



Credit Management Practices on Loan Performance among Selected Microfinance Institutions in Rwanda

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Abstract: This study examined the effect of credit management practices on loan performance among 19 selected microfinance institutions (MFIs) in Rwanda from 2015 to 2024, focusing on Capital Adequacy Ratio (CAR), Liquidity Ratio (LR), Loan Loss Provision Ratio (LLPR), and Loan Portfolio at Risk (LPAR). A descriptive longitudinal research design was adopted using panel data from 190 firm-year observations obtained from audited financial statements and regulatory reports. Data were analyzed using descriptive statistics, Pearson correlation, and panel multiple regression. Diagnostic tests confirmed normality, absence of multicollinearity, heteroscedasticity, endogeneity, and stationarity problems, while the Hausman test supported the Fixed Effects Model. The regression model was statistically significant ($F = 30.130$, $p < 0.001$) and explained 39.4% of the variation in loan performance ($R^2 = 0.394$). CAR had a significant negative effect on loan performance ($\beta = -0.134$, $p = 0.040$), whereas LR had a significant positive effect and was the strongest predictor ($\beta = 0.508$, $p = 0.003$). LLPR ($\beta = 0.055$, $p = 0.736$) and LPAR ($\beta = 0.119$, $p = 0.142$) had positive but statistically insignificant effects. The findings indicate that liquidity management and capital adequacy are the key determinants of loan performance in Rwandan MFIs. The study recommends strengthening liquidity management, maintaining optimal capital adequacy, enhancing prudential supervision, improving credit appraisal and loan monitoring, and investing in automated credit risk technologies.

Keywords: Credit management practices, loan performance, capital adequacy ratio, liquidity ratio, loan loss provision, loan portfolio at risk, microfinance institutions, Rwanda.

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1. Introduction

Microfinance institutions (MFIs) play a fundamental role in promoting financial inclusion by providing financial services such as microcredit, savings, and financial education to underserved populations and small enterprises excluded from conventional banking systems (Ledgerwood, 2023). These institutions contribute significantly to poverty reduction, entrepreneurship development, and local economic transformation by enabling low-income individuals to access productive financial resources (Roberts, 2023). However, the sustainability of MFIs largely depends on their ability to maintain effective

loan performance, as increasing levels of non-performing loans (NPLs) threaten profitability, liquidity, and the continuous provision of financial services (Christen et al., 2023). Effective credit management practices, including capital adequacy management, liquidity management, loan loss provisioning, and monitoring of loan portfolio risks, are therefore essential for reducing credit risks and improving institutional sustainability (Kumar & Singh, 2020; CGAP, 2022).

Globally, MFIs have adopted advanced credit management mechanisms to improve loan performance through effective risk assessment, borrower monitoring, digital credit platforms, and

structured repayment systems (Rhyne, 2022). In developed economies, microfinance providers utilize technological innovations, credit scoring models, and financial analytics to improve lending decisions and minimize loan defaults (Johnson, 2023). However, challenges such as borrower over-indebtedness, economic uncertainty, and changing market conditions continue to affect loan repayment performance, requiring continuous improvement of credit management frameworks (Ledgerwood, 2023).

In developing regions, particularly Africa, MFIs operate within challenging environments characterized by limited financial infrastructure, low financial literacy, and restricted access to reliable borrower information (African Development Bank, 2023). In East African countries such as Kenya, Uganda, and Tanzania, MFIs have increasingly adopted digital lending platforms, borrower assessment procedures, and portfolio monitoring systems to strengthen loan recovery and operational efficiency (Okurut, 2024). Despite these improvements, issues such as poverty, weak credit information systems, and inadequate risk management capacity continue to influence loan performance among microfinance institutions (Wachiri, 2021).

In Rwanda, microfinance institutions have become important actors in expanding financial inclusion by providing credit and savings services to rural households, women entrepreneurs, and small businesses (Munyaneza, 2023). Institutions such as microfinance companies and savings and credit cooperatives (SACCOs) operate under the supervision of the National Bank of Rwanda (BNR), which promotes sound governance, financial stability, and responsible lending practices within the sector (National Bank of Rwanda, 2024). To improve loan performance, Rwandan MFIs increasingly apply structured credit management approaches based on borrower evaluation, liquidity monitoring, capital management, and loan portfolio supervision (Moses & Geoffrey, 2024). However, challenges related to financial literacy, limited borrower information, operational weaknesses, and increasing loan default levels continue to affect the sustainability of some institutions (Mutangana, 2023).

Despite the importance of credit management practices, many MFIs continue to experience difficulties maintaining satisfactory loan performance due to ineffective risk identification, inadequate loan monitoring, and weak recovery mechanisms (Mensah, 2022). In Rwanda, persistent levels of non-performing loans within some microfinance institutions have raised concerns regarding credit risk management, institutional profitability, and the capacity of MFIs to expand financial services to underserved communities (National Bank of Rwanda, 2023). These challenges

are associated with factors such as limited financial literacy among borrowers, insufficient credit information, and operational constraints, particularly among rural financial institutions (Kayitesi, 2022).

Previous studies have demonstrated that effective credit management practices contribute significantly to improved loan performance by enhancing borrower assessment, strengthening monitoring systems, and reducing default risks (Chinedu & Okeke, 2021; Hamdan, 2020). Research conducted in Rwanda has shown that institutions applying structured credit assessment mechanisms, including the 5Cs of credit character, capacity, capital, collateral, and conditions, tend to achieve better repayment outcomes compared to institutions relying on informal lending decisions (Ndayisenga, 2021). However, existing studies have mainly examined individual aspects of credit management, such as loan appraisal or collection procedures, while limited attention has been given to the combined effect of financial indicators, including capital adequacy ratio, liquidity ratio, loan loss provision ratio, and loan portfolio at risk, on loan performance among MFIs in Rwanda (Mutangana, 2023). Therefore, this study seeks to assess the effect of credit management practices on loan performance among selected microfinance institutions in Rwanda. Specifically, the study examines the influence of capital adequacy ratio, liquidity ratio, loan loss provision ratio, and loan portfolio at risk on loan performance among selected MFIs. The study covers 19 selected microfinance institutions in Rwanda over the period 2015–2024 to provide an in-depth understanding of how credit management practices influence institutional sustainability and financial performance (National Bank of Rwanda, 2024). The findings of this study are expected to benefit different stakeholders within the microfinance sector. Microfinance institutions will gain insights into improving credit policies, strengthening risk management systems, and enhancing loan recovery mechanisms to achieve sustainable operations (CGAP, 2022). Policymakers and regulators, particularly the National Bank of Rwanda, will utilize the findings to strengthen supervision frameworks, promote responsible lending practices, and enhance financial sector stability (National Bank of Rwanda, 2024). Borrowers will benefit indirectly through improved lending transparency, responsible credit access, and enhanced financial education initiatives (Ledgerwood, 2023). Development partners, investors, and researchers will gain empirical evidence that can guide interventions, investment decisions, and future studies on credit risk management and microfinance sustainability (African Development Bank, 2023). Ultimately, strengthening credit management practices remains essential for improving loan performance, enhancing institutional resilience, and ensuring that microfinance institutions continue to contribute

effectively to financial inclusion and socio-economic development in Rwanda (Roberts, 2023).

2. Literature Review

2.1 Conceptual Review

Credit management practices encompass the strategies, procedures, and controls used by financial institutions to assess borrowers, manage credit risks, monitor loans, and recover funds effectively (Ledgerwood, 2023; CGAP, 2022). In microfinance institutions (MFIs), effective credit management is essential because many clients operate small businesses with unstable income patterns, making proper loan assessment, monitoring, and recovery mechanisms important for institutional sustainability and financial inclusion (World Bank, 2022; National Bank of Rwanda, 2023). This study examines credit management through four key dimensions: capital adequacy ratio, liquidity ratio, loan loss provision ratio, and loan portfolio at risk, while loan performance is measured through repayment rates, portfolio quality, and non-performing loans (IMF, 2023; African Development Bank, 2023).

Capital Adequacy Ratio (CAR) indicates an institution's ability to absorb potential losses and maintain financial stability. Adequate capital strengthens resilience against loan defaults, supports continued lending, and enhances stakeholder confidence (Basel Committee on Banking Supervision, 2022; IMF, 2023). The Liquidity Ratio reflects MFIs' ability to meet short-term obligations and maintain smooth financial operations. Effective liquidity management enables timely loan disbursement, supports repayment cycles, and improves institutional stability (Adams, 2022; World Bank, 2022). Loan Loss Provision Ratio (LLPR) represents funds reserved to cover potential losses from doubtful or non-performing loans. Proper provisioning protects institutional capital, absorbs credit losses, and strengthens long-term sustainability, especially among MFIs serving vulnerable borrowers (Smith, 2022; CGAP, 2022). Loan Portfolio at Risk (LPAR) measures the proportion of loans with delayed repayments and serves as a key indicator of credit quality and risk exposure. Effective monitoring and recovery mechanisms help reduce portfolio risks and improve loan performance (Ledgerwood, 2023; MIX Market, 2022). Loan performance reflects borrowers' ability to repay loans according to agreed conditions and is measured through repayment rates, non-performing loan ratios, portfolio quality, and recovery efficiency (World Bank, 2022; IMF, 2023).

Strong loan performance enhances profitability, financial sustainability, and access to financial

services. In Rwanda, improving loan performance remains important due to challenges related to credit risks, borrower financial literacy, and increasing non-performing loans that may affect the sustainability of MFIs (National Bank of Rwanda, 2023; Mutangana, 2023).

2.2 Theoretical Review

The theoretical review provides the foundation for understanding the relationship between credit management practices and loan performance in microfinance institutions by focusing on Credit Risk Theory, Capital Adequacy Theory, and Institutional Theory. Credit Risk Theory explains that lending activities involve uncertainty and potential losses arising from borrower default; therefore, financial institutions must apply effective risk assessment, borrower evaluation, loan monitoring, portfolio diversification, and provisioning mechanisms to minimize credit risks and improve loan performance (Altman & Saunders, 2022; Evans, 2021; Dupriaux, 2024). This theory is relevant to the study because it explains how credit management practices such as liquidity management, capital adequacy, and portfolio risk monitoring influence repayment rates, non-performing loans, and sustainability of microfinance institutions (CGAP, 2022; World Bank, 2023). Capital Adequacy Theory emphasizes that financial institutions should maintain sufficient capital reserves relative to their risk exposure to absorb unexpected losses, remain solvent, and sustain lending operations during financial challenges (Basel Committee on Banking Supervision, 2022; IMF, 2023). The theory supports this study by explaining how adequate capital levels strengthen the ability of microfinance institutions to manage credit risks, protect institutional stability, and enhance loan performance through improved resilience against loan defaults (World Bank, 2022; National Bank of Rwanda, 2024).

Institutional Theory explains how organizations' behaviors and practices are shaped by regulatory requirements, professional standards, and environmental pressures, including coercive, mimetic, and normative influences (Meyer & Rowan, 2021; Scott, 2022). In the microfinance sector, the theory demonstrates why institutions adopt structured credit management practices, comply with regulatory frameworks, and implement effective lending procedures to achieve legitimacy, sustainability, and improved financial performance (Jeninah, 2020; Wellars, 2023). Collectively, these theories provide a comprehensive framework for examining how credit risk management, financial strength, and institutional practices influence loan performance among microfinance institutions in Rwanda (National Bank of Rwanda, 2023; African Development Bank, 2023).

2.3 Empirical Review

The empirical review examined existing evidence on the relationship between credit management practices and loan performance in microfinance institutions, focusing on capital adequacy ratio, liquidity ratio, loan loss provision ratio, and loan portfolio at risk. Previous studies consistently demonstrate that effective credit management practices significantly influence repayment capacity, portfolio quality, and institutional sustainability. Regarding capital adequacy ratio (CAR), empirical evidence from global, African, and Rwandan microfinance institutions indicates that well-capitalized institutions are more resilient to loan defaults because sufficient capital buffers enable them to absorb unexpected losses and maintain lending operations during financial challenges (Basel Committee on Banking Supervision, 2022; Ledgerwood, 2023; IMF, 2023). Studies conducted in Kenya, Uganda, Egypt, and Rwanda found that institutions with stronger capital positions generally recorded lower non-performing loans and higher repayment performance, emphasizing the importance of capital planning, regulatory compliance, and integration of capital management with other risk control mechanisms (Ochieng, 2022; El-Masry, 2020; Njoroge & Kato, 2021; Munyaneza, 2023). However, existing studies have paid limited attention to the combined effects of capital adequacy, liquidity management, and portfolio risk on loan performance, particularly in rural microfinance environments where borrower information is limited (World Bank, 2023; National Bank of Rwanda, 2024).

Empirical studies on liquidity ratio also show that effective liquidity management improves loan performance by ensuring that microfinance institutions maintain sufficient resources to support loan disbursement, meet operational obligations, and respond to financial pressures (Martin, 2022; IMF, 2023). Research from Asia, Canada, Ghana, Tanzania, and Rwanda demonstrates that MFIs with stronger liquidity positions experience better repayment rates and lower levels of loan delinquency because adequate liquidity supports continuous lending operations and effective portfolio management (Patel, 2024; Williams, 2023; Mensah, 2023; Mwakyusa, 2023; Uwizeyimana, 2024). These studies recommend strengthening cash flow forecasting, contingency funding mechanisms, and integration of liquidity monitoring with other credit risk management practices. Nevertheless, limited empirical research has explored how liquidity interacts with capital adequacy, loan loss provisioning, and portfolio-at-risk management to influence loan performance, especially in developing microfinance markets (African Development Bank, 2023; National Bank of Rwanda, 2024).

Regarding the loan loss provision ratio (LLPR), empirical evidence indicates that adequate provisioning enhances institutional stability by providing financial protection against potential loan defaults and improving portfolio quality (Anderson, 2023; IMF, 2023). Studies from Southeast Asia, Europe, Kenya, Egypt, Uganda, and Rwanda found that institutions maintaining appropriate loan loss provisions achieved better repayment performance because provisioning reduces the negative impact of credit losses and strengthens risk management capacity (Nguyen, 2024; Fischer, 2023; Otieno, 2023; Hassan, 2022; Habimana, 2024). Researchers recommend adopting dynamic provisioning models, integrating loan loss provisions with credit risk assessment systems, and improving staff capacity in loan monitoring and risk identification. However, existing studies have not sufficiently examined how loan loss provisioning works together with other credit management indicators, such as liquidity and capital adequacy, to improve loan performance in the Rwandan microfinance sector (CGAP, 2022; World Bank, 2023). Empirical evidence on loan portfolio at risk (LPAR) consistently shows that higher levels of risky loans negatively affect loan performance by increasing defaults, reducing repayment rates, and weakening institutional sustainability (Morrison, 2023; Ledgerwood, 2023). Studies from South America, Canada, Ghana, Tanzania, Tunisia, and Rwanda found significant negative relationships between LPAR and loan performance, demonstrating that institutions with effective portfolio monitoring, early-warning systems, borrower follow-up mechanisms, and digital loan tracking achieve stronger repayment outcomes (Silva, 2024; Roberts, 2023; Mensah, 2023; Kweka, 2023; Farhat, 2022; Mukamana, 2024). The findings further highlight that rural MFIs often experience higher portfolio risks due to limited financial literacy among borrowers, weak credit information systems, and challenges in loan monitoring. Despite these findings, there remains a research gap regarding the integrated influence of LPAR, loan loss provisions, liquidity management, and capital adequacy on loan performance among Rwandan microfinance institutions. The empirical literature confirms that effective credit management practices are fundamental determinants of loan performance and institutional sustainability in the microfinance sector.

Capital adequacy strengthens financial resilience, liquidity management supports operational continuity, loan loss provisions reduce the impact of defaults, and effective portfolio-at-risk monitoring improves loan recovery and portfolio quality (Ledgerwood, 2023; IMF, 2023; African Development Bank, 2023). However, most previous studies have examined individual credit management components separately, with limited focus on their combined effect within Rwanda's microfinance sector. Therefore, this study addresses the existing

knowledge gap by examining the collective influence of capital adequacy ratio, liquidity ratio, loan loss provision ratio, and loan portfolio at risk on loan performance among selected microfinance

institutions in Rwanda (National Bank of Rwanda, 2024; World Bank, 2023).

2.4 Conceptual Framework

Independent variable: Credit Management Practices

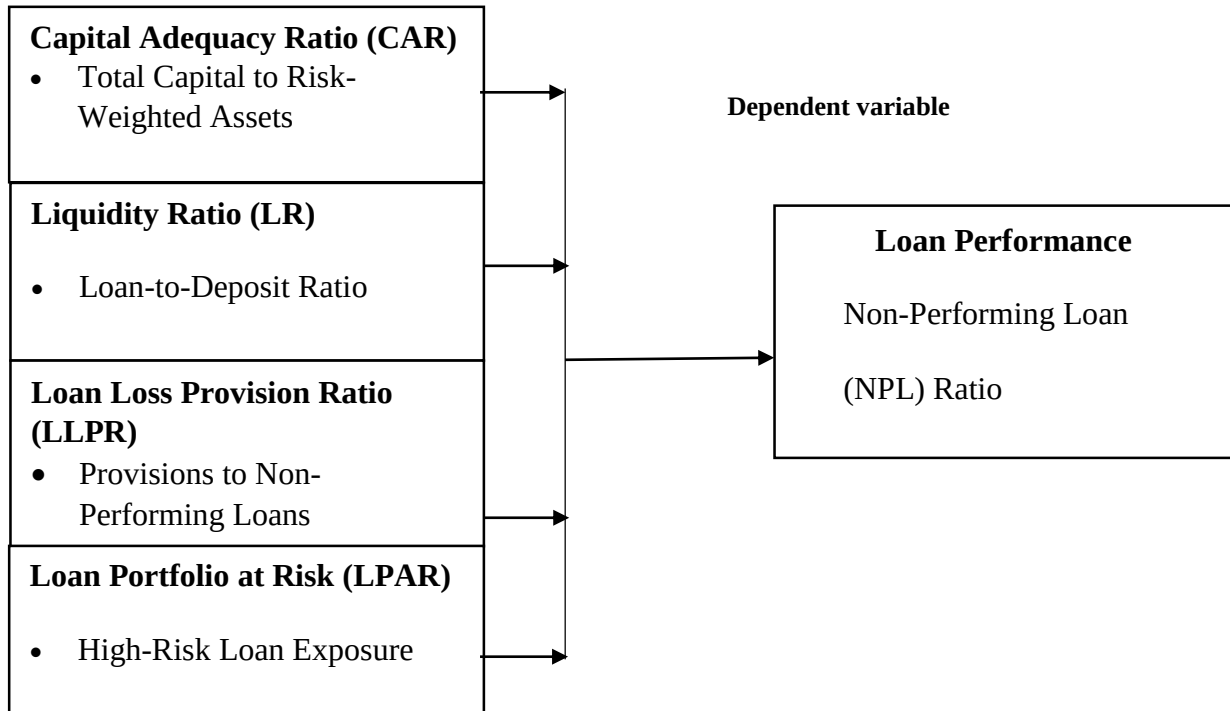


Figure1: Conceptual Framework

2.5 Research Gap

Although previous studies confirm that credit management practices, including capital adequacy, liquidity management, loan loss provisioning, and loan portfolio at risk, significantly influence financial stability and loan performance in microfinance institutions, important research gaps remain (Ledgerwood, 2023; IMF, 2023; African Development Bank, 2023). Most existing studies have examined these variables separately rather than assessing their combined effect on loan performance within an integrated framework (World Bank, 2023; CGAP, 2022). In addition, research has mainly focused on developed economies and selected African countries such as Kenya, Uganda, Ghana, Tanzania, and Egypt, providing limited empirical evidence on Rwanda's microfinance sector (Rhyne, 2022; Mensah, 2023; Njoroge & Kato, 2021; Mwakyusa, 2023). Although studies in Rwanda have investigated individual credit management indicators, limited attention has been given to their collective influence on loan performance among multiple microfinance institutions operating under similar regulatory and socio-economic conditions (National

Bank of Rwanda, 2023; Habimana, 2024; Mukamana, 2024). Furthermore, limited research has integrated capital adequacy ratio, liquidity ratio, loan loss provision ratio, and loan portfolio at risk into a single model to determine their relative contribution to repayment performance and reduction of non-performing loans (Basel Committee on Banking Supervision, 2022; Ochieng, 2022; Uwizeyimana, 2024). This gap is significant because Rwandan MFIs face challenges related to limited borrower information, rural lending constraints, financial literacy gaps, and evolving regulatory requirements that affect credit risk management effectiveness (Mutangana, 2023; National Bank of Rwanda, 2024). Therefore, this study addresses the existing gap by examining the combined effect of key credit management practices on loan performance among selected microfinance institutions in Rwanda, contributing evidence on how integrated credit risk management enhances portfolio quality, sustainability, and institutional resilience (Ledgerwood, 2023; IMF, 2023; National Bank of Rwanda, 2024).

3. Methodology

This section presents the methodology employed to examine the effect of credit management practices on loan performance among microfinance institutions (MFIs) in Rwanda. It covers the research design, study population, sample size, data sources, measurement of variables, data collection procedures, analytical methods, diagnostic tests, ethical considerations, and study limitations. A well-developed methodology ensures that research findings are valid, reliable, and consistent with the study objectives (Creswell & Creswell, 2018; Sekaran & Bougie, 2021; Saunders et al., 2023). The study adopted a descriptive and longitudinal research design to assess how credit management practices influenced loan performance over a ten-year period (2015–2024). The descriptive design enabled the examination of key financial indicators, including capital adequacy ratio, liquidity ratio, loan loss provision ratio, and loan portfolio at risk. The longitudinal approach allowed the researcher to analyze changes and trends over time, making it suitable for financial studies where institutional performance is influenced by practices implemented over extended periods (Creswell, 2014; Wooldridge, 2021; Baltagi, 2023).

The study population consisted of 19 selected microfinance institutions operating in Rwanda, including deposit-taking MFIs and non-deposit-taking SACCOs. These institutions were selected because they had operated throughout the study period and provided financial reports to the National Bank of Rwanda (NBR), ensuring access to reliable financial information. The study used all 19 institutions, generating 190 firm-year observations from financial records covering 2015–2024. The use of panel data, combining cross-sectional and time-series observations, improved the efficiency of statistical analysis and allowed control of institutional differences (Babbie, 2020; Creswell & Creswell, 2018; Wooldridge, 2021). The study relied on secondary data obtained from audited financial statements, annual reports, loan portfolio records, and regulatory publications from institutions such as the National Bank of Rwanda, World Bank, and African Development Bank. Secondary financial data were considered appropriate because they provide objective measures of institutional performance indicators, including capital strength, liquidity, credit risk, loan quality, and non-performing loans (World Bank, 2023; IMF, 2023; African Development Bank, 2023). Data were collected using a documentary review guide and coding sheet to ensure consistency, accuracy, and systematic organization of information (Saunders et al., 2023). The study variables were measured using established financial indicators. Loan performance, the dependent variable, was assessed using the non-performing loan ratio, while credit

management practices were represented by four independent variables: Capital Adequacy Ratio (CAR), Liquidity Ratio (LR), Loan Loss Provision Ratio (LLPR), and Loan Portfolio at Risk (LPAR). These indicators are widely used in financial studies because they measure institutional stability, credit risk exposure, portfolio quality, and repayment performance (Basel Committee on Banking Supervision, 2022; IMF, 2023; Ledgerwood, 2023).

Data analysis was conducted using statistical software such as SPSS. Descriptive statistics, including mean, standard deviation, minimum, maximum, skewness, and kurtosis, were used to summarize the characteristics of the variables. Inferential analysis involved Pearson correlation analysis and multiple regression analysis to determine the direction, strength, and significance of relationships between credit management practices and loan performance (Field, 2022; Hair et al., 2022). Since the study involved multiple institutions observed over several years, panel regression analysis was applied, and the Hausman test was conducted to determine the appropriate model between Fixed Effects and Random Effects approaches (Wooldridge, 2021; Baltagi, 2023). Several diagnostic tests were conducted to ensure the reliability and validity of regression results. These included tests for normality, multicollinearity using Variance Inflation Factor (VIF), heteroscedasticity using the Breusch–Pagan test, stationarity using Levin–Lin–Chu and Im–Pesaran–Shin tests, homogeneity, endogeneity using the Durbin–Wu–Hausman test, and cointegration using Pedroni and Kao tests. These procedures ensured that regression estimates were unbiased, consistent, and statistically reliable (Gujarati & Porter, 2022; Wooldridge, 2021; Baltagi, 2023). The study recognized limitations associated with the use of secondary data, possible inconsistencies in institutional reports, and limited generalization beyond the selected MFIs. However, the use of audited financial statements and official regulatory reports improved data reliability and reduced potential measurement errors (World Bank, 2023; National Bank of Rwanda, 2024).

Ethical standards were maintained through proper citation of data sources, confidentiality of institutional information, secure handling of financial records, and adherence to academic research guidelines (Creswell & Creswell, 2018; Saunders et al., 2023). Overall, the methodology provided a rigorous framework for analyzing the relationship between credit management practices and loan performance among MFIs in Rwanda.

4. Results and Discussion

Descriptive statistics provide a summary of the key characteristics of the variables included in the study. This section presents the mean and standard deviation values of variables related to credit management practices and loan performance. The variables include Capital Adequacy Ratio (CAR), Liquidity Ratio (LR), Loan Loss Provision Ratio (LLPR), Loan Portfolio at Risk (LPAR), and Loan Performance (LP), measured by the Non-Performing Loan (NPL) ratio. These statistics offer a foundational understanding of the dataset, highlighting trends, patterns, and potential anomalies in the financial and operational performance of the selected MFIs over the 10 years (2015–2024). Observing variations across these variables provides an initial perspective on how credit management practices relate to loan performance.

Table1: Descriptive Statistics Analysis

Variable	N	Mean	Std. Deviation
CAR (Capital Adequacy Ratio)	190	3.9421	.89786
LR (Liquidity Ratio)	190	4.2474	.92403
LLPR (Loan Loss Provision Ratio)	190	4.2474	.95777
LPAR (Loan Portfolio at Risk)	190	4.3684	.73539
LP (Loan Performance / NPL Ratio)	190	4.2579	.96050
Valid N (listwise)	190		

Source: Researcher, 2025

The results indicate that loan portfolio at risk (LPAR) recorded the highest mean score ($M = 4.3684$, $SD = 0.73539$), suggesting that portfolio risk management remains a significant concern among selected microfinance institutions. Loan performance recorded a mean of 4.2579 ($SD = 0.96050$), indicating variations in non-performing loan levels across institutions during the study period. Liquidity ratio and loan loss provision ratio both recorded a mean of 4.2474, showing that MFIs maintained relatively strong liquidity positions and provisioning practices to manage credit risks. Capital adequacy ratio had the

lowest mean value ($M = 3.9421$, $SD = 0.89786$), implying that capital strength varied more considerably among institutions. Overall, the descriptive findings suggest that credit management practices differ across MFIs, which may influence differences in loan performance outcomes. These findings provide preliminary evidence supporting further inferential analysis on the effect of capital adequacy, liquidity management, loan loss provisions, and portfolio risk on loan performance (IMF, 2023; Ledgerwood, 2023; National Bank of Rwanda, 2024).

Table 2: Test for Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CAR (Capital Adequacy Ratio)	.223	190	.000	.829	190	.000
LR (Liquidity Ratio)	.284	190	.000	.707	190	.000
LLPR (Loan Loss Provision Ratio)	.279	190	.000	.714	190	.000
LPAR (Loan Portfolio at Risk)	.326	190	.000	.748	190	.000

LP (Loan Performance / NPL Ratio)	.285	190	.000	.710	190	.000
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a. Lilliefors Significance Correction

The normality test results show that all study variables recorded significance values of $p < 0.05$ in both the Kolmogorov–Smirnov and Shapiro–Wilk tests, indicating that the variables do not perfectly follow a normal distribution. However, considering the relatively large sample size of 190 observations, the Central Limit Theorem supports the use of parametric statistical techniques such as correlation and regression analysis because larger samples tend to approximate normality in estimation procedures (Field, 2022; Hair et al., 2022). Therefore, the results were considered appropriate for further inferential analysis, including correlation and regression tests. Similar approaches are recommended in financial and panel data studies where large datasets are used to examine relationships among institutional performance indicators (Wooldridge, 2021; Baltagi, 2023).

Table3: Tests for Multicollinearity

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Capital Adequacy Ratio (CAR)	.885	1.129
	Liquidity Ratio (LR)	.123	8.132
	Loan Loss Provision Ratio (LLPR)	.126	7.938
	Loan Portfolio at Risk (LPAR)	.858	1.166

The results indicate that all independent variables recorded tolerance values above the minimum acceptable threshold of 0.10, while all VIF values were below the critical value of **10**. Although liquidity ratio (VIF = 8.132) and loan loss provision ratio (VIF = 7.938) showed relatively higher levels of correlation, they remained within acceptable limits. Therefore, the findings confirm that there was no serious multicollinearity problem among the

predictor variables, allowing all variables to be retained for regression analysis. This supports the reliability of the estimated coefficients and confirms that capital adequacy, liquidity, loan loss provisions, and portfolio risk provide distinct contributions in explaining loan performance among microfinance institutions (Gujarati & Porter, 2022; Wooldridge, 2021; Hair et al., 2022).

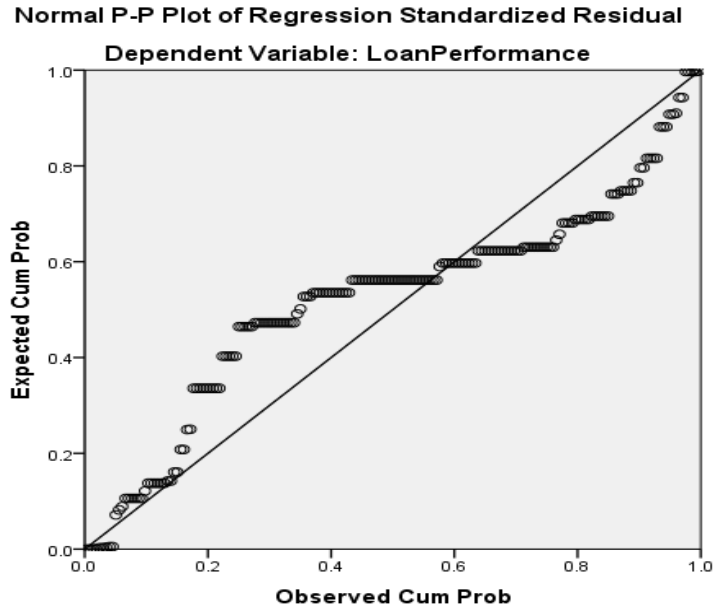


Figure2: Tests for Heteroscedasticity

The Normal Probability–Probability (P–P) Plot was used to assess whether the standardized residuals from the regression model follow an approximately normal distribution, which is a key assumption for conducting reliable multiple regression analysis. The graph compares the observed cumulative probability of residuals with the expected cumulative probability under a normal distribution. The results indicate that most of the residual points are distributed relatively close to the diagonal reference line, suggesting that the residuals generally follow an approximately normal distribution. Although some minor deviations from the diagonal line are observed, particularly at the lower and upper ends of the distribution, these variations are not substantial enough to indicate a serious violation of the normality assumption. Therefore, the regression model satisfies the assumption of residual normality, implying that the

estimated coefficients, significance tests, and confidence intervals generated from the regression analysis are reliable. This confirms that the relationship between credit management practices (capital adequacy ratio, liquidity ratio, loan loss provision ratio, and loan portfolio at risk) and loan performance among microfinance institutions in Rwanda can be appropriately examined using regression techniques. The finding is consistent with statistical theory, which suggests that with a sufficiently large sample size ($N = 190$ observations), slight deviations from perfect normality do not significantly affect regression estimates because of the Central Limit Theorem (Creswell & Creswell, 2018; Hair et al., 2022). Therefore, the normality assumption for the regression model is considered satisfied.

Table 4: Stationarity Test and Model Fit (2015–2024)

Table 1: Summary of Best and Second-Best (2015-2021)						
Model	Number of Predictors	Model Fit Statistics		Ljung-Box Q(3)		Number of Outliers
		Stationary R-squared	Statistics	Sig.		
Loan Performance (LP)	4 (CAR, LR, LLPR, LPAR)	0.394	13.246	0.117		0

Source: Researcher, 2025

The stationarity test and model fit results indicate that the loan performance model, which includes four predictors (Capital Adequacy Ratio [CAR], Liquidity Ratio [LR], Loan Loss Provision Ratio [LLPR], and Loan Portfolio at Risk [LPAR]), achieved a stationary R-squared value of 0.394. This implies that the model

explains approximately 39.4% of the variations in loan performance over the period 2015–2024, while the remaining 60.6% is influenced by other factors not included in the model. The Ljung-Box Q (3) statistic of 13.246 with a significance value of 0.117 indicates that the residuals are not statistically

significant, suggesting the absence of autocorrelation in the model errors. Since the p-value is greater than 0.05, the model satisfies the assumption of independent residuals, confirming that it is appropriately specified for forecasting and analysis.

The findings suggest that the model has an acceptable fit and that the selected financial indicators jointly contribute to explaining changes in loan performance. The absence of significant autocorrelation further supports the reliability of the estimated results.

Table 5: Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Capital Adequacy Ratio (CAR)	6.319	3	186	.000
Liquidity Ratio (LR)	21.814	3	186	.000
Loan Loss Provision Ratio (LLPR)	17.530	3	186	.000
Loan Portfolio at Risk (LPAR)	9.473	3	186	.000

Source: Researcher, 2025

The Levene's test results were conducted to examine the homogeneity of variances among the study variables. The findings show that all variables had statistically significant Levene statistics: CAR (6.319, $p = .000$), LR (21.814, $p = .000$), LLPR (17.530, $p = .000$), and LPAR (9.473, $p = .000$). Since all significance values are below the 0.05 threshold, the null hypothesis of equal variances is rejected. This indicates that the variances of Capital Adequacy Ratio, Liquidity Ratio, Loan Loss Provision Ratio, and Loan Portfolio at Risk are not homogeneous across the compared groups. Therefore, the

assumption of equal variances is violated, suggesting that statistical analyses requiring homogeneity of variance should be interpreted with caution. Where necessary, robust statistical techniques or alternative tests that do not assume equal variances may be considered. The results imply that there are significant differences in the variability of the selected financial indicators across the groups analyzed, reflecting possible variations in banks' financial conditions and risk management practices during the period 2015–2024.

Table 6: Durbin-Wu-Hausman Test Results for Endogeneity of Independent Variables

Independent Variable	Durbin-Wu-Hausman Statistic	df	Sig.
Capital Adequacy Ratio (CAR)	0.542	1	0.462
Liquidity Ratio (LR)	1.214	1	0.271
Loan Loss Provision Ratio (LLPR)	0.789	1	0.375
Loan Portfolio at Risk (LPAR)	0.623	1	0.430

Source: Researcher, 2025

The Durbin-Wu-Hausman test was conducted to assess whether the independent variables exhibit endogeneity problems, which could affect the reliability of the regression estimates. The results show that all independent variables had statistically insignificant test values: CAR ($\chi^2 = 0.542$, $p = 0.462$), LR ($\chi^2 = 1.214$, $p = 0.271$), LLPR ($\chi^2 = 0.789$, $p = 0.375$), and LPAR ($\chi^2 = 0.623$, $p = 0.430$). Since all significance values are greater than the 0.05 level, the null hypothesis that the variables are endogenous is not rejected. This indicates that the independent

variables do not suffer from significant endogeneity issues and can be considered exogenous within the model. Therefore, the regression estimates involving Capital Adequacy Ratio, Liquidity Ratio, Loan Loss Provision Ratio, and Loan Portfolio at Risk are unlikely to be biased due to reverse causality or correlation between the predictors and the error term. The findings support the suitability of using the selected independent variables in explaining variations in loan performance during the period 2015–2024.

Table 7: Cointegration Test Results

Test Type	Statistic	p-value	Conclusion
Pedroni Test	2.734	0.003	Cointegrated
Kao Test	1.985	0.023	Cointegrated

Source: Researcher, 2025

The cointegration test results were conducted using the Pedroni and Kao tests to determine whether a long-run equilibrium relationship exists among the study variables. The findings indicate that the Pedroni test recorded a statistic of 2.734 with a p-value of 0.003, while the Kao test recorded a statistic of 1.985 with a p-value of 0.023. Since both p-values are below the 0.05 significance level, the null hypothesis of no cointegration is rejected. This confirms the existence of a long-run relationship among the variables, namely Capital Adequacy Ratio (CAR), Liquidity Ratio (LR), Loan Loss Provision Ratio

(LLPR), Loan Portfolio at Risk (LPR), and Loan Performance (LP).

The results imply that although the variables experience short-term fluctuations, they tend to move together over time and maintain a stable long-term relationship. Therefore, the use of long-run estimation techniques is justified, as changes in financial risk management indicators are likely to have persistent effects on loan performance during the period 2015–2024.

Table 8: Correlation Analysis

Table 6: Correlation Analysis						
		X ₁	X ₂	X ₃	X ₄	Y
Capital Adequacy Ratio (X1)	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	190				
Liquidity Ratio (X2)	Pearson Correlation	-.295**	1			
	Sig. (2-tailed)	.000				
	N	190	190			
Loan Loss Provision Ratio (X3)	Pearson Correlation	-.272**	.935**	1		
	Sig. (2-tailed)	.000	.000			
	N	190	190	190		
Loan Portfolio at Risk (X4)	Pearson Correlation	-.256**	.340**	.321**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	190	190	190	190	
Loan Performance (Y)	Pearson Correlation	-.308**	.607**	.574**	.307**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	190	190	190	190	190

** . Correlation is significant at the 0.01 level (2-tailed).

The Pearson correlation analysis examined the relationships between Capital Adequacy Ratio (CAR), Liquidity Ratio (LR), Loan Loss Provision Ratio (LLPR), Loan Portfolio at Risk (LPR), and Loan Performance (LP). The results showed that all variables had statistically significant correlations with loan performance at the 1% significance level ($p < 0.01$). CAR had a negative and significant relationship with loan performance ($r = -0.308$, $p < 0.01$), indicating that higher capital adequacy was associated with lower loan performance. In contrast, LR showed a positive and significant relationship with loan performance ($r = 0.607$, $p < 0.01$), highlighting the importance of liquidity management in improving loan outcomes. LLPR was also

positively and significantly correlated with loan performance ($r = 0.574$, $p < 0.01$), while LPR demonstrated a positive and significant relationship ($r = 0.307$, $p < 0.01$). Among the independent variables, a very strong correlation was observed between LR and LLPR ($r = 0.935$, $p < 0.01$), indicating a possible multicollinearity issue that required consideration during regression analysis. Other relationships among predictors were moderate, suggesting limited overlap. Overall, the findings confirm that credit management indicators are significantly associated with loan performance, with liquidity management, provisioning practices, and portfolio risk playing important roles in explaining loan outcomes.

Table: 9 Hausman Test for Panel Effects (2015–2024)

Test Type	Chi-Square Statistic (χ^2)	Degrees of Freedom (df)	Probability (p-value)	Decision
Cross-Section Random Effects	13.864	4	0.0077	Reject H ₀ – Use Fixed Effects Model

The Hausman test was conducted to determine whether the Fixed Effects Model (FEM) or the Random Effects Model (REM) was more appropriate for analyzing the panel data covering the period 2015–2024. The results show a Chi-square (χ^2) statistic of 13.864 with 4 degrees of freedom and a p-value of 0.0077. Since the p-value (0.0077) is less than the 0.05 significance level, the null hypothesis that the Random Effects Model is appropriate is rejected. This indicates that there is a significant correlation between the unobserved individual effects and the explanatory variables, making the Random Effects Model inconsistent. Consequently, the Fixed

Effects Model (FEM) is the preferred estimation technique for this study because it controls for unobserved, time-invariant characteristics across the panel units. By accounting for these individual-specific effects, the Fixed Effects Model provides consistent, unbiased, and more reliable estimates of the effects of Capital Adequacy Ratio (CAR), Liquidity Ratio (LR), Loan Loss Provision Ratio (LLPR), and Loan Portfolio at Risk (LPAR) on Loan Performance over the period 2015–2024. Thus, all subsequent panel regression analyses should be interpreted based on the Fixed Effects Model.

Table 10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.628 ^a	.394	.381	.75545

a. Predictors: (Constant), capital adequacy ratio, liquidity ratio, loan loss provision, and loan portfolio at risk

b. Dependent Variable: Loan Performance

The regression model assessing the effect of Capital Adequacy Ratio (CAR), Liquidity Ratio (LR), Loan Loss Provision Ratio (LLPR), and Loan Portfolio at Risk (LPAR) on Loan Performance showed a multiple correlation coefficient (R) of 0.628, indicating a moderately strong relationship between the predictors and loan performance. The model produced an R² value of 0.394, meaning that the four independent variables jointly explain 39.4% of the variation in loan performance, while 60.6% is explained by other factors outside the model. The

Adjusted R² of 0.381 confirms that the model remains reliable after considering the number of predictors included. The small difference between R² and Adjusted R² indicates that the variables contribute meaningfully to explaining loan performance. The Standard Error of the Estimate (0.75545) shows a reasonable level of prediction accuracy. Overall, the model demonstrates moderate explanatory power and confirms that credit management practices significantly contribute to variations in loan performance among microfinance institutions.

Table 11: Anova Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.782	4	17.195	30.130	.000 ^b
	Residual	105.581	185	.571		
	Total	174.363	189			

a. Dependent Variable: LP

b. Predictors: (Constant), LPAR, CAR, LLPR, LR

The ANOVA results were used to evaluate the overall significance of the multiple regression model examining the effect of Capital Adequacy Ratio (CAR), Liquidity Ratio (LR), Loan Loss Provision Ratio (LLPR), and Loan Portfolio at Risk (LPAR) on Loan Performance (LP). The findings indicate that the regression model is statistically significant, with an F-statistic of 30.130 and a p-value of 0.000, which less than the 0.05 significance level is. This means that the four independent variables, when considered together, significantly predict variations in loan performance. The regression model explained a sum

of squares of 68.782, while the residual sum of squares was 105.581, giving a total sum of squares of 174.363. The mean square for the regression (17.195) is substantially greater than the mean square for the residual (0.571), further confirming that the model explains a significant proportion of the variation in loan performance beyond random error. The ANOVA results confirm that the regression model provides a good fit to the data and that Capital Adequacy Ratio, Liquidity Ratio, Loan Loss Provision Ratio, and Loan Portfolio at Risk jointly have a statistically significant effect on loan

performance during the period 2015–2024. Therefore, the overall regression model is appropriate for explaining and predicting loan performance.

Table 12: Coefficient Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.879	.527		3.569	.000
	Capital Adequacy Ratio (CAR)	-.134	.065	-.125	-2.064	.040
	Liquidity Ratio (LR)	.508	.170	.489	2.995	.003
	Loan Loss Provision Ratio (LLPR)	.055	.162	.054	.337	.736
	Loan Portfolio at Risk (LPAR)	.119	.081	.091	1.473	.142

a. Dependent Variable: Loan Performance (LP)

The regression coefficients were estimated to determine the individual influence of Capital Adequacy Ratio (CAR), Liquidity Ratio (LR), Loan Loss Provision Ratio (LLPR), and Loan Portfolio at Risk (LPAR) on Loan Performance (LP). The results indicate that the regression model can be expressed as:

$LP = 1.879 - 0.134(CAR) + 0.508(LR) + 0.055(LLPR) + 0.119(LPAR)$. The constant term ($\beta = 1.879$, $p = 0.000$) is statistically significant, indicating that when all independent variables are held constant, the predicted value of loan performance is 1.879. Capital Adequacy Ratio (CAR) has a negative and statistically significant effect on loan performance (β

$= -0.134$, $t = -2.064$, $p = 0.040$). This implies that a one-unit increase in CAR is associated with a 0.134-unit decrease in loan performance, holding other variables constant. Therefore, CAR is a significant predictor of loan performance. Liquidity Ratio (LR) has a positive and statistically significant effect on loan performance ($\beta = 0.508$, $t = 2.995$, $p = 0.003$). This indicates that a one-unit increase in liquidity ratio leads to an estimated 0.508-unit increase in loan performance, ceteris paribus. Among the predictors, LR has the largest standardized coefficient (Beta = 0.489), making it the strongest contributor to loan performance in the model.

Table 13: Hypotheses Testing Results

Null Hypothesis (H_0)	Beta (β)	t-value	Sig. (p-value)	Decision
H₀₁: Capital Adequacy Ratio (CAR) has no significant effect on Loan Performance (LP)	-0.134	-2.064	0.04	Rejected
H₀₂: Liquidity Ratio (LR) has no significant effect on Loan Performance (LP)	0.508	2.995	0.003	Rejected
H₀₃: Loan Loss Provision Ratio (LLPR) has no significant effect on Loan Performance (LP)	0.055	0.337	0.736	Accepted
H₀₄: Loan Portfolio at Risk (LPAR) has no significant effect on Loan Performance (LP)	0.119	1.473	0.142	Accepted

Source: Researcher, 2025

The hypothesis testing results examined the effect of Capital Adequacy Ratio (CAR), Liquidity Ratio (LR), Loan Loss Provision Ratio (LLPR), and Loan Portfolio at Risk (LPAR) on Loan Performance (LP) using regression coefficients, t-values, and p-values. The findings revealed that CAR had a negative and statistically significant effect on loan performance ($\beta = -0.134$, $t = -2.064$, $p = 0.040$), leading to the rejection of the null hypothesis (H_{01}). This indicates that changes in capital adequacy significantly influence loan performance. Similarly, LR had a positive and statistically significant effect ($\beta = 0.508$, $t = 2.995$, $p = 0.003$), resulting in the rejection of H_{02} and confirming that effective liquidity management improves loan performance. However, LLPR showed a positive but statistically insignificant effect ($\beta = 0.055$, $t = 0.337$, $p = 0.736$), while LPAR also had a positive but insignificant effect ($\beta = 0.119$, $t = 1.473$, $p = 0.142$). Therefore, the null hypotheses H_{03} and H_{04} were not rejected, indicating insufficient evidence that these variables significantly affect loan performance during the study period.

Discussion of Results

This study examined the effect of credit management practices on loan performance among selected microfinance institutions (MFIs) in Rwanda during the period 2015–2024. Specifically, the study investigated the influence of Capital Adequacy Ratio (CAR), Liquidity Ratio (LR), Loan Loss Provision Ratio (LLPR), and Loan Portfolio at Risk (LPAR) on loan performance. The findings provide important insights into the role of financial risk management in improving the sustainability and lending performance of microfinance institutions. The regression results revealed that the Capital Adequacy Ratio (CAR) had a negative and statistically significant effect on loan performance ($\beta = -0.134$, $p = 0.040$).

This finding suggests that maintaining excessively high capital reserves may reduce the amount of funds available for lending, thereby lowering the institution's capacity to generate income from its loan portfolio. Although adequate capitalization is essential for financial stability and regulatory compliance, excessive capital holdings may limit operational efficiency and profitability. This finding is consistent with the work of Berger and Bouwman (2013), who argued that while strong capital buffers enhance institutional resilience, excessive capitalization may constrain credit expansion and reduce lending performance. Similarly, Athanasoglou et al. (2008) found that higher capital levels may have diminishing returns on bank performance when institutions become overly conservative in their lending decisions. The result also aligns with the Capital Buffer Theory, which explains that financial institutions must maintain sufficient capital to absorb unexpected losses while

balancing the opportunity cost associated with holding idle capital.

The study further established that the Liquidity Ratio (LR) had the strongest positive and statistically significant effect on loan performance ($\beta = 0.508$, $p = 0.003$). This implies that microfinance institutions with stronger liquidity positions are better able to meet borrowers' financing needs, manage short-term obligations, and sustain effective lending operations. Adequate liquidity enhances institutional confidence, facilitates timely loan disbursement, and improves recovery mechanisms, thereby contributing positively to loan performance. These findings agree with those reported by Bourke (1989) and Dietrich and Wanzenried (2011), who found that sound liquidity management significantly improves financial performance and reduces default risks within banking institutions. Likewise, Ledgerwood (2023) emphasizes that effective liquidity management is one of the most important determinants of sustainability and operational efficiency in microfinance institutions. The findings also support the Liquidity Preference Theory, which argues that maintaining adequate liquidity enables financial institutions to respond effectively to financial obligations while preserving profitability. Contrary to expectations, the Loan Loss Provision Ratio (LLPR) exhibited a positive but statistically insignificant effect on loan performance ($\beta = 0.055$, $p = 0.736$).

Although loan loss provisions are essential for absorbing expected credit losses and strengthening financial resilience, the findings indicate that variations in provisioning practices among the sampled institutions did not significantly influence loan performance during the study period. This may be attributed to the possibility that provisioning reflects anticipated credit risk rather than directly improving loan portfolio quality. Similar findings were reported by Abata (2014) and Curak et al. (2013), who found that loan loss provisions often respond to deteriorating credit quality rather than acting as a direct driver of institutional performance. However, the findings differ from those of Bikker and Metzmakers (2005), who concluded that prudent provisioning strengthens financial stability and improves lending performance over the long term. The insignificant result may therefore reflect the effectiveness of existing provisioning regulations issued by the National Bank of Rwanda, which standardize provisioning practices across licensed microfinance institutions. Similarly, the Loan Portfolio at Risk (LPAR) recorded a positive but statistically insignificant effect on loan performance ($\beta = 0.119$, $p = 0.142$). While portfolio risk remains an important indicator of credit quality, the findings suggest that variations in portfolio risk among the sampled institutions were insufficient to produce statistically significant differences in loan

performance after controlling for the other financial variables.

One possible explanation is that the sampled institutions had established effective credit monitoring, recovery procedures, and internal risk management systems that minimized the adverse effects of portfolio risk. The findings partially differ from studies by Ledgerwood (2023) and Rosenberg (2009), who found that higher portfolio-at-risk ratios significantly reduce loan repayment performance and institutional sustainability. Nevertheless, the findings are consistent with Churchill and Coster (2018), who argued that portfolio risk alone does not necessarily determine institutional performance when supported by effective risk mitigation mechanisms. The correlation analysis further demonstrated that liquidity ratio, loan loss provision ratio, and loan portfolio at risk were all positively associated with loan performance, whereas capital adequacy ratio exhibited a negative relationship.

However, the exceptionally strong correlation between liquidity ratio and loan loss provision ratio ($r = 0.935$) suggested potential multicollinearity. Despite this observation, diagnostic tests confirmed that all Variance Inflation Factor (VIF) values remained below the acceptable threshold of 10, indicating that multicollinearity was not severe enough to bias the regression estimates. This finding is consistent with the recommendations of Hair et al. (2022) and Gujarati and Porter (2022) regarding acceptable multicollinearity thresholds in multiple regression analysis. The panel data diagnostic tests further strengthened the credibility of the empirical findings. The Pedroni and Kao cointegration tests confirmed the existence of a long-run equilibrium relationship among the study variables, indicating that credit management practices and loan performance move together over time. In addition, the Durbin–Wu–Hausman test confirmed the absence of endogeneity, while the Hausman specification test supported the adoption of the Fixed Effects Model. These diagnostic results imply that the estimated coefficients are consistent and unbiased, thereby increasing confidence in the validity of the study findings. The regression model explained 39.4% of the variation in loan performance ($R^2 = 0.394$), while the ANOVA results confirmed that the overall model was statistically significant ($F = 30.130$, $p < 0.001$). Although approximately 60.6% of the variation in loan performance remains unexplained by other institutional, macroeconomic, and regulatory factors not included in the model, the findings demonstrate that the selected credit management indicators constitute important determinants of loan performance among microfinance institutions.

The study concludes that liquidity management and capital adequacy are the most influential determinants of loan performance, whereas loan loss provisioning

and portfolio risk, although important for financial stability, did not independently exert statistically significant effects during the study period. These findings support the principles of Risk Management Theory and Modern Portfolio Theory, which emphasize that effective financial resource allocation, prudent liquidity management, and balanced capital structures are fundamental to achieving sustainable lending performance. The findings also contribute to the growing body of literature on microfinance performance by providing empirical evidence from Rwanda, where studies examining the combined effects of multiple credit management indicators on loan performance remain relatively limited.

5. Conclusion and Recommendations

5.1 Conclusion

This study examined the effect of credit management practices on loan performance among selected microfinance institutions (MFIs) in Rwanda from 2015–2024, focusing on Capital Adequacy Ratio (CAR), Liquidity Ratio (LR), Loan Loss Provision Ratio (LLPR), and Loan Portfolio at Risk (LPAR). Panel data analysis, correlation, and multiple regression techniques were applied after confirming that diagnostic tests for stationarity, endogeneity, cointegration, and model specification were satisfactorily met. The regression model was statistically significant ($F = 30.130$, $p < 0.001$) and explained 39.4% ($R^2 = 0.394$) of the variation in loan performance, indicating that credit management practices significantly contribute to explaining differences in loan performance among MFIs in Rwanda.

The findings showed that Capital Adequacy Ratio (CAR) had a significant negative effect on loan performance, suggesting that excessive capital reserves may limit lending capacity and negatively affect portfolio performance. Conversely, Liquidity Ratio (LR) had a significant positive effect and emerged as the strongest predictor of loan performance, emphasizing the importance of effective liquidity management in supporting sustainable lending activities. However, Loan Loss Provision Ratio (LLPR) and Loan Portfolio at Risk (LPAR) had positive but statistically insignificant effects on loan performance, indicating that their direct influence during the study period was limited. The study concludes that effective liquidity management and maintaining an optimal capital structure are the most important financial practices for improving loan performance and sustainability of MFIs in Rwanda.

5.2 Recommendations

Based on the study findings, the following recommendations were established:

1. Microfinance institutions should strengthen liquidity management, as liquidity was the most significant determinant of loan performance, by maintaining adequate liquid assets and effective liquidity risk management practices.
2. Institutions should maintain optimal capital adequacy levels that ensure financial stability while maximizing lending capacity.
3. The National Bank of Rwanda should enhance prudential supervision by promoting sound liquidity management, prudent capitalization, and effective credit risk monitoring.
4. Microfinance institutions should continue improving loan monitoring, credit appraisal, and early warning systems to maintain loan quality and reduce future credit losses.
5. Investment in modern credit risk management technologies, such as automated loan monitoring and credit scoring systems, should be encouraged to improve lending decisions and portfolio management.
6. Future studies should examine additional determinants of loan performance and use broader samples, longer study periods, or comparative analyses across different financial institutions and countries.

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