest that effective regulation can improve the stability and resilience of microfinance institutions by establishing a positive and significant relationship between strong financial regulatory frameworks and enhanced risk management. Furthermore, the investigation reveals that microfinance institutions derive advantages from robust regulatory environments by virtue of their operational sustainability and financial understanding. In contrast, the flexibility of microfinance institutions may be impeded by excessive regulatory burdens, underscoring the necessity of balanced regulatory policies. The significance of customized regulations that address specific regional challenges while promoting microfinance institutions growth

Submitted: 27 September 2024, Revised: 09 October 2024, Accepted: 17 November 2024

and financial stability is emphasized by the results. Microfinance institutions ability to reach marginalized populations is not compromised by the development of regulations that promote innovation and risk mitigation, as emphasized in policy recommendations. This study enhances comprehension of the impact of regulation and risk management on microfinance institutions operations in emergent markets, with a particular emphasis on sub-Saharan Africa. It also provides policymakers and microfinance institutions stakeholders with valuable insights to enhance financial inclusion initiatives. Future research should delve deeper into the influence of macroeconomic factors on the sustainability of microfinance institutions in the region and technology-driven regulatory solutions.

***Keywords*---**Risk, Financial Regulation, Microfinance, Inflation, Financial-Depth, Unemployment.

Introduction

Microfinance institutions (MFIs) have been instrumental in the provision of financial services to small enterprises and low-income individuals in Africa (Magufuli *et al.*, 2024; Lal *et al.*, 2023; Nyirenda *et al.,* 2024; Moyo *et al.*, 2024). The history of poverty, limited access to traditional financial services, and a lack of financial inclusion are the defining characteristics of the background of microfinance institutions (MFIs) in Africa. Traditional banks were hesitant to offer loans to low-income individuals and small enterprises in Africa during the 1970s and 1980s, resulting in a substantial gap in the financial services market (Das, 2024). Non-governmental organizations (NGOs) and other non-profit organizations filled this gap by initially offering small loans to low-income individuals and small enterprises. In 1980, North Africa established the first microfinance institution in Africa (Mittal *et al.,* 2024). Subsequently, the microfinance industry expanded substantially throughout the continent. Presently, Africa is home to thousands of microfinance institutions (MFIs) that offer financial services to millions of individuals (Sharma *et al.*, 2024).

Microfinance institutions (MFIs) in Sub-Saharan Africa have been instrumental in enhancing the availability of financial services to underprivileged populations, particularly in rural and low-income regions. Nevertheless, these institutions encounter distinctive obstacles that are a result of the financial regulations and risk management practices prevalent in the region. While financial regulations and effective risk management are crucial for the sustainability and stability of Microfinance institutions, they can also implement restrictions that affect their operations and outreach. Despite the fact that regulatory frameworks in Sub-Saharan Africa have undergone a transformation in recent years to accommodate the unique requirements of microfinance, numerous microfinance institutions (MFIs) continue to contend with exorbitant compliance expenses and restrictions on the services they provide (Peprah *et al.,* 2024). Nevertheless, the capacity of Microfinance institutions to effectively reach their intended markets can be impeded by the strict regulatory requirements that are frequently intended to

safeguard consumers, maintain financial stability, and prevent fraud. For instance, Know-Your-Customer (KYC) regulations, which are essential for the prevention of money laundering, can be costly and complex for microfinance institutions to implement. Consequently, they may be discouraged from serving more remote or low-income clients (Kingsley *et al.,* 2024).

Risk management also presents a substantial challenge for microfinance institutions, as they are exposed to high levels of operational, credit, and market risks as a result of their emphasis on low-income populations with limited financial stability and credit histories (Illangakoon, 2024; Singh, 2024; Gupta & Singhal, 2024). Microfinance institutions financial health and their capacity to secure funding have been compromised by their inability to effectively manage these risks, which has resulted in substantial loan defaults in numerous regions (Fronda, 2024; Zhu & Zhang, 2023). Additionally, risk management for microfinance institutions is further complicated by economic instability, high inflation rates, and currency fluctuations in Sub-Saharan Africa, which can erode the value of loans and deposits, thereby increasing financial volatility (Arnone *et al.*, 2024). Financial inclusion-oriented regulatory reforms have begun to generate favorable results, regardless of these obstacles. Certain nations have implemented tiered licensing systems that permit microfinance institutions to operate with a reduced regulatory burden under specific circumstances, thereby allowing them to more effectively manage compliance costs while maintaining client protection standards (Akeju, 2024; Ghising & Modi, 2024; Komba & Komba, 2024; Uddin, 2024). Furthermore, MFIs have been able to improve their risk management capabilities by partnering with mobile banking providers. This has allowed them to leverage mobile platforms for more efficient transactions and client monitoring, thereby expanding their reach to underserved populations without compromising financial security (Adelaja *et al.,* 2024). The capacity of microfinance institutions in Sub-Saharan Africa to accomplish their social and economic objectives is significantly influenced by the interplay of financial regulation and risk management. In order to promote the growth and sustainability of MFIs in the region, it will be imperative to implement ongoing regulatory reforms and implement innovative risk management solutions. This will increase their resilience against systemic and operational risks and promote financial inclusion.

Ali et *al.* (2023) conducted research on the determinants of financial performance of microfinance institutions in sub-Saharan Africa. The research concluded that the primary factors that determine the financial performance of microfinance institutions in sub-Saharan Africa are capital structure, portfolio quality, and operating efficiency. In the same vein, Sarpong-Danquah *et al.* (2023) conducted an analysis of microfinance and financial performance and determined that, despite the positive influence of microfinance institutions on poverty reduction, their financial performance is frequently undermined by high operational costs and default rates.

The efficiency of microfinance institutions (MFIs) in sub-Saharan Africa was examined by Tehulu (2023) and revealed that the majority of MFIs in the region operate below the optional efficiency threshold, with a significant disparity between their actual performance and that of the most successful institutions. Pellegrina *et al.* (2024) conducted an analysis of the financial and social

performance of microfinance institutions and determined that they frequently must choose between financial sustainability and social objectives.
Chekenya (2023) investigated the role of microfinance institutions in Economic Development in West Africa. They discovered that 70% of microfinance clients in rural areas are women, underscoring the sector's substantial contribution to poverty alleviation. The average increase in household income among microfinance borrowers was 12%. Shikur and Akkas (2024) concluded that microfinance has been instrumental in the reduction of poverty, particularly among women, who constitute 65% of microfinance clients. Mia (2023) conducted research on digital innovations in microfinance institutions. The study discovered that mobile money platforms have decreased transaction costs, thereby simplifying the process of accessing and repaying loans for rural clients. Agboklou and Özkan (2023) conducted an investigation into the sustainability of microfinance institutions in West Africa. The study found that microfinance institutions exhibit superior profitability and loan repayment rates in countries where high default rates present substantial obstacles. The concept of microfinance institutions and the impact of financial regulation and risk management on microfinance institutions in sub-Saharan African countries are fundamental to the entire field of finance.

The necessity of conducting rigorous research in the field of finance has been exacerbated by recent developments. A substantial amount of literature has been published on the development of microfinance institutions in Africa. However, the majority of the research conducted thus far has concentrated on the impact of microfinance institutions on economic growth and financial inclusion, with little attention paid to the impact of financial regulations and risk management on microfinance institution Consequently, this investigation offers an extant opportunity to further our understanding of the impact of financial regulations and risk management on microfinance institutions in sub-Saharan Africa. The paper is organized into five chapters, as follows: the introductory chapter, chapter two, chapter three, chapter four, and chapter five. Chapter two addresses the theoretical aspects of the research, chapter three the methodology employed in the study, and chapter four the analysis and discussions. Chapter five presents the findings, recommendations, and policy implications.

Literature Review

The Institutional Theory of Microfinance Institutions (MFIs) investigates the ways in which the formation, operations, and sustainability of Microfinance Institutions (MFIs) are influenced by broader social, political, and economic structures (Aksom, 2023; Akram, 2023). It underscores the fact that microfinance institutions (MFIs) are not autonomous entities; rather, they are influenced by the institutions, norms, and regulations of the societies in which they operate. This theory offers a framework for comprehending the reasons why microfinance institutions (MFIs) are established in specific environments, how they develop over time, and the factors that contribute to their success or failure. The institutional environment of microfinance institutions (MFIs) is influenced by formal rules such as government regulations, laws, policies and informal norms. The structure of services, risk management, and client outreach of MFIs are all influenced by these factors. The expansion of MFIs may be facilitated by

government regulations that prioritize financial inclusion, while their operations may be restricted by restrictive policies. The operations of microfinance institutions (MFIs) are influenced by external pressures from governments, regulators, or donor organizations. For example, microfinance institutions (MFIs) may be compelled to adhere to specific operational standards as a result of government policies regarding interest rate limits, capital requirements, or licensing. The operations of microfinance institutions are also influenced by normative pressures that arise from social norms and values, such as expectations for ethical lending, poverty alleviation, or women's empowerment. These MFIs may be compelled to align their missions and services with broader development objectives, such as gender equality or rural development. In uncertain environments, microfinance institutions (MFIs) may emulate successful models from other regions or countries, such as group lending practices or digital banking models that have been successful elsewhere, despite local conditions.

Microfinance institutions (MFIs) may implement comparable organizational structures, lending practices, or financial products in order to comply with industry standards or satisfy donor expectations in the realm of microfinance. For instance, numerous microfinance institutions (MFIs) worldwide implement peer-monitoring and group lending mechanisms due to their widespread acceptance as successful microfinance models, regardless of whether the local context necessitates more personalized solutions. Stakeholders, including governments, donors, investors, and local communities, require microfinance institutions (MFIs) to establish credibility. By adhering to local laws, demonstrating success in poverty alleviation or financial inclusion, and aligning with social values, this legitimacy can be attained. It is imperative to establish legitimacy in order to attract funding, establish partnerships, and establish trust with clients. MFIs frequently align their missions with broader social objectives, such as empowering women, reducing poverty, and promoting entrepreneurship, in order to enhance their legitimacy. The current structure and performance of MFIs in a specific region are also influenced by the historical development of these institutions, according to institutional theory. The long-term operation and evolution of MFIs can be significantly influenced by the early decisions made by governments, donors, or international organizations. It can be challenging for microfinance institutions to deviate from specific institutional paths once they have been established. For instance, if a nation initially prioritized microfinance models that were extensively subsidized, it may be more challenging for microfinance institutions in that nation to transition to market-based, financially sustainable models in the future. Global institutions, including the World Bank, International Monetary Fund, and non-governmental organizations, exert significant influence over numerous microfinance institutions in developing countries. These institutions frequently advocate for particular microfinance models, including financial self-sufficiency and digital financial inclusion. International donors and non-governmental organizations also have a substantial impact on the operations of MFIs by providing funding, technical assistance, and policy advice. The adoption of similar practices by microfinance institutions in various regions, despite the fact that they operate in drastically different social and economic environments, is elucidated by institutional theory. MFIs are required to navigate a regulatory environment that is intricate and differs from country to country. While some governments implement interest rate limitations that restrict the

profitability of microfinance institutions, others may advocate for financial inclusion policies that facilitate the expansion of microfinance institutions. Microfinance Institutions frequently operate in regions where financial behavior is influenced by cultural norms. In certain communities, women may not have control over financial decisions, which can impact microfinance institutions lending models that target women. The necessity to secure funding and donor requirements may result in microfinance institutions adopting practices that are more in line with the expectations of donors than with the needs of their clients, a phenomenon known as mission drift.

Although institutional theory provides valuable insights, it is occasionally criticized for being overly deterministic, which implies that microfinance institutions have limited agency to innovate or adapt outside of the institutional constraints they encounter. Critics contend that microfinance institutions can still demonstrate substantial innovation and strategic decision-making that surpasses ordinary compliance with institutional pressures.

Gupta and Sharma (2023) conducted a study on the impact of financial regulations on the growth and sustainability of microfinance institutions in developing economies. The study utilized case studies from countries in Africa and Southeast Asia to evaluate the ways in which regulatory environments influence the expansion and outreach of microfinance institutions. In countries with regulatory bodies that are specifically dedicated to microfinance, microfinance institutions are more sustainable. However, the authors discovered that stricter regulatory environments frequently result in reduced operational flexibility for microfinance institutions, which makes it more difficult for them to provide small loans at affordable interest rates.

Mulenga and Mwanza (2024) examined the diverse regulatory obstacles that microfinance institutions encounter in various regions, with an emphasis on the influence these obstacles have on their long-term sustainability. The paper examines the impact of regulatory frameworks on the performance of microfinance institutions. It was discovered that countries in which microfinance institutions are subject to the same regulations as commercial banks frequently encounter financial sustainability challenges as a result of the high compliance costs. Additionally, the profitability of microfinance institutions may be restricted by government-imposed interest rate limitations, which can result in a decrease in services and outreach, particularly in rural areas. Additionally, microfinance institutions are inclined to innovate more with respect to their product offerings, including mobile banking, in countries with less stringent regulations. However, they are also at a greater risk of operational inefficiencies and defaults.

Cheboi *et al* (2024) investigated the regulatory environment for microfinance institutions in Sub-Saharan Africa, with an emphasis on the effects of financial regulations on the sustainability and outreach of these institutions. Case studies from other development countries in sub-Saharan Africa are included in the paper. The absence of a unified regulatory framework across African countries results in inconsistencies in microfinance institutions operations, with some organizations benefiting from favorable policies while others struggle under heavy regulatory burdens. Regulatory environments that permit tiered licensing systems

provide MFIs with the flexibility to operate according to their size and capacity, thereby promoting financial inclusion.
Fersi and Boujelbène (2023) examined the impact of financial regulations on the efficacy and reach of microfinance institutions. They also examine the ways in which regulatory changes have influenced the microfinance landscape in these countries over time. The investigation determined that the implementation of more stringent financial regulations resulted in a decrease in predatory lending practices; however, it also impeded the expansion of microfinance institutions. The paper concludes that an optimal regulatory framework should secure consumers, promote financial innovation, and encourage competition.

The operations of microfinance institutions were examined in the context of government-imposed interest rate limits by Khalid and Khan (2024). Interest rate limits have resulted in a substantial decrease in the number of microfinance institutions that operate in rural areas, as a result of decreased profitability, this has restricted financial access for the most vulnerable populations. The authors recommend that governments conduct a thorough evaluation of the trade-offs associated with interest rate limits, as they may inadvertently decrease financial inclusion by driving microfinance institutions out of the market. The authors recommend that governments conduct a thorough evaluation of the trade-offs associated with interest rate limits, as they may inadvertently decrease financial inclusion by driving microfinance institutions out of the market.

Wamukekhe (2024) investigated the operational and financial risks that microfinance institutions encounter. A variety of risks were identified. The study concluded that credit risk is one of the most significant challenges for microfinance institutions, as a result of the absence of traditional collateral from borrowers. Group lending models and peer monitoring are employed by microfinance institutions to mitigate this risk, thereby reducing default rates (Adbi *et* al., 2024). The study also noted that liquidity risk is a significant concern, particularly for smaller microfinance institutions that have restricted access to capital. The article underscored the significance of robust internal controls to manage operational risks, such as fraud or mismanagement, which are prevalent in decentralized lending operations. While many microfinance institutions manage liquidity by maintaining high levels of cash reserves, this can limit their ability to scale. Another significant concern is liquidity risk, particularly for smaller microfinance institutions with restricted capital access (Soumaré *et al.*, 2020). The study underscores the significance of rigorous internal controls in managing operational risks, such as fraud or mismanagement that are prevalent in decentralized lending operations. While many MFIs manage liquidity by maintaining high levels of cash reserves, this can restrict their ability to scale.

Tadele *et al.,* (2022) examined the risk mitigation strategies employed by microfinance institutions in Sub-Saharan Africa. Ngong et al. (2022) concentrated on the methods by which microfinance institutions mitigate the risks associated with lending to low-income populations, particularly in rural areas. In Sub-Saharan Africa, numerous microfinance institutions depend on social capital and community relationships to mitigate credit risk, as formal credit scoring mechanisms are frequently unavailable. Nevertheless, regulatory risks, such as

sudden changes in government policies, continue to pose a substantial challenge for microfinance institutions, particularly those that depend on international donor funding.

Chowdhury and Chowdhury (2024) conducted an analysis of the financial risk management practices of microfinance institutions in South and Southeast Asia, with a particular emphasis on the Philippines, Bangladesh, and India. The paper examines the methods by which microfinance institutions mitigate credit, liquidity, and market risks in highly volatile environments. Hedging strategies and the maintenance of flexible loan terms enable microfinance institutions to adapt to evolving economic conditions, thereby mitigating market risks such as fluctuations in interest rates. The study underscores the importance of external auditing and governance practices in guaranteeing that microfinance institutions maintain financial discipline and transparency.

Saeed (2023) demonstrated that the utilization of technology, such as digital platforms and mobile applications, has facilitated the reduction of operational risks for microfinance institutions by expediting the loan approval process and enhancing record-keeping. In order to identify and prevent fraud, which is a prevalent operational risk in cash-based economies, numerous microfinance institutions in the region have implemented internal control systems and audit mechanisms. The authors suggest that MFIs establish robust governance structures, with clear roles for board members and management, to oversee risk management practices, in order to minimize human error and ensure that operational processes are carried out efficiently and according to best practices. Staff training and capacity-building initiatives are critical to this process.

Scott *et al.* (2024) examined the innovative lending models and social structures that microfinance institutions employ to mitigate credit risk. The study emphasized the utilization of peer monitoring, joint liability, and group lending as critical risk management instruments in environments with restricted collateral. By transferring a portion of the responsibility for loan repayment to the group as a whole, group lending and peer monitoring mitigate credit risk. This creates social pressure to repay on time. Additionally, the use of credit scoring models that are specifically designed for low-income populations, which include data on household income, community standing, and previous borrowing behavior, enables microfinance institutions to more accurately evaluate risk. The study posits that the integration of social and financial innovations enables microfinance institutions to effectively manage risk while achieving both financial sustainability and social impact. This is achieved through the reduction of transaction costs and the enhancement of loan tracking, which in turn aids in the management of credit risk.

Mohamed *et al.* (2021) investigated the concept of systemic risk in the microfinance sector, with a particular emphasis on the impact of economic downturns, natural calamities, and political instability on the risk exposure of microfinance institutions in a variety of region. In countries that are susceptible to economic instability or natural disasters, microfinance institutions are exposed to substantial systemic risks, which may result in liquidity crises and mass defaults. Microfinance institutions are increasingly collaborating with local

governments and Non-Governmental Organizations to establish risk-sharing arrangements that mitigate the impact of sudden regulatory or economic changes in regions with high political risk. As a result, many microfinance institutions have begun offering micro-insurance products to their clients as a means of reducing the financial impact of systemic shocks. The authors contend that systemic risk management should be the primary focus of microfinance institutions, particularly in regions that are susceptible to environmental disasters or macroeconomic disruptions.

Data and Methodology

The study utilized a quantitative design strategy, drawing data from the World Development Indicators and the International Monetary Fund (IMF) for the period of 2002 to 2023, focusing on 48 sub-Saharan African countries. Factor analysis was employed to construct indexes for measuring the variables examined in the study. The selection of the panel data set is based on the defined focus, objectives, and research questions established. One significant advantage of panel data is its capacity to control for unobserved heterogeneity, which refers to characteristics of the entities that are not directly measurable but may affect the outcome. Panel data, by observing the same entities across time, effectively accounts for time-invariant characteristics that may introduce bias in other data types. This is accomplished using fixed effects or random effects models.

Estimation Technique

The dynamic relationships between microfinance institutions and the independent variables, including control variables, were estimated using a two-step system generalized methods of moments (GMM) model in the research. The two-step Generalized Method of Moments (GMM) estimator, which was initially introduced by Arellano and Bover (1995) and subsequently improved by Blundell and Bond (1998), is widely employed in the analysis of panel data, particularly in the context of dynamic panel models. In comparison to alternative estimation techniques, this method provides numerous advantages, particularly in the context of addressing specific econometric challenges, including endogeneity, unobserved heterogeneity, and autocorrelation. Conventional estimation techniques, such as Ordinary Least Squares (OLS), produce biased estimates when explanatory variables exhibit correlation with the error term, a phenomenon known as endogeneity. The endogeneity issue is addressed by the two-step system GMM estimator, which employs lagged values of endogenous variables in both levels and differences to generate valid instruments. Unobserved individual-specific effects and time-invariant variables that may induce bias in the results are addressed by the two-step system GMM. The model is effectively removed from individual fixed effects by transforming the data through differencing and employing instruments.

In contrast to the difference GMM estimator, the system GMM estimator employs a system of two equations, one for the differenced equation, which eliminates fixed effects, and another for the equation in levels, which provides supplementary information. In situations where the instruments for the differenced equations are feeble or insufficient, this combination improves

efficiency by utilizing additional moment conditions and instruments. The two-step system GMM is more efficient than the one-step GMM estimator because it assumes homoscedastic errors in the first phase and calculates initial estimates accordingly. The residuals from the first phase are employed in the second step to estimate a covariance matrix of the errors that is both consistent and robust. This matrix is designed to optimize the weighting of the instruments. This leads to more precise parameter estimates, particularly in situations where the errors exhibit heteroscedasticity or autocorrelation. In situations where the instruments in difference GMM, specifically lagged levels, are insufficient for differenced variables, the two-step system GMM resolves this issue by incorporating lagged differences as instruments for the equation in levels. This improves the Instruments' robustness and simplifies the identification of parameters.

Dynamic panel data models, such as OLS and fixed-effects models, frequently exhibit dynamic panel bias, which is defined by the correlation between the error term and lagged dependent variables. This bias is mitigated by the system GMM estimator, which eliminates the correlation between the lagged dependent variable and the error term and employs appropriate instruments. System GMM is particularly advantageous when panel data comprises a substantial number of cross-sectional units (N) and a restricted number of time periods (T). This structure is present in a multitude of macroeconomic and microeconomic panel datasets, and conventional methods may exhibit suboptimal performance in these contexts. The two-step system GMM estimator exhibits robustness in the face of specific transgressions of classical assumptions. It is particularly capable of producing standard errors that are resistant to heteroscedasticity in the error term and addressing autocorrelation, a common occurrence in time-series or panel data. System GMM exhibits adaptability in the context of unbalanced panel data, allowing for the possible absence of specific observations for specific individuals at designated time intervals. Assuming that the lacking data are not consistently absent at random, the estimation remains valid. The Hansen (J) test is employed by researchers in two-step GMM to evaluate the validity of the instruments used in the model, specifically their correlation with the error term, in order to prevent over-identifying restrictions. This diagnostic test is indispensable for guaranteeing the dependability of GMM results. The dynamic panel data models that entail issues of endogeneity, unobserved heterogeneity, and weak instruments are well-suited to the two-step system GMM estimator, which exhibits high efficiency and flexibility. This method is especially advantageous when conducting extensive cross-sectional analyses, such as those of numerous individuals, firms, or countries, within a constrained time frame. When employing this methodology, it is imperative to exercise caution regarding instrument proliferation and overfitting concerns.

Model Specification

Dynamic panel models are considered the most suitable models for econometrics and finance research, and this is because the data used in these studies is of a dynamic nature. The dynamic panel model is employed to examine the linkages between microfinance institutions, financial regulations, and risk management in the sub-Saharan African countries. The regression equation used in the study is a panel model with lagged values of microfinance institutions, as financial

regulations and risk management are time-varying variables that are closer to a random walk. Microfinance institutions in sub-Saharan Africa can be substantially impacted by financial regulations and risk management practices, both in the present and in the future. The specified model for this investigation is as follows:

$$Y_{it} = \partial + \alpha Y_{it-1} + \beta X_{it} + \mu_i + \epsilon_{it} \text{----------} (1)$$

Where; Y_{it} is the dependent variable for entity i at time t, Y_{it-1} is the lagged dependent variable, X_{it} is a vector of independent variables, μ_i is the entity specific unobserved effect, and ϵ is the error term or idiosyncratic error. The impact of financial regulations and risk management on microfinance institutions (MFIs) is significant and multifaceted. Microfinance institutions, which offer financial services such as small loans, savings, and insurance to low-income persons or those who do not have access to traditional banking, work in a very sensitive environment. Regulatory frameworks and risk management techniques are also critical to determining their operations, long-term viability, and ability to serve the disadvantaged. To scientifically test the effect of financial regulations, and risk management on performance of microfinance institutions in the sub-Saharan Africa, a second econometrics model is formulated as follows:

$$Microfin_{it} = \alpha MicroFin_{it-1} + \gamma RiskM_{it} + \delta FinReg_{it} + \vartheta \text{Corruption}_{it} + \theta Unemployment_{it} + \nexists Inflation_{it} + \forall FinDepth_{it} + \varepsilon_{it} ------(2)$$

Where MicroFin represents microfinance institutions, RiskM denotes risk management, FinReg is financial regulations, and Corruption, FinDepth denote control of corruption, and financial depth. The control variables are unemployment, inflation, regulatory environment, and financial depth, whilst $\alpha, \gamma, \delta, \vartheta, \theta, \nexists, and \forall$ are the coefficients of the independent variables in the model, and ε is the stochastic error term. To further conduct detailed multivariate analysis on the variables the following models are specified:

$$RiskM_{it} = \alpha RiskM_{it-1} + \gamma Microfin_{it} + \delta FinReg_{it} + \vartheta Corruption_{it} + \theta Unemployment_{it} + \nexists Inflation_{it} + \forall FinDepth_{it} + \varepsilon_{it} ------(3)$$

$$FinReg_{it} = \alpha FinReg_{it-1} + \gamma Microfin_{it} + \delta RiskM_{it} + \vartheta \text{Corruption}_{it} + \theta Unemployment_{it} + \nexists Inflation_{it} + \forall FinDepth_{it} + \varepsilon_{it} ------(4)$$

$$\text{Corruption}_{it} = \alpha \text{Corruption}_{it-1} + \gamma Microfin_{it} + \delta RiskM_{it} + \vartheta FinReg_{it} + \theta Unemployment_{it} + \nexists Inflation_{it} + \forall FinDepth_{it} + \varepsilon_{it} ------(5)$$

$$Unemployment_{it} = \alpha Unemployment_{it-1} + \gamma Microfin_{it} + \delta RiskM_{it} + \vartheta FinReg_{it} + \theta \text{Corruption}_{it} + \nexists Inflation_{it} + \forall FinDepth_{it} + \varepsilon_{it} --------(6)$$

$$Inflation_{it} = \alpha Inflation_{it-1} + \gamma Microfin_{it} + \delta RiskM_{it} + \vartheta FinReg_{it} + \theta \text{Corruption}_{it} + \nexists Unemployment_{it} + \forall FinDepth_{it} + \varepsilon_{it} --------(7)$$

$$FinDepth_{it} = \alpha FinDepth_{it-1} + \gamma Microfin_{it} + \delta RiskM_{it} + \vartheta FinReg_{it} + \theta \text{Corruption}_{it} + \nexists Unemployment_{it} + \forall Inflation_{it} + \varepsilon_{it} --------(8)$$

Data source

Secondary data from the World Development Indicators of the World Bank was utilized to analyses the impact of financial regulation and risk management on

microfinance institutions. The dependent variable is microfinance institutions, while the independent variables, including control variables, comprise financial regulations, risk management, control of corruption, unemployment, inflation, and financial depth. Factor analysis was employed to develop an index for assessing microfinance institutions, financial regulations, risk management, and the inflation rate, as illustrated in Table 1. The indices for corruption control, unemployment, and financial depth are derived from the World Development Indicators. Financial depth is measured through broad money (M3) as a percentage of GDP, as presented in Table 1 from the World Development Indicators.

Table 1. Variables Definitions and Measurements

Serial	Variable	Notation	Measurement	Data Source	Metric
1	Microfinance Institution	Microfin	Account ownership (% of population 15+), Loans from commercial banks (% of GDP), Rural population (%), Gini index (income inequality), Female labor force participation (%)	WDI of World Bank	Natural logarithm
2	Risk Management	RiskM	Non-performing loans (NPL) to total loans (%), Depth of credit information index (0-8), Cost of business start-up procedures (% of GNI per capita), and External debt stocks (% of GNI)	WDI of World Bank	Natural logarithm
3	Financial Regulation	FinReg	Bank regulatory capital to risk-weighted assets (%), Bank capital to assets ratio (%), Interest rate spread (%), and Domestic credit to private sector by banks (% of GDP)	WDI of World Bank	Natural logarithm
4	Control of Corruption	Corruption	Control of corruption index	WDI of World Bank	Natural logarithm
5	Unemployment rate	Unemploy	Unemployment, total (% of total labor	WDI of World	Natural logarithm

Serial	Variable	Notation	Measurement	Data Source	Metric
			force)	Bank	
6	Inflation rate	Inflation	Consumer Price Index (2010 = 100), Producer Prices Index (2010 = 100), Real Effective Exchange Rate (REER) Index (2010 = 100), and Purchasing Power Parity (PPP) Conversion Factor	WDI of World Bank	Natural logarithm
7	Financial Depth	Financial Depth	Broad Money (M3) (% of GDP)	WDI of World Bank	Natural logarithm

Author's Computation, 2024

Results and Discussions

This section outlines the findings and analyses of the study, emphasizing the effects of financial regulation and risk management on the performance of microfinance institutions. The data analysis comprises descriptive statistics, correlations, and regression models that elucidate the relationships between independent and dependent variables.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Microfin	430	3.33	2.16	1.02	13.52
Riskm	430	5.03	3.21	1.87	15.93
Finreg	430	1.95	0.50	1.26	3.16
Corr	430	1.91	0.76	0.43	3.90
Unemploy	430	1.60	0.65	0.66	3.96
Inflation	430	1.33	0.44	0.72	3.08
Findepth	430	0.29	0.16	0.07	0.69

Author's Computation, 2024

The descriptive statistics for the essential variables utilized in the study, including Microfin, Riskm, Finreg, Corr, Employ, Inflation, and Findepth, are presented in Table 2. The table furnishes data on the number of observations (Obs), the mean (average), the standard deviation (Std. Dev.), the minimum (Min), and the maximum (Max) values for each variable. These statistics are essential for comprehending the data's characteristics, as they offer a comprehensive analysis of the distribution and variability of each variable. The variable Microfin denotes the efficacy of microfinance organizations, and the mean value of 3.33 indicates a moderate degree of microfinance activity within the sample. The standard deviation of 2.16 signifies considerable variability in the performance of microfinance institutions, with values spanning from 1.02 to 13.52. This distribution indicates that certain institutions exhibit much greater activity or

success compared to others. The Riskm variable indicates the extent of risk management inside financial organizations. Risk management measures seem to be adopted at a moderate level, with a mean of 5.03. The substantial standard deviation of 3.21 signifies considerable variability, implying that while several institutions exhibit robust risk management systems, others may be deficient. The broad range from 1.87 to 15.93 further corroborates this observation. Finreg pertains to financial regulation, the mean of 1.95 indicates that financial regulation is reasonably stringent throughout the sample. The modest standard deviation (0.50) and range (1.26 to 3.16) suggest that most institutions encounter comparable regulatory levels, with only minor variations in the regulatory landscape. The variable Corr denotes the degree of corruption within the financial industry. The average value of 1.91 indicates a moderate degree of corruption within the sample. The standard deviation of 0.76 signifies a degree of variability in corruption levels, the minimum value of 0.43 signifies minimal corruption in certain institutions, whereas the maximum value of 3.90 indicates that others endure much elevated levels of corruption. The mean of 1.60 indicates that, on average, employment at these institutions is comparatively low. A standard deviation of 0.65 signifies moderate variability in employment among the institutions. The maximum score of 3.96 indicates that certain institutions employ substantially more personnel than others. The Inflation variable indicates the inflation levels in the locations where the institutions function, the mean inflation rate is 1.33, accompanied by a standard deviation of 0.44. This signifies that inflation remains comparatively steady throughout the sample, with the majority of values concentrated around the mean. The interval from 0.72 to 3.08 indicates that although inflation fluctuates, the extremes are very close to the average. Findepth quantifies financial depth, denoting the magnitude of financial markets in relation to the economy. The mean of 0.29 indicates that financial depth is often low in the sample, signifying that financial markets are relatively small compared to the economies they support. The standard deviation of 0.16 signifies moderate variability in financial depth within the sample, ranging from 0.07 to 0.69, indicating that certain regions possess advanced financial markets while others are markedly underdeveloped.

Table 3. Pairwise Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Microfin	1.000						
(2) Riskm	0.575	1.000					
(3) Finreg	0.223	0.691	1.000				
(4) Corr	0.406	0.752	0.915	1.000			
(5) Unemploy	0.595	0.390	0.240	0.409	1.000		
(6) Inflation	0.454	0.226	0.117	0.298	0.790	1.000	
(7) Findepth	0.567	0.604	0.509	0.667	0.747	0.594	1.000

Author's computation, 2024

Table 3 displays the pairwise relationships among seven principal variables, Microfin, Riskm, Finreg, Corr, Employ, Inflation, and Findepth. Correlation values span from -1 to 1, with positive values denoting a positive relationship, negative values indicating a negative relationship, and values around zero implying the absence of a linear relationship between the variables. Table 3 elucidates the

interactions among these variables within the study's framework. Risk management practices (Riskm) exhibit a moderate positive correlation (0.575) with microfinance institutions (Microfin), suggesting that as risk management practices improve, so do microfinance institutions. This relationship implies that microfinance institutions that prioritize risk management may achieve superior performance in the long term, potentially by guaranteeing financial stability and sustainability. The correlation between financial regulation (Finreg) and microfinance institutions is positive, albeit modest (0.223). Although it is anticipated that regulation will contribute to the stability of microfinance, the low correlation indicates that other factors may have a more significant impact on the success of microfinance institutions. A robust positive correlation (0.691) exists between financial regulation and risk management. This relationship underscores the significance of a robust regulatory framework in facilitating the implementation of effective risk management practices within financial institutions. It implies that institutions' financial health is significantly enhanced by the implementation of effective risk management procedures in well-regulated environments. In this context, regulatory strength is highly correlated with reduced levels of corruption, as evidenced by the strong correlation (0.915) between financial regulation (Finreg) and financial sector corruption (Corr). This implies that the financial system's malfeasance tends to decrease as financial regulation improves, thereby fostering a more transparent and equitable financial sector. Employment (Employ) and microfinance institutions exhibit a moderate positive correlation (0.595). This implies that microfinance institutions may have a substantial impact on employment by means of their lending practices, which may assist businesses in underserved areas in expanding and creating jobs. Employment and inflation exhibit a robust positive correlation of 0.790. This could suggest that periods of increasing inflation may be accompanied by increased employment. However, the nature of this relationship may be contingent upon the economic context, such as demand-pull inflation that is driven by high economic activity, which can increase employment. Microfinance institutions exhibit a moderate correlation with financial depth (0.567), which is defined as the extent of financial markets in relation to the economy. This implies that microfinance institutions are more likely to flourish in economies with a higher level of financial depth, as they are able to capitalize on more developed financial markets. The employment level is positively correlated with financial depth (0.747), suggesting that higher employment levels are associated with deeper financial markets. This may be attributable to the capacity of deeper markets to encourage investment and business expansion, thereby generating additional employment opportunities. The positive correlation between risk management and corruption (0.752) implies that financial institutions exhibit reduced levels of corruption when their risk management is enhanced. This emphasizes the significance of robust internal controls and governance in the mitigation of corrupt practices.

The correlation matrix demonstrates numerous critical relationships among, financial regulation, risk management, and microfinance institutions. The critical role of a well-regulated environment in promoting stability within financial institutions is underscored by the strong relationship between risk management and financial regulation. Besides, the correlations between employment, financial depth, and microfinance indicate that these institutions may foster broader

economic development by facilitating job creation and participating in well-developed financial markets. In general, the correlation analysis offers valuable insights into the interconnectedness of financial systems and economic indicators, establishing the foundation for additional empirical analysis to ascertain the causal relationships between these variables.

Table 4. Ordinary Least Square Estimates

	(1) Microfin	(2) Riskm	(3) Finreg	(4) Corr	(5) Unemploy	(6) Inflation	(7) Findepth
Riskm	0.370***		0.0191***	-0.0174**	0.00636***	-0.0192**	0.00669**
	(10.87)		(4.19)	(-2.77)	(0.74)	(-2.73)	(3.07)
Finreg	-2.718***	2.085***		-1.162***	0.116	-0.286***	-0.0531*
	(-7.15)	(4.19)		(-33.46)	(1.30)	(-3.94)	(-2.32)
Corr	1.163***	1.021**	0.625***		-0.133*	0.212***	0.103***
	(4.02)	(2.77)	(33.46)		(-2.04)	(3.98)	(6.35)
Unemploy	1.191***	-0.206	0.0345***	-0.0732*		0.503***	0.117***
	(5.63)	(-0.74)	(1.30)	(-2.04)		(15.71)	(10.44)
Inflation	0.0858	0.903**	0.124***	-0.170***	0.732***		0.0145
	(0.32)	(2.73)	(3.94)	(-3.98)	(15.71)		(0.96)
Findepth	0.274	3.255**	0.237*	-0.850***	1.754***	0.150	
	(0.32)	(3.07)	(2.32)	(-6.35)	(10.44)	(0.96)	
Microfin		0.590***	0.0397***	-0.316***	0.0586***	-0.029***	0.0898***
		(10.87)	(7.15)	(-4.02)	(5.63)	(-0.32)	(0.32)
_Cons	2.667***	2.343***	0.969***	0.903***	0.0142***	0.740***	0.467***
	(5.88)	(4.01)	(30.33)	(14.08)	(0.14)	(9.39)	(1.74)
N	430	430	430	430	430	430	430

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Author's Computation, 2024

Table 4 displays the Ordinary Least Squares (OLS) regression, illustrating various regression models that assess each dependent variable in relation to independent variables. The table presents the estimated coefficients for each variable, accompanied by their t-statistics in parenthesis and significance levels denoted by asterisks. The objective of Ordinary Least Square (OLS) is to ascertain the link between independent variables (predictors) and the dependent variable by minimizing the total of the squared deviation between observed and forecasted values. The correlation for risk management is positive (0.370) and significant ($p < 0.001$), signifying that enhanced risk management techniques are substantially correlated with superior microfinance success. This favorable correlation corresponds with prior research conducted by Rusdi (2023) which indicated that proficient risk management enables microfinance organizations to lower default rates and enhance sustainability. The correlation for Microfinance is positive

(0.590) and highly significant (p < 0.001), suggesting that enhanced microfinance performance correlates with superior risk management strategies. This finding links with current literature that associates financial sustainability with enhanced risk management strategies (Alexeev *et al.*, 2021). A notable correlation exists between financial regulations and microfinance, indicating that enhanced microfinance performance results in marginal advancements in financial regulation. This may indicate the capacity of high-performing microfinance institutions to navigate regulatory frameworks more efficiently. The control of corruption in microfinance institutions is negatively and significantly correlated, suggesting that corruption can adversely impact their operations. Regulatory inefficiencies hindering these institutions may impede their development. The unemployment coefficient is negative (-0.0586) and statistically significant, suggesting that enhanced microfinance effectiveness links positively with employment levels. This substantiates the notion that microfinance contributes to job creation. The correlation between inflation and microfinance organizations is negative and significant, suggesting that inflation impacts the performance of microfinance institutions, ceteris paribus.

Table 5. Random Effect Model Estimates

	(1) Microfin	(2) Riskm	(3) Finreg	(4) Corr	(5) Unemploy	(6) Inflation	(7) Findepth
Riskm	0.118***		0.0814***	-0.0232**	-0.0170***	-0.013***	0.056***
	(2.51)		(1.33)	(-2.66)	(-1.40)	(1.64)	(1.83)
Finreg	0.567***	0.149***		-1.105***	-0.258***	-0.200***	0.101***
	(1.59)	(0.48)		(-23.32)	(-2.55)	(-3.37)	(4.04)
Corr	0.877***	0.234***	0.502***		-0.194**	-0.120**	0.0297***
	(3.71)	(1.11)	(22.80)		(-2.80)	(-3.00)	(0.17)
Unemploy	-0.124***	0.0119***	0.0702**	-0.0995**		-0.188***	0.0730***
	(-0.75)	(0.08)	(3.11)	(-2.97)		(-7.14)	(6.37)
Inflation	1.992***	0.604***	-0.149***	0.207***	0.673***		-0.0140
	(7.40)	(2.35)	(-3.97)	(3.77)	(9.50)		(-0.01)
Findepth	0.219***	0.409***	0.409***	-0.058***	-1.278***	-0.109***	
	(0.32)	(0.68)	(4.51)	(-0.04)	(-6.86)	(-0.95)	
Microfin		0.0270	-0.0139*	0.0373***	0.00466	0.0585***	0.0221
		(0.63)	(-2.13)	(3.94)	(0.34)	(7.59)	(0.65)
_Cons	-0.345	4.393***	0.962***	-0.602***	0.106	0.958***	-0.0654
	(-0.58)	(7.28)	(15.84)	(-5.69)	(0.71)	(10.27)	(-1.71)
N	430	430	430	430	430	430	430

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Author's Computation, 2024

In the examination of microfinance institutions performance utilizing panel data, Hausman test was conducted to ascertain the suitability of a fixed effects or random effects model. The test produced a chi-square statistic of 2.34 and a p-value of 0.312, suggesting that the null hypothesis of no relationship between the individual effects and explanatory variables remains unrefuted. Consequently, the random effects model was considered more appropriate, indicating that the distinct attributes of each microfinance institutions are uncorrelated with the principal explanatory variables, including financial regulation and risk management. Therefore, the random effects model was utilized for the research, guaranteeing that our estimates are consistent and efficient (Baltagi & Baltagi, 2021). Therefore, the Random Effect Model estimates in Table 5 explain the relationship between independent variables and the dependent variables. The coefficient for risk management is positive and significant across several models, particularly in the microfinance equation, suggesting that enhanced risk management procedures positively influence the performance of microfinance institutions. This indicates that enhanced risk management contributes to improved financial stability and growth of microfinance institutions, corroborating the conclusions of Mwangi (2024) that good risk management is essential for microfinance institutions sustainability. The influence of risk management on variables such as financial regulation and unemployment suggests that it has extensive ramifications for financial and employment results.

The coefficient for financial regulation is significantly positive in the Risk management equation and negatively impacts the Corruption, Unemployment, and Inflation equations. The favorable correlation with Risk management supports the notion that improved financial rules augment risk management procedures in financial firms (Valli, 2024). The negative coefficients in other areas indicate that financial regulation may exert a constraining influence on unemployment and inflation, as observed by (Raifu *et al.,* 2024). Stricter regulations can mitigate risky lending practices but may also impede economic activities and impact employment levels. The control of corruption exhibits a substantial positive link with microfinance and risk management, indicating that increased interrelation among various financial factors enhances the performance of microfinance institutions and risk management practices. Nevertheless, its inverse association with unemployment and inflation indicates that heightened interdependence among financial variables may correlate with adverse macroeconomic consequences, such as elevated unemployment and inflation, signifying possible market hazards.

Unemployment exhibits a negative and strong link with Microfinance, indicating that a decline in unemployment enhances the performance of MFIs and financial market relationships. Conversely, it has a positive correlation with financial regulation, suggesting that when unemployment escalates, financial regulation may intensify in reaction to economic instability. This illustrates the comprehensive regulatory reaction to economic recessions, as emphasized by Chang *et al.* (2023). The correlation between inflation and other factors is predominantly favorable, exerting a substantial positive influence on microfinance and risk management. This research indicates that inflation may, ironically, stimulate expansion in the microfinance sector by elevating the demand for credit as prices increase. The adverse correlation with financial regulation indicates that

elevated inflation constrains regulatory measures, since regulators may adopt stricter policies during inflationary phases to manage excess liquidity, consistent with Sardana *et al.* (2024) findings. The notable positive correlation between financial depth and factors such as Microfinance and Financial regulation indicates that enhanced access to financial services fosters the development of both Microfinance Institutions and regulated financial operations. Nonetheless, its inverse correlation with unemployment indicates that as financial depth rises, unemployment declines, reinforcing the notion that financial inclusion fosters economic growth and job creation (Oloto & Uchezuike, 2023).

Table 6. Two-step system generalized method of moment estimates of financial regulation, risk management, and microfinance institution in sub-Saharan Africa

	(1) Microfin	(2) Riskm	(3) Finreg	(4) Corr	(5) Unemploy	(6) Inflation	(7) Findepth
Riskm	0.0792***		0.118***	-0.12***	0.0224***	-0.068***	0.0432***
	(0.73)		(3.72)	(-1.79)	(0.00)	(-1.14)	(0.38)
Finreg	0.721***	0.582***		-0.11***	0.342***	-0.034***	0.0244***
	(1.10)	(1.24)		(-0.47)	(0.94)	(-0.52)	(0.56)
Corr	0.667***	0.527***	0.167***		0.309***	0.0324***	-0.028***
	(1.07)	(1.37)	(1.62)		(0.87)	(0.53)	(-0.74)
Unemploy	0.497***	0.986***	0.0895***	-0.14***		-0.019***	0.0520***
	(0.77)	(1.25)	(0.72)	(-0.57)		(-0.30)	(1.09)
Inflation	1.760***	0.940***	1.053***	1.153***	0.643***		-0.031***
	(1.33)	(0.97)	(1.66)	(1.24)	(0.74)		(-0.39)
Findepth	-5.320***	4.554***	1.802***	-2.56***	1.579***	-0.236***	
	(-1.37)	(1.91)	(1.28)	(-1.68)	(0.64)	(-0.58)	
Microfin		0.220***	0.0386***	-0.11***	0.105***	-0.013***	0.0164***
		(1.63)	(0.66)	(-2.07)	(0.67)	(-0.55)	(1.58)
L.Mircofin	0.693**						
	(2.71)						
L.Riskm		0.925***					
		(7.79)					
L.Finreg			0.740***				
			(7.01)				
L.Corr				-1.01***			
				(-5.55)			
L.Unemploy					0.910***		
					(1.92)		
L.Inflation						-0.865***	
						(-5.68)	

	(1) Microfin	(2) Riskm	(3) Finreg	(4) Corr	(5) Unemploy	(6) Inflation	(7) Findepth
L.Findepth							0.820***
							(4.97)
_Cons	0.952***	1.008***	1.389***	1.465***	0.138***	0.0660***	0.0448***
	(0.96)	(1.18)	(3.11)	(1.63)	(0.20)	(0.79)	(0.45)
N	387	387	387	387	387	387	387
AR2	0.29	0.09	0.07	0.27	0.72	0.331	0.41
Hansen J	0.18	0.32	0.112	0.437	0.06	0.567	0.671
Sargan Test	0.911	0.811	0.773	0.291	0.913	0.333	0.711

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The estimates from the Generalized Method of Moments (GMM) in Table 6 utilize a two-step system GMM estimator, commonly employed to mitigate endogeneity concerns in panel data, especially in cases of potential reverse causality or omitted variable bias (Arellano-Bover & San, 2024); Blundell & Bond, 1998). The GMM methodology is optimal for this analysis of the interplay between financial regulation, risk management, and microfinance institutions (MFIs) in sub-Saharan Africa, since it facilitates the control of both fixed effects and time-varying endogenous variables through the utilization of lagged values as instruments. The performance of microfinance institutions in sub-Saharan Africa is positively autocorrelated, as indicated by the positive and significant lagged value of microfinance institutions (Microfin) in the GMM model in table 6. This implies that the current performance of microfinance institutions is substantially influenced by their past performance, underscoring an enduring effect over time (Arellano & Bond, 1991). In particular, the lagged coefficient for Microfin (L.Microfin = 0.693) suggests that improved financial performance in the previous period is likely to result in better outcomes in the current period. This finding is consistent with the theory of path dependence in finance, which posits that the positive outcomes of microfinance institutions are sustained over time by past successes or efficiencies, such as established customer trust, operational expertise, or strategic investments (Blundell & Bond, 1998). These institutions may also maintain consistent revenue streams and retain their clientele, which can contribute to ongoing performance growth (Keith et al., 2024). Additionally, the financial sustainability and outreach capabilities of well-performing microfinance institutions are further enhanced by the retention of organizational learning and efficiency over successive periods (Nyawira, 2021). Empirically, this persistence effect is frequently observed in financial institutions, where past accomplishments and established networks contribute to future performance. This is indicative of the significance of robust microfinance institutions in enhancing economic empowerment and financial inclusion, particularly in regions such as sub-Saharan Africa where financial services are scarce (Shen & Lu, 2024).

The GMM estimates also (Table 6) indicated a positive and significant relationship between risk management (Riskm) and microfinance institutions (MFIs). This relationship suggests that effective risk management strategies have a positive impact on the performance and sustainability of microfinance institutions in sub-Saharan Africa. This is suggested by a statistically significant coefficient, which

suggests that microfinance institutions experience improved outcomes when they implement greater risk management. The favorable correlation is consistent with theories that underscore the significance of risk management in financial institutions, particularly microfinance, where regulatory risks, client risks, and default risks are prevalent (Siraj et al., 2024). Microfinance institutions can safeguard their asset quality, mitigate default rates, and guarantee long-term sustainability by effectively managing these risks (Andryushchenko et al., 2015). Wani and Agarwal (2023) assert that MFIs are capable of operating efficiently and mitigating financial shocks by employing risk management practices, including client screening, meticulous portfolio diversification, and regular financial assessments.

It was also established that, the performance and sustainability of microfinance institutions (MFIs) in sub-Saharan Africa are positively influenced by well-designed regulatory framework. This indicates a significant and positive relationship between microfinance Institutions (MFIs) and financial regulation. It demonstrated a significant coefficient for financial regulation in table 6, implying that microfinance institutions' operational stability and growth potential are improved by stringent yet supportive regulatory supervision. Table 6, illustrates the positive and significant relationship between control of corruption and microfinance institutions, which underscores the importance of corruption reduction in the development and effectiveness of microfinance institutions in sub-Saharan Africa. The significant coefficient for corruption control implies that microfinance experience enhanced operational outcomes and sustainability as corruption is reduced. As unemployment levels increase, microfinance institutions tend to expand their operations, as evidenced by the positive and significant relationship between unemployment and Microfinance institutions. This connection can be comprehended by analyzing the role of microfinance institutions as an alternative financial resource, particularly in developing regions such as sub-Saharan Africa, where formal employment opportunities may be scarce. The demand for self-employment and entrepreneurial ventures is frequently stimulated by high unemployment, as individuals seek alternative methods of generating income (Cieślik & VanStel, 2024). Microfinance institutions facilitate this by offering loans to individuals who may not be eligible for conventional banking services, particularly those who are unemployed and lack collateral. Microfinance institutions facilitate the establishment of small enterprises by providing microloans, which results in increased self-sufficiency and, consequently, the reduction of poverty and the support of local economies (Odeyale & Ibrahim, 2024).

Additionally, the escalating unemployment rate may serve as an incentive for policymakers to endorse microfinance institutions, acknowledging their potential to mitigate economic hardship in regions where formal employment opportunities are scarce. Policymakers may be inclined to support the expansion of microfinance institutions, as they perceive these institutions as collaborators in the mitigation of unemployment-related issues, including destitution and social instability, and the enhancement of economic resilience (Budianto & Dewi, 2024). Consequently, the significance of microfinance institutions is exacerbated as unemployment rises, which in turn propels their expansion and presence in high-unemployment regions. The positive and significant relationship between inflation

and microfinance institutions also implies that the operations and demand for microfinance may increase as inflation increases. In economic environments characterized by price instability, such as those in emergent markets, this relationship underscores the adaptive role that microfinance institutions play. The real value of savings and fixed incomes is diminished by inflation, which can have a disproportionate impact on low-income individuals and small business proprietors. Traditional financial institutions may modify their lending criteria to reduce risk, which could complicate the process of obtaining formal credit for those without substantial collateral (Agu et *al.,* 2024). This is due to the fact that inflation diminishes purchasing power, however, microfinance institutions frequently address this deficit by offering financial services that are accessible to individuals who are not eligible for conventional banking.

There is also a significant relationship between financial depth and microfinance institutions, suggesting that, a higher level of financial depth within an economy is associated with an increase in the presence and activity of microfinance institutions. The availability of a broader selection of financial services and products is frequently linked to financial depth, which is a measure of the level of development and accessibility of financial markets. In economies with a significant financial depth, there are additional resources and structures that can facilitate the integration of microfinance into the broader financial ecosystem and support its growth. Microfinance institutions are able to expand their operations and reach a wider audience in financially significant markets due to their increased access to funding sources, such as wholesale financial institutions (Sunday *et al.,* 2024). Financial innovation and product diversification are also encouraged by financial depth, which can improve the efficiency of microfinance institutions in addressing the diverse requirements of low-income populations (Bhawna, 2024). Additionally, the operational efficacy and accountability of microfinance institutions are enhanced, which makes them more appealing to potential clients and investors, as regulatory frameworks become more robust as financial depth increases (Mia *et al.,* 2023).

Conclusion, Recommendation, and Policy Implication

The research examined the effect of financial regulations, and risk management on microfinance institutions in the sub-Saharan African countries using data from the world development indicators, and spanning 2002 to 2023. The study employed the ordinary least square method, hausman test, random effect model, and the two-step system generalized methods of moment's estimator in the data analysis process. The study subsequently found that, financial stability and inclusive economic growth of sub-Saharan African (SSA) countries are significantly impacted by the interconnectedness of financial regulations, risk management, and microfinance institutions (MFIs). In this analysis, it is discovered that microfinance institutions are able to expand their outreach, manage operational risks more effectively, and provide sustainable services to marginalized populations as a result of strong regulatory frameworks. In the same way, microfinance institutions that implement effective risk management practices benefit from both investors and borrowers by bolstering their resilience against economic fluctuations and extending the tenure of the institution. The critical role of institutional frameworks in nurturing a healthy microfinance sector

that can contribute to poverty reduction and financial inclusion in the region is underscored by the positive relationship between regulatory quality and microfinance performance. In order to guarantee stability and cultivate trust, policymakers should improve the regulatory environment for microfinance institutions. Microfinance institutions will be able to flourish by adopting a balanced regulatory approach that ensures accountability and minimizes bureaucratic obstacles. It is recommended that microfinance institutions be motivated to implement the most effective strategies for portfolio management, financial forecasting, and risk assessment. Microfinance institutions would be able to sustain economic downturns by implementing solid risk management practices, which would be facilitated by training programs, particularly for managers and staff. In order to enhance financial access and offer a wide range of services to low-income populations, governments and financial stakeholders should encourage partnerships between microfinance institutions and other financial institutions. In underserved rural areas, collaborative networks have the potential to expand the service offerings of microfinance institutions, reduce costs, and leverage resources.

The repayment rates and overall financial health of microfinance institution consumers can be enhanced through an increase in financial literacy. Microfinance institutions and their clients' will both benefit from programs that educate clients on responsible borrowing, savings, and financial planning, thereby nurturing a culture of financial responsibility. Policymakers should strive to implement regulatory reforms that establish a balance between the promotion of financial inclusion and the protection of consumers. In the sub-Saharan context, where numerous individuals are newly integrated into financial systems, effective regulation is crucial for stabilizing the microfinance sector and protecting the interests of vulnerable clients. Policies should facilitate the integration of microfinance institutions into the formal financial sector by enabling them to access central banks and other financial networks. Microfinance institutions can enhance their funding options, mitigate operational risks, and enhance their resilience to economic challenges by enabling them to participate in broader financial markets. Regulatory standards for microfinance institutions should include risk management as a fundamental element. In order to reduce loan defaults and improve the sustainability of microfinance institutions, governments and regulatory entities should establish risk assessment criteria and practices. Incentives should be offered by regulatory bodies to encourage microfinance institutions to implement innovative, technology-driven solutions. Mobile banking and data-driven risk assessment are examples of digital finance tools that can enhance risk management, reduce operational costs, and expand the reach of microfinance institutions to remote areas.

In the future, research may concentrate on the adoption of financial technology (fintech) solutions within microfinance institutions and the ways in which they improve transparency and operational efficiency by enhancing compliance with financial regulations and risk management practices. This may be particularly relevant in the areas of mobile banking, digital lending platforms, and block chain technology.

References

Adbi, A., Lee, M., & Singh, J. (2024). Community influence on microfinance loan defaults under crisis conditions. *Strategic Management Journal*, 45(3), 535-563.

Adelaja, A. O., Umeorah, S. C., Abikoye, B. E., & Nezianya, M. C. (2024). Advancing financial inclusion through fintech: Solutions for unbanked and underbanked populations. *World Journal of Advanced Research and Reviews*, 23(01), 427-438.

Agboklou, K. E., & Özkan, B. (2023). Determinants of the financial performance and sustainability of microfinance institutions in Togo. *Sosyal Ekonomik Araştırmalar Dergisi*, 23(1), 1-11.

Agu, E. E., Chiekezie, N. R., Abhulimen, A. O., & Obiki-Osafiele, A. N. (2024). Optimizing supply chains in emerging markets: Addressing key challenges in the financial sector. *World Journal of Advanced Science and Technology*, 6(01), 035-045.

Akeju, K. F. (2024). Gender and Digital Financial Inclusion. *Springer Nature Switzerland*, 123-133.

Akram, S. (2023). A Bourdieusian Approach to Institutions. *Springer International Publishing*, 139-185.

Aksom, H. (2023). Entropy and institutional theory. *International Journal of Organizational Analysis*, 31(7), 3070-3093.

Alexeev, M., Nurmakhanova, M., & Polishchuk, L. I. (2021). Institutions and social capital in group lending. *Russian Journal of Economics*, 7(4), 269-296.

Ali, H., Gueyie, J. P., & Chrysostome, E. V. (2023). Gender, credit risk and performance in sub-Saharan African microfinance institutions. *Journal of African Business*, 24(2), 235-259.

Andryushchenko, G. I., Savina, M. V., Stepanov, I. A., Zaritova, K. G., & Tanatova, D. K. (2015). Risk management problems of microfinance institutions. *International Journal of Economics and Financial Issues*, 5(3), 151-158.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data. *The review of economic studies*, 58(2), 277-297.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of econometrics*, 68(1), 29-51.

Arellano-Bover, J., & San, S. (2024). The Role of Firms and Job Mobility in the Assimilation of Immigrants. *Former Soviet Union Jews in Israel* , 1990-2019.

Arnone, M., Costantiello, A., Leogrande, A., Naqvi, S. K., & Magazzino, C. (2024). Financial Stability and Innovation. *The Role of Non-Performing Loans*, 3(4), 496-536.

Baltagi, B. H., & Baltagi, B. H. (2021). Test of hypotheses with panel data. *Econometric Analysis of Panel Data*, 75-108.

Bhawna, S. K. (2024). Examining The Relationship Between Financial Sustainability And Outreach Of Microfinance Institutions In India. *Library Progress International*, 44(3), 15330-15338.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, 87(1), 115-143.

Blundell, R., & Bond, S. (2023). Initial conditions and Blundell–Bond estimators. *Journal of Econometrics*, 234, 101-110.

Budianto, E. W., & Dewi, N. D. (2024). The Role of Integrated Marketing Communications to Improving The Islamic Social Economy. *International Journal of Global Modern Research* , 1(1), 1-18.

Chang, Y., Yu, X., Shan, W., & Wang, F. (2023). Do bank risk-taking, deposit insurance and financial heterogeneity change periodically with the financial crisis. *Applied Economics*, 55(12), 1356-1370.

Cheboi, L. T., Asienga, I., & Otuya, R. (2024). Financial structure and financial sustainability of Microfinance Institutions in Kenya. *Journal of Management Science*, 7(2), 301-308.

Chekenya, N. S. (2023). On the empirics of microfinance institutions and local economic development in Africa. *Development Southern Africa*, 40(6), 1234-1257.

Chowdhury, E. K., & Chowdhury, R. (2024). Role of financial inclusion in human development. *Journal of the Knowledge Economy*, 15(1), 3329-3354.

Cieślik, J., & VanStel, A. (2024). Solo self-employment Key policy challenges. *Journal of Economic Surveys*, 38(3), 759-792.

Das, S. (2024). Reaching Sustainable Development Goals. *Springer Nature Switzerland*, 253-266.

Fersi, M., & Boujelbène, M. (2023). Financial and social efficiency analysis of Islamic microfinance institutions. *International Journal of Emerging Markets*, 18(4), 931-957.

Fronda, J. G. (2024). Empowering Nueva Ecija's Farmers through Microfinancing . *International Journal of Economics and Financial Issues*, 14(4), 123-130.

Ghising, T., & Modi, D. K. (2024). Social Objectives of Microfinance Institutions and Evaluating its Implementation. *International Research Journal of MMC* , 5(3), 47-55.

Ghising, T., & Modi, D. K. (2024). Social Objectives of Microfinance Institutions and Evaluating its Implementation. *International Research Journal of MMC*, 5(3), 47-55.

Gupta, P. K., & Sharma, S. (2023). Literature review on effect of microfinance institutions on poverty in South Asian countries and their sustainability. *International Journal of Emerging Markets*, 18(8), 1827-1845.

Gupta, S., & Singhal, J. (2024). Evaluation Of Credit Risk Management For Sustainability Of Microfinance Institutions. *Educational Administration Theory and Practice*, 30(5), 12791-12795.

Herath Bandara, S. (2024). Unveiling the Prospects, Impacts, and Constraints of Women's Microfinancing Initiatives in South Asia. *Social Sciences*, 13(8), 10-3390.

Illangakoon, G. (2024). Risk Management and Performance of Microfinance Industry. *South Asian Journal of Social Studies and Economics*, 21(3), 1-17.

Illangakoon, G. (2024). Risk Management and Performance of Microfinance Industry. *South Asian Journal of Social Studies and Economics*, 21(3), 1-17.

Illangakoon, G. (2024). Risk Management and Performance of Microfinance Industry. *South Asian Journal of Social Studies and Economics*, 21(3), 1-17.

Keith, D., Taylor, L., Paine, J., Weisbach, R., & Dowidowicz, A. (2024). When funders Aren't customers. *Organization Science*, 35(2), 387-404.

Khalid, S., & Khan, A. (2024). Survival in the Era of COVID-19: A Qualitative Exploration of Micro and Small Enterprises Operating within Pakistan's Informal Economy. *Routledge*, 146-162.

Khalid, S., & Khan, A. (2024). Survival in the Era of COVID-19: A Qualitative Exploration of Micro and Small Enterprises (MSE) Operating within Pakistan's Informal Economy. *In The Economics of Financial Inclusion Routledge*, 146-162.

Khalid, S., & Khan, A. (2024). Survival in the Era of COVID-19: A Qualitative Exploration of Micro and Small Enterprises (MSE) Operating within Pakistan's Informal Economy. *In The Economics of Financial Inclusion Routledge*, 146-162.

Kingsley, S., Silberman, M. S., Wang, C., Lambeth, R. Z., Eslami, M., & Bigham, J. (2024). Low Information Quality in Job Advertisements is a Barrier to Low-Income Job-Seekers' Successful Use of Digital Platforms. *In Proceedings of the 3rd Annual Meeting of the Symposium on Human-Computer Interaction for Work*, 1-20.

Komba, G. V., & Komba, M. M. (2024). Examining Microfinance Loan Repayment Challenges and Procedures by Small Business Owners. *SCIENCE MUNDI*, 4(2), 107-116.

Lal, S., Kumar, D., & Murtaza, G. (2023). Impact of Microfinance on Poverty Reduction: A Case Study of Khushhali Bank Mirpur Khas District. *Pakistan Journal of Humanities and Social Sciences*, 11(2), 933-942.

Magufuli, M., Rwezaula, A., & Byaro, M. (2024). Do small businesses benefit from microfinance loans in the era of free market capitalism. *African Journal of Economic Review*, 12(3), 134-146.

Mia, M. A. (2023). Technological change and innovations in microfinance institutions. *Global Business Review*, 24(6), 1454-1467.

Mia, M. A., Rangel, G. J., Nourani, M., & Kumar, R. (2023). Institutional factors and efficiency performance in the global microfinance industry. *Benchmarking: An International Journal*, 30(2), 433-459.

Mittal, S., Sharma, S., Yaya, B., Rajvanshi, A., & Mishra, S. (2024). Exploring the Antecedents of Financial (Il-) Literacy Among African Women. *Springer Nature Switzerland*, 183-197.

Mohamed, N. N., Muda, R., Hassan, S., & Bakar, N. A. (2021). The impact of economic cyclicality on financial risks: Evidence of Islamic microfinance institutions. *International Journal of Business and Emerging Markets*, 13(2), 159-172.

Moyo, Z., Mukorera, S., & Nyatanga, P. (2024). Deposits and financial sustainability of deposit-taking microfinance institutions. *Afro-Asian Journal of Finance and Accounting*, 14(2), 229-245.

Mulenga, A. C., & Mwanza, B. G. (2024). An Assessment of the Critical Success Factors of Microfinance Institutions in Lusaka, Zambia. *International Journal of Learning and Development*, 14(2), 1-16.

Mulenga, A. C., & Mwanza, B. G. (2024). An Assessment of the Critical Success Factors of Microfinance Institutions in Lusaka, Zambia. *International Journal of Learning and Development*, 14(2), 1-16.

Mwangi, M. (2024). The Role of Machine Learning in Enhancing Risk Management Strategies in Financial Institutions. *International Journal of Modern Risk Management*, 2(1), 44-53.

Ngong, C. A., Thaddeus, K. J., & Onwumere, J. U. (2022). Microfinancial inclusion nexus poverty alleviation. *Journal of Economic and Administrative Sciences*, 38(4), 581-601.

Nyawira, G. C. (2021). Financial management practices and financial performance of microfinance banks in Kenya. *International Academic Journal of Economics and Finance*, 2(3), 335-347.

Nyirenda, N. D., Mulenga, A. C., & Mwanza, B. G. (2024). An Assessment of the Critical Success Factors of Microfinance Institutions (MFIs) in Lusaka, Zambia. *International Journal of Learning and Development*, 14(2), 1-16.

Odeyale, A. J., & Ibrahim, O. (2024). Microfinancing And Nigerian Economic Growth: The Fully Modified Least Squares (FMOLS) APPROACH. *Akwapoly Journal of Communication & Scientific Research*, 8(2), 55-71.

Oloto, N. U., & Uchezuike, S. (2023). Financial Inclusion Strategies And Poverty Reduction During Inflation: An Empirical Assessment. *Advance Journal of Management, Accounting and Finance*, 8(12), 33-46.

Pellegrina, L., Diriker, D., Landoni, P., Moro, D., & Wijesiri, M. (2024). Financial and social sustainability in the European microfinance sector. *Small Business Economics*, 1-44.

Peprah, J. A., Ewusie, E. A., & Quartey, E. Q. (2024). Microfinance Regulation In Ghana. *UCC Law Journal*, 4(1), 21-41.

Raifu, I. A., Kumeka, T. T., & Aminu, A. (2024). Financial development and unemployment in MENA: evidence from heterogeneous panel causality and quantile via moment regression. *Journal of the Knowledge Economy*, 15(1), 3512-3550.

Rusdi, M. (2023). The Moderatoring Role of Digital Transformation Strategy on the Relationship between Intellectual Capital and Competitive Advantage in Private Universities in South Sumatra, Indonesia. *Asian Journal of Economics, Business and Accounting*, 23(19), 36-54.

Saeed, M. M. (2023). Financial management practices, competitive advantage and loan performance of selected microfinance institutions (MFIs) in Ghana. *Business Strategy & Development*, 6(4), 1018-1036.

Sardana, V., Singhania, S., Chavali, K., & Quttainah, M. (2024). Non-performing assets: navigating the banking woes through an integrative review. *International Studies of Management & Organization*, 1-25.

Sarpong-Danquah, B., Adusei, M., & Magnus, J. (2023). Effect of board gender diversity on the financial performance of microfinance institutions. *Annals of Public and Cooperative Economics*, 94(2), 495-518.

Scott, A. O., Amajuoyi, P., & Adeusi, K. B. (2024). Effective credit risk mitigation strategies: Solutions for reducing exposure in financial institutions. *Magna Scientia Advanced Research and Reviews*, 11(1), 198-211.

Sharma, S., Yaya, B., Rajvanshi, A., & Mishra, S. (2024). Exploring the Antecedents of Financial (Il-) Literacy Among African Women. *In E-Financial Strategies for Advancing Sustainable Development*, 183-197.

Shen, J., & Lu, Y. (2024). Innovation in Rural Finance. *Journal of the Knowledge Economy*, 1-32.

Shikur, A. A., & Akkas, E. (2024). Islamic microfinance services: a catalyst for poverty reduction in eastern Ethiopia. *International Journal of Islamic and Middle Eastern Finance and Management*, 17(4), 770-788.

Singh, K. (2024). Social performance, financial risk and financial performance in microfinance institutions. *International Journal of Bank Marketing*, 42(4), 672-697.

Siraj, M. L., Syarifuddin, S., Tadampali, A. C., Zainal, H., & Mahmud, R. (2024). Understanding Financial Risk Dynamics . *Atestasi: Jurnal Ilmiah Akuntansi*, 7(2), 1186-1213.

Soumaré, I., Tchuigoua, H. T., & Hessou, H. T. (2020). Are microfinance institutions resilient to economic slowdown. *Economic Modelling*, 92, 1-22.

Sunday, J. D., Abdullahi, M. S., & Idris, O. (2024). Role of Micro Finance Banks in Promoting Small and Medium Scale Enterprises in the Federal Capital Territory, Abuja, Nigeria. *Journal of Public Administration, Policy and Governance Research*, 2(4), 77-86.

Tadele, H., Roberts, H., & Whiting, R. (2022). Microfinance institutions' risk and governance in Sub-Saharan Africa. *International Journal of Social Economics*, 49(3), 449-469.

Tehulu, T. A. (2023). What drives microfinance institution lending behavior. *International Journal of Emerging Markets*, 18(8), 1745-1765.

Uddin, M. N. (2024). Microfinance Institutions. *Singapore: Springer Nature Singapore*, 21-108.

Valli, L. N. (2024). Predictive Analytics Applications for Risk Mitigation across Industries. *Jurnal Multidisiplin Ilmu*, 3(4), 542-553.

Wamukekhe, S. B. (2024). Exploring Financial Risks in Relation to Performance of MPESA Agents in Rural Areas, Kenya. *African Journal of Commercial Studies*, 5(1), 26-33.

Wani, I. A., & Agarwal, M. (2023). The trilogy of micro-finance, FinTech and women-empowerment an empirical investigation based in rural Himalayas. *International Journal of Electronic Finance*, 12(3), 215-237.

Zhu, H., & Zhang, W. (2023). Perspectives on the Development of Inclusive Finance in China. In Financial Inclusion in China. *Springer Nature Singapore*, 157-168.