

A study on financial performance of cooperative societies in Nepal

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Abstract: This article delves into the financial performance of cooperative societies in Nepal, honing in on liquidity, leverage, and risk management. Employing a robust methodology encompassing descriptive, financial ratio, correlation, and regression analyses, the study is centered on cooperatives in Kathmandu. The sample, carefully selected to represent approximately 10% of total cooperatives, is derived from a combination of primary and secondary data sources. The analysis extends to various dimensions including organizational structure, loan investment procedures, and credit risk management practices within these cooperative societies. Through regression models, the study uncovers significant relationships between financial performance indicators such as return on assets, net profit margin, net interest margin, and return on equity, and a multitude of factors. One of the key findings underscores the critical importance of effectively managing leverage and liquidity to bolster cooperative profitability. This not only highlights the financial health of these cooperatives but also sheds light on their operational efficiency and risk resilience. By integrating both primary and secondary data sources, the study offers a comprehensive exploration of critical aspects related to cooperative financial performance. It provides valuable insights into effective strategies for optimizing leverage and liquidity within these cooperative societies, which can serve as a roadmap for enhancing their sustainability and resilience in the face of economic challenges.

Keywords: *Financial performance, Investment risk, Leverage risk, Liquidity risk.*

1. Introduction

Cooperatives are independent, membership-driven organizations that operate under principles of self-management and self-control. Their financial success hinges on the competence and motivation of their human resources, effective management, and adherence to principles like the rule of law, fairness, and transparency. Capacity building and strong relationships with members, employees, suppliers, and communities further contribute to enhanced performance.

Cooperatives represent a unique blend of commercial enterprise and community organization, functioning for the collective benefit of their users and members. Governed by the "one member, one vote" principle, cooperatives are collectively owned and democratically managed. They prioritize democratic, participatory, and transparent organizational structures and decision-making processes, with self-help, mutual aid, individual responsibility, democracy, equality, and solidarity as their core values. Members of cooperatives embrace moral values, including social responsibility, honesty, ownership, and compassion, as they actively participate in fostering a cooperative and socially responsible business environment.

The cooperative movement in Nepal has a robust historical foundation, driven by the noble aim of enhancing the socio-economic well-being of marginalized rural communities. The country's rich tradition of promoting cooperation is evident in various traditional practices such as Parm, Dhikuti, Manka Khal, Dharma Bhakari, etc. The genesis of modern cooperatives in Nepal can be traced back to 1957 when the Bakhampur saving and credit cooperative committee was established in Chitwan. As of mid-March 2023, marking sixty-six years since its establishment, the cooperative movement has demonstrated remarkable growth. The accumulated share capital reached an 94.15 billion rupees, with total deposits amounting to 478.03 billion rupees and the cooperatives disbursed a total 426.35 billion rupees in loans to their members. This not only provided direct employment to 93,771 individuals but also generated numerous

indirect employment opportunities. The scale of this movement is noteworthy, with 7,381,218 members actively participating across 31,373 cooperative societies (Economic, 2023). This expansion underscores the cooperative sector's significant contribution to the economic landscape of Nepal, playing a pivotal role in fostering financial inclusion and sustainable development.

The cooperative sector's tremendous growth occurred following the restoration of democracy in 1990, accompanied by the enactment of a new cooperative act in 1992 and the adoption of liberal economic policies by the democratic Government of Nepal. The cooperative sector in Nepal plays a pivotal role in expanding access to financial services, offering non-financial support, and contributing to the socio-economic well-being of its members. Economic survey, 2023 revealed that a significant portion of the population prefers saving and borrowing through cooperatives, underscoring the need for a tailored rating tool to evaluate the performance of financial cooperatives in Nepal.

Various rating tools are utilized to assess the financial health of cooperative institutions, including PEARLS, CAMELS, etc. In Nepal, these tools are employed by some of the cooperative societies only. However, a critical knowledge gap exists in selecting an appropriate performance assessment tool for saving and credit cooperatives in Nepal, as the suitability and validity of these tools have not been comprehensively discussed.

The performance of cooperative societies has improved due to factors like access to capital, risk-sharing mechanisms, and strong community support. However, challenges such as adverse selection problems, lack of transparency, and governance issues have emerged, necessitating greater awareness, regulation, and ethical considerations in cooperative practices.

Uwaramutse, Towo, and Machimu (2022) identified key factors like liquidity, leverage, employee count, total assets, and share capital as significant drivers of Return on Assets (ROA) and Return on Equity (ROE). Ng'etich Joseph Collins (2011) emphasized the direct influence of loan evaluation criteria on the performance of savings and credit cooperative societies. Evaluating profitability, particularly through ROE and ROA, is common among cooperative managers and analysts to identify high-performing societies. Cooperative financial performance reflects both immediate decisions and enduring strategies, visible through financial statements. This study aims to analyze Nepalese cooperative societies' financial performance using descriptive, financial ratio, correlation, and regression analysis tools.

2. Literature Review

The cooperative sector in Nepal has recently garnered increased attention due to its potential contributions to financial inclusion and economic development. This surge in interest has spurred an in-depth examination of the financial performance of cooperative societies in Nepal, with a focus on the critical factors shaping their success.

The International Credit Union Regulators' Network (ICURN) has emerged as a pivotal advocate for effective regulation and supervision within the cooperative sector. ICURN's principles emphasize the necessity of a robust regulatory framework, delineating specific Key Performance Indicators (KPIs), allocating adequate human and financial resources, conducting regular monitoring, and implementing corrective measures when needed (WOCCU, 2011). This framework serves as a foundational basis for ensuring sound governance and oversight.

In contributing to the understanding of cooperative financial performance, the United Nations Capital Development Fund (UNCDF) identifies five key areas adapted from the microfinance sector: outreach, productivity, efficiency, self-sufficiency, and delinquency (United Nations Capital Development Fund, 2003). These areas offer a comprehensive evaluation framework for assessing how effectively cooperative institutions serve their members and communities.

Ngui (2010) underscores financial performance as a critical indicator of how effectively a firm utilizes its assets to generate revenue from primary business activities. The measurement of financial performance aims to optimize the return on the capital invested in business operations.

Uno, Ita, Mbong, Vera, and Okpunor (2023) discover that internal audit, control activities, communication, and monitoring significantly impact the performance of thrift and credit cooperatives.

Their recommendations underscore the importance of internal control in mitigating risks within the cooperative sector.

Regarding performance evaluation, Tunji (2013) defines performance as the result of organizational activities over a given period. Financial performance is assessed using various variables to determine how well an entity has achieved its financial objectives (Wainaina, 2011).

Chunilal (2014) underscores the pivotal role of financial analysis in comprehending the strengths and weaknesses of cooperative entities. This analytical approach involves a thorough examination of key financial statement figures and their interconnections, offering deeper insights into a cooperative's financial position and performance. Chunilal provides practical strategies for enhancing financial leverage within cooperatives, offering actionable guidance for cooperative management seeking to optimize financial stability.

Addressing challenges presented by the COVID-19 pandemic, Juma and Maseko (2022) propose tailored recommendations for savings and credit cooperative societies (SACCOS), emphasizing online supervision, self-regulation, and off-site audits to manage the profound impact of interest rates on SACCOS financial performance and mitigate loan defaults and member dropouts.

To tackle financial challenges faced by cooperatives in Tanzania, Juma and Maseko (2022) call for government intervention, particularly in terms of infrastructure support. They stress sustained government backing for long-term cooperative industry development and advocate for further research into the economic consequences of the COVID-19 pandemic on cooperative societies like SACCOS. However, challenges faced by cooperatives and SACCOS in Tanzania, such as poor management, embezzlement, working capital deficits, suboptimal business practices, and high loan delinquency rates (Maghimbi, 2010; Mwakajumilo, 2011) underscore the need for effective governance and management practices within the cooperative sector to ensure sustainability and continued contributions to economic growth.

Paudel (2014) and Paudel (2023) reveals the remarkable potential of Nepalese cooperative societies as robust microfinance institutions. Across diverse landscapes, these societies heavily rely on member savings and equity for financial sustenance, with interest rates on loans emerging as pivotal determinants of profitability. Paudel's findings highlight the efficiency of Nepalese cooperative societies in operating with minimal administration costs, even in impoverished and remote communities, where significant member savings are amassed. Noteworthy recommendations include maintaining a strict separation between politics and the business affairs of SACCOS and instituting comprehensive training programs in investment analysis, targeting both management and members to enhance financial prudence.

Juma and Maseko (2022) emphasize the global oversight of SACCOS financial performance by WOCCU, concluding that the impact of interest rates on SACCOS financial performance can vary significantly. Successful SACCOS exhibit strong control over loan defaults, ensuring enhanced financial stability and superior overall performance.

Paudel (2023) indicate that cooperative societies in Nepal are distributing dividends surpassing their actual profits, raising concerns about transparency and potential mismanagement of member deposits. Immediate measures are suggested to improve transparency within the cooperative sector, protecting the integrity of financial operations and maintaining the trust and confidence of cooperative members.

Upadhaya, Munir, and Blount (2014) emphasize that performance measurement involves collecting, analyzing, and reporting information on the performance of individuals, groups, organizations, systems, or components. Internal control, including internal audits, enhances the reliability of financial performance by increasing accountability among information providers within an organization (Ejoh & Ejom, 2014).

A study by WOCCU (2008) revealed severe liquidity problems faced by SACCOS, with the majority unable to meet clients' demands for loans and withdrawals of savings. Common issues affecting SACCOS in Malawi included inadequate capital, poor asset quality, governance, profitability, liquidity, and noncompliance. Evaluating the performance of savings and credit cooperative societies (SACCOS) is crucial in determining their effectiveness and sustainability (Nyanjwa, 2008).

Mmari and Thinyane (2019) expand this evaluation by employing a comprehensive set of measures, including the ratio of members' share of capital, loan delinquency, the ratio of fixed assets to total assets, growth of loans, growth in savings volume, and growth of total assets. The guidelines set by the World Council of Credit Unions (WOCCU) provide a comprehensive overview of SACCOS performance.

Estiasih (2021) introduces a novel perspective on performance assessment, categorizing indicators based on strategic objectives from four distinct angles: financial perspective, customer perspective, internal business process perspective, and growth perspective. These perspectives offer a holistic view of cooperative performance.

Bastian (2006) provides a broader understanding of performance indicators, categorizing them into five key aspects: input, output, outcome, benefit, and impact. These indicators reflect the degree of achievement of predetermined goals and objectives.

Pagaddut (2023) offers a detailed breakdown of various financial ratios, indicating strengths and weaknesses in the performance of Nepalese cooperatives. Deposit liabilities to total assets ratio, external borrowings to total assets ratio, and net surplus to gross revenue ratio demonstrate relative strength. However, the asset efficiency ratio and earnings per share ratio require improvement.

Shamsuddin, Mahmood, Ghazali, Salleh, and Nawi (2018) suggest considering other dimensions influencing cooperative performance, such as location or regional factors, innovation in product development, service or product quality, employee retention, member satisfaction, and insights from previous research on successful business models.

Kadima, Sindani, and Maingi (2023) found that prudent credit risk management boosts net profit margins, return on capital invested, and cash flow. Their insights highlight the significant role credit risk management plays in determining microfinance effectiveness.

Ngumo, Collins, Shikumo, and David (2017) uncovered crucial determinants influencing the financial performance of microfinance banks in Kenya, establishing a direct relationship between operational efficiency, capital adequacy, firm size, and overall financial performance. However, liquidity risk and credit risk had no discernible sway over microfinance banks' financial performance in Kenya.

Al-Tamimi and Hassan (2010) and Aburime (2005) categorized banking performance determinants into internal and external factors. Internal factors include individual bank characteristics directly impacting performance, while external factors encompass broader sector-wide or country-wide elements.

In a related study focusing on commercial banks, Ongore and Kusa (2013) emphasized the significance of capital adequacy, asset quality, and management efficiency as critical determinants of performance. They concluded that factors within managerial control wielded more significant influence on commercial banks' financial performance in Kenya. However, the relationship with asset quality was discernibly negative, indicating that poor asset quality correlates with diminished bank performance.

In conclusion, this comprehensive literature review underscores the historical significance of cooperative societies in Nepal's economic and social development. While serving as platforms for collective action, financial inclusion, and community enhancement, transparency challenges persist, including issues such as financial data confidentiality, the absence of robust accountability mechanisms, and limited member involvement in decision-making, necessitating critical attention and improvement.

3. Methodology

3.1. Population and Sampling

In Kathmandu, as the capital city, people from all over the country reside and work. The diverse demographics and economic disparities in this area provide the basis for sampling. For this study, we consider the entire population of Nepal, with Kathmandu district chosen as the sample. It represents a wide range of cooperatives. The sample size is approximately 10% of the total number of cooperatives in Kathmandu. The study utilizes both primary and secondary data to address research questions related to organizational structure, loan investment procedures, and credit risk management.

3.2. Descriptive Analysis

Descriptive analysis employs statistical tools such as distribution analysis, measures of central tendency, and dispersion to provide simple summaries of the data. These techniques help in simplifying a large dataset in a meaningful way.

3.3. Financial Ratio Analysis

Financial ratios are mathematical comparisons of financial accounts that aid in understanding a cooperative's performance. They are crucial for investors, creditors, and internal management to assess how well a cooperative is doing and identify areas for improvement. The study analyzes three categories of ratios.

3.4. Profitability Ratios

Net Profit Margin (NPM): Measures the efficiency of converting operating revenues into profit.

Net Interest Margin (NIM): Indicates the difference between interest income generated and interest paid out.

Return on Assets (ROA): Measures how effectively assets generate net income.

Return on Shareholders' Equity (ROE): Reflects a firm's ability to generate profits from shareholders' investments.

3.5. Risk Measurement Ratios

Liquidity Ratio (LR): Assesses a cooperative's solvency and liquidity.

Capital Adequacy Ratio (CAR): Indicates long-term capital strength and credibility to protect against risk.

Interest Spread (Spread): Measures profitability and risk.

Non-Performing Loan Ratio (NPL): Measures the debt default rate of a cooperative.

3.6. Efficiency Ratios

Assets Utilization Ratio (AU): Calculates the revenue earned for every rupee of assets.

Credit to Deposit Ratio (CD): Measures the efficiency and risk of deposit utilization.

3.7. Correlation Analysis

The correlation coefficient measures the linear relationship between variables. The study calculates Pearson correlation statistics for both secondary data variables (e.g., deposit, revenue) and regression variables (e.g., ROA, NPM) to assess the relationships between these factors.

3.8. Regression Analysis

Regression analysis is employed in this study to connections between dependent and independent variables. The analysis utilizes multi-variable regression analysis with ordinary least square estimates (OLS). The primary focus of this investigation is on understanding the relationship between credit risk and financial performance, efficiency, and organizational factors. Four regression models CAR, NPL, LR, and Spread are tested to assess financial performance.

In summary, the research methodology encompasses a range of analytical techniques to examine cooperatives in Kathmandu, Nepal, and evaluate their financial performance and risk factors.

The financial performance model comprises four regression equations, as outlined below:

$$CAR = \alpha + \beta_1 ROA + \beta_2 NPM + \beta_3 NIM + \beta_4 ROE + ei \quad (A1)$$

$$NPL = \alpha + \beta_1 ROA + \beta_2 NPM + \beta_3 NIM + \beta_4 ROE + ei \quad (A2)$$

$$LR = \alpha + \beta_1 ROA + \beta_2 NPM + \beta_3 NIM + \beta_4 ROE + ei \quad (A3)$$

$$Spread = \alpha + \beta_1 ROA + \beta_2 NPM + \beta_3 NIM + \beta_4 ROE + ei \quad (A4)$$

3.9. Analysis of Data

Below are the results of the multi-variable regression analysis, which involves pooling cross-sectional and time series data to estimate the parameters of the regression line. The parameters α and β are estimated to make inferences about the population regression line. The significance levels of α and β indicate the predictive capacity of the outcome variable. The standard error of estimate, denoted as e , represents the average variability from observed values around the fitted regression line.

The F score and its significance level convey whether the applied model is sufficiently significant overall in predicting the outcome variable. The coefficient of determination, R square, measures the goodness of fit of the regression model (Gujarati, Porter, & Gunasekar, 2012). The estimated parameters and scores of the regression models are as follow.

3.10. Risk Versus Financial Performance Model:

$$CAR = \alpha + \beta_1 ROA + \beta_2 NPM + \beta_3 NIM + \beta_4 ROE + e_i \quad (A_1)$$

$$CAR = 18.174 + 0.332ROA - 0.035NPM + 1.258NIM - 0.094ROE \pm 12.2$$

The following tables present additional statistics and are interpreted as follows.

Table 1.

Model A₁ summary.

Model	R	R square	Adjusted R square	Std. error of the estimate
A ₁	0.525	0.276	0.270	12.2

Note: Predictors: (Constant), ROE, NIM, ROA, NPM.

Table 1 provides a detailed summary of Model A₁. The R value of 0.525 indicates a moderate level of correlation within the dataset, representing the strength of the linear relationship between variables. The R² value, which stands at 27.6%, illustrates the proportion of the dependent variable, CAR, that can be explained by the independent variables such as ROE, NIM, ROA, NPM, etc., specifically related to leverage risk. This means that approximately 27.6% of the variability in CAR can be accounted for by these factors, while the remaining 72.4% is influenced by other variables not included in the model.

Adjusted R², at 27%, serves as an adjustment to the R-squared value to address the inclusion of unnecessary predictors in the multi-variable regression model. It penalizes the addition of extraneous variables, providing a more accurate assessment of the model's explanatory power.

The standard error of the estimate, also known as the root mean squared error, measures the variability or dispersion of observed values around the fitted regression line. For Model A₁, the standard error is 12.2, indicating an average deviation of ± 12.2 from the observed values around the predicted values.

Table 2.

Model A₁ ANOVA.

Model	Variables	Sum of squares	df	Mean square	F	Sig.
A ₁	Regression	30247.206	4	7561.801	50.694	0.0
	Residual	79505.203	533	149.165		
	Total	109752.408	537			

Note: Predictors: Constant, ROE, NIM, ROA, NPM; Dependent variable: CAR.

Table 2 ANOVA, furnishes crucial insights. It reveals an F value of 50.694, with a significance level of 0 percent. This outcome signifies the rejection of hypothesis I, indicating that none of the independent variables ROE, NIM, ROA, NPM serve as useful predictors of the dependent variable, leverage risk. Consequently, it is suggested that managers focus on significantly managing leverage risk to enhance the profitability of cooperatives in Nepal.

Table 3.
Model A₁ coefficients.

Model	Variables	Un-standardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
A ₁	Constant	18.174	0.718	-	25.324	0
	ROA	0.332	0.374	0.047	0.886	0.376
	NPM	-0.035	0.028	-0.070	-1.237	0.217
	NIM	1.258	0.090	0.520	13.928	0
	ROE	-0.094	0.029	-0.144	-3.301	0.001

Note: Dependent variable: CAR.

Table 3 provides a concise overview of the unstandardized coefficients utilized in forming regression model A1. The constant coefficient, 18.174, along with the coefficients for the independent variables ROA, NPM, NIM, and ROE, denoted as B, are presented as follows: 0.332, -0.035, 1.258, -0.094, and 18.174, respectively. The standard error, representing the deviation of coefficients from observed variables, is also included.

A larger beta is associated with larger t-values and lower significance levels. The coefficients for NIM and ROA are not significantly different from 0, as indicated by their t-scores being greater than 0.05, suggesting that these variables do not significantly predict the outcome variable. Conversely, the coefficients for NPM and ROE are significantly different from 0, with their t-scores being less than 0.05, indicating their significant predictive power for the outcome variable.

Since EA is a component of TA, and CAR is calculated by dividing permanent capital by TA, NIM significantly influences CAR in a positive direction, consistent with prior research. Conversely, higher CAR tends to mitigate the leverage effect in the capital structure, thereby reducing ROE, as derived from ROA. This negative influence of ROE on CAR aligns with some studies but contradicts others. Nevertheless, maintaining long-term solvency necessitates cooperatives to optimize the tradeoff between CAR and ROE, despite the reduction in firm returns associated with higher CAR.

Given that Equity on Assets (EA) is a component of Total Assets (TA), and CAR is calculated by dividing permanent capital by TA, while NIM is calculated by dividing net interest income by EA, CAR is significantly influenced by NIM in a positive direction. This result is consistent with Kosmidou, Tanna, and Pasiouras (2005).

Simultaneously, a higher CAR tends to exhibit less leverage effect in the capital structure, thereby reducing the Return on Equity (ROE) when derived from Return on Assets (ROA). CAR is significantly influenced by ROE in a negative direction, which is consistent with Büyüksalvarcı and Abdioglu (2011) but inconsistent with Bateni, Vakilifard, and Asghari (2014). Despite the reduction in the firm's return associated with a higher CAR, cooperatives must optimize the tradeoff between CAR and ROE to maintain long-term solvency strength.

$$NPL = \alpha + \beta_1 ROA + \beta_2 NPM + \beta_3 NIM + \beta_4 ROE + e_i \quad (A_2)$$

$$NPL = 11.76 + 3.82ROA - 0.83NPM - 0.91NIM + 0.28ROE \pm 15.2$$

Further statistics are presented and interpreted as follows:

Table 4.
Model A₂ summary.

Model	R	R square	Adjusted R square	Std. error of the estimate
A ₂	0.305	0.093	0.010	15.22

Note: Predictors: Constant, ROE, NIM, ROA, NPM.

Table 4 offers a succinct overview of key statistics. The R value, standing at 0.305, signifies a moderate correlation, representing the simple correlation within the dataset. The R² value gauges the proportion of the dependent variable, NPL, that can be explained by independent variables such as ROE, NIM, ROA, NPM, etc., regarding credit default risk. Specifically, approximately 9.3% of NPL can be attributed to these factors, leaving the remaining 90.07% influenced by other variables. Adjusted R², at 1%, adjusts the R-squared to penalize the inclusion of extraneous predictors in the multi-variable regression model A₂. The standard error of the estimate for model A₂ is 15.22, indicating an average variability of ±15.22 from the observed value around the fitted regression line.

Table 5.
Model A₂ ANOVA.

Model	Variables	Sum of squares	Df	Mean square	F	Sig.
A ₂	Regression	1044.878	4	261.22	1.13	0.36
	Residual	10202.559	44	231.9		
	Total	11247.437	48			

Note: Predictors: Constant, ROE, NIM, ROA, NPM; Dependent variable: NPL.

Table 5 provides a concise overview of the ANOVA results. The F score, standing at 1.13, is significant at 0.36, which exceeds the significance threshold of 0.05. This indicates that, overall, the applied model lacks significant predictive power for the outcome variables. Consequently, null hypothesis II is accepted, suggesting that none of the independent variables ROE, NIM, ROA, NPM serve as useful predictors of the dependent variable, debt default risk.

Table 6.
Model A₂ coefficients.

Model	Variable s	Un-standardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
A ₂	Constant	11.757	3.803	-	3.092	0.01
	ROA	3.823	6.556	0.311	0.583	0.56
	NPM	-0.831	1.115	-0.453	-0.746	0.46
	NIM	-0.906	0.477	-0.315	-1.901	0.06
	ROE	0.278	0.591	0.174	0.471	0.64

Note: Dependent variable: NPL.

Table 6 presents key coefficients utilized in constructing regression model A₂. The constant coefficient, set at 11.757, along with the unstandardized coefficients for NIM, NPM, ROE, and ROA, represented as B, have been utilized. However, none of these coefficients are significantly different from 0, as indicated by their t-scores being greater than 0.05. This suggests that, overall, these variables do not have significant predictive power for the outcome variable.

The observed strong degree of correlation and F score contrast with the poor significance of individual predicting variables to the dependent variable. This discrepancy can be attributed to a smaller number of observations or degrees of freedom for the NPL variables.

$$LR = \alpha + \beta_1 ROA + \beta_2 NPM + \beta_3 NIM + \beta_4 ROE + e_i \quad (A_3)$$

$$LR = 17.742 + 0.82\beta_1 - 0.123\beta_2 + 0.467\beta_3 + 0.043\beta_4 \pm 13.48$$

Further statistics are presented and interpreted as follows:

Table 7.
Model A₃ summary.

Model	R	R square	Adjusted R square	Std. error of the estimate
A ₃	0.256	0.065	0.058	13.48

Note: Predictors: (Constant), ROE, NIM, ROA, NPM.

Table 7 offers a concise summary of key statistical measures. The R value, standing at 0.256, reflects a small degree of correlation, indicating a limited relationship within the dataset. The R² value provides insight into the extent to which the dependent variable, LR, can be elucidated by independent variables such as ROE, NIM, ROA, NPM, etc., concerning the risk of Nepalese cooperatives. Specifically, approximately 6.5% of LR can be attributed to these factors, leaving the remaining 93.5% influenced by other variables. Adjusted R², at 5.8%, adjusts the R-squared to penalize the inclusion of extraneous predictors in the multi-variable regression model A₃. The standard error of the estimate for model A₃ is 13.48, indicating an average variability of ±13.48 from the observed value around the fitted regression line.

Table 8.
Model A₃ ANOVA.

Model	Variables	Sum of squares	Df	Mean square	F	Sig.
A ₃	Regression	6715.718	4	1678.930	9.238	0.00
	Residual	95964.549	528	181.751		
	Total	102680.267	532			

Note: Predictors: Constant, ROE, NIM, ROA, NPM; Dependent variable: LR.

Table 8 provides a succinct overview of the ANOVA results. The F-statistic, recorded at 9.238, is accompanied by a significant level of 0 percent. This implies that the applied model possesses significant predictive power for the outcome variable, leading to the rejection of null hypothesis III. Hence, it can be inferred that at least one of the independent variables ROE, NIM, ROA, NPM serves as a useful predictor of the dependent variable, liquidity risk. This underscores the importance for managers to effectively manage liquidity in order to enhance the profitability of cooperatives in Nepal.

Table 9.
Model A₃ coefficients.

Model	Variable s	Un-standardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
A ₃	Constant	17.742	0.796	-	22.302	0
	ROA	0.82	0.413	0.121	1.984	0.048
	NPM	-0.123	0.031	-0.257	-3.96	0
	NIM	0.467	0.1	0.199	4.677	0
	ROE	0.043	0.032	0.068	1.365	0.173

Note: Dependent variable: LR.

Table 9 presents key coefficients utilized in constructing regression model A₃. The constant coefficient and unstandardized coefficients for ROA, NPM, ROE, and NIM, represented as B, have been utilized. Additionally, beta, the standardized coefficient, is provided for ROA, NPM, ROE, and NIM, with values of 0.121, -0.257, 0.199, and 0.068 respectively. These values are obtained when all dependent and independent variables are standardized before running the regression line.

The coefficients for NIM, NPM, and ROA are significantly different from 0, as indicated by their t-scores being less than 0.05. This suggests that these variables have significant predictive power for the

outcome variable. However, the coefficient for ROE is not significantly different from 0, with its t-score being greater than 0.05, indicating its lack of significant predictive power for the outcome variable.

Since cooperatives can increase their investment and earning assets by collecting higher deposits, NIM and LR, calculated by dividing by EA and deposit respectively, exhibit a significant positive influence. Conversely, an increase in LR raises the opportunity cost of liquid assets and reduces returns, resulting in a significant negative influence of NPM on LR. Therefore, cooperatives must seek an optimum point to balance the tradeoff between LR and NPM. The causation of LR from NIM and ROA is inconsistent with a study conducted by Kosmidou et al. (2003) in UK banks.

$$\text{Spread} = \alpha + \beta_1 \text{ROA} + \beta_2 \text{NPM} + \beta_3 \text{NIM} + \beta_4 \text{ROE} + e_i \quad (A_4)$$

$$\text{Spread} = 0.718 + 0.055 \text{ROA} + 0.001 \text{NPM} + 0.906 \text{NIM} + 0.002 \text{ROE} \pm 3.57$$

Further statistics are presented and interpreted as follows:

Table 10.

Model A₄ summary.

Model	R	R square	Adjusted R square	Std. error of the estimate
A ₄	0.834	0.696	0.693	3.57

Note: Predictors: Constant, ROE, NIM, ROA, NPM.

Table 10 provides a concise summary of key statistical measures. The R value, recorded at 0.834, reflects a strong degree of correlation, indicating a robust relationship within the dataset. The R² value sheds light on the proportion of the dependent variable, spread, that can be elucidated by independent variables such as ROE, NIM, ROA, NPM, etc., concerning investment risk. Specifically, approximately 69.6% of spread can be attributed to these factors, leaving the remaining 30.4% influenced by other variables. Adjusted R², at 69.3%, adjusts the R-squared to penalize the inclusion of extraneous predictors in the multi-variable regression model A₄. The standard error of the estimate for model A₄ is 3.57, indicating an average variability of ±3.57 from the observed value around the fitted regression line.

Table 11.

Model A₄ ANOVA.

Model	Variables	Sum of squares	Df	Mean square	F	Sig .
A ₄	Regression	15544.204	4	3886.051	304.543	0.0
	Residual	6801.216	533	12.760		
	Total	22345.420	537			

Note: Predictors: Constant, ROE, NIM, ROA, NPM; Dependent variable: Spread.

Table 11 offers a succinct overview of the ANOVA results, providing the F value and its significance level. In the regression row, the significance level of the F score is recorded at 0 percent, with a value of 304.543.

This significant result leads to the rejection of null hypothesis IV, indicating that at least one of the independent variables ROE, NIM, ROA, NPM serves as a useful predictor of the dependent variable, investment risk. Consequently, managers are advised to effectively manage investment risk to enhance the profitability of cooperatives in Nepal.

Table 12.
Model A₄ coefficients.

Model	Variables	Un-standardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
A ₄	Constant	0.718	0.21	-	3.42	0.001
	ROA	0.055	0.11	0.017	0.502	0.616
	NPM	0.001	0.008	0.003	0.085	0.932
	NIM	0.906	0.026	0.83	34.297	0
	ROE	0.002	0.008	0.006	0.2	0.842

Note: Dependent variable: Spread.

Table 12 presents key coefficients utilized in constructing regression model A4. The unstandardized coefficients, represented as B, have been utilized for this purpose. Additionally, standardized coefficients for ROA, NPM, ROE, NIM, and the constant are provided, with values of 0.017, 0.003, 0.83, 0.006, and 0.718 respectively. These standardized coefficients are obtained when all dependent and independent variables are standardized before running the regression line.

The coefficient for NIM is significantly different from 0, as indicated by its t-score being less than 0.05. This suggests that NIM has significant predictive power for the outcome variable. However, the coefficients for ROA, NPM, and ROE are not significantly different from 0, with their t-scores being greater than 0.05. This indicates that these variables do not have significant predictive power for the outcome variable.

Since both spread and NIM are calculated based on interest income, interest expenses, earning assets, and paying liabilities, both variables exhibit a significant positive correlation.

4. Findings

Based on the above analysis, the following findings were drawn after a comprehensive examination.

1. The regression model (A1) indicates that ROE and NPM significantly affect leverage risk (CAR). Managers should actively manage leverage risk to enhance cooperative profitability.
2. The regression model (A2) shows no significant impact of ROE, NIM, ROA, and NPM on credit default risk (NPL). Null hypothesis II is accepted, suggesting limited predictive capacity of these variables for debt default risk.
3. The regression model (A3) reveals a significant influence of NIM on liquidity risk (LR). Managers should actively manage liquidity to enhance cooperative profitability.
4. The regression model (A4) indicates a significant impact of NIM on investment risk (Spread). Managers should actively and significantly manage investment risk to enhance cooperative profitability.

These revelations offer a detailed exploration of the relationships between various risk factors and cooperative profitability, shedding light on the explanatory power and implications inherent in each model, particularly in the context of leverage, debt default, liquidity, and investment risks.

5. Conclusions

This study sheds light on the intricate dynamics of the financial performance of cooperative societies in Nepal. The study reveals that leverage risk is intricately linked to factors such as ROE and NPM, whereas credit default risk demonstrates less predictability based on variables like ROE, NIM, ROA, and NPM.

The significant impact of NIM on liquidity risk underscores the imperative of adept liquidity management for cooperative profitability. Moreover, the discernible influence of NIM on investment risk emphasizes the necessity for proactive management to augment overall profitability. In summation, these

findings underscore the paramount importance of strategic financial management in the cooperative sector.

This study firmly concludes that the financial performance of cooperative societies in Nepal is intricately influenced by a multitude of factors, encompassing leverage risk, various independent variables, liquidity risk, and investment risk.

6. Recommendations

Derived from the thorough analysis presented above, the following recommendations were drawn.

1. Cooperative managers should focus on optimizing the tradeoff between leverage risk and return on equity to maintain long-term solvency strength.
2. Further research is needed to explore additional factors influencing credit default risk in cooperative societies.
3. Active management of liquidity is crucial for cooperative profitability, and managers should carefully balance the tradeoff between liquidity and net profit margin.
4. Cooperatives should actively and significantly manage investment risk to enhance overall profitability.
5. Continuous monitoring and adaptation of financial strategies are essential for cooperative societies to navigate dynamic economic conditions effectively.

These recommendations are designed to steer cooperative societies in Nepal towards a more informed and proactive stance in financial management, focusing on specific aspects such as leverage, credit default, liquidity, and investment risks. Implementation of these measures is anticipated to result in an enhanced financial performance for Nepalese cooperative societies.

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Data Availability Statement:

Gyanendra Prasad Paudel may provide study data upon reasonable request.

Competing Interests:

The author declares that there are no conflicts of interests regarding the publication of this paper.

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