

Financial Performance of Savings and Loan Cooperatives in Badung Regency: A Panel Descriptive Analysis of Solvency, Profitability, and Activity

Made Yudi Darmita*, Ida Bagus Raka Suardana, A.A. Ngurah Eddy Supriyadinata
Gorda, Ida Ayu Oka Martini

Undiknas Graduated School, Universitas Pendidikan Nasional, Jl. Bedugul No 39 Sidakarya,
Denpasar, Bali, 80224, Indonesia

Corresponding author: Made Yudi Darmita*, Undiknas Graduated School, Universitas Pendidikan Nasional, Jl. Bedugul No 39 Sidakarya, Denpasar, Bali, 80224, Indonesia, ORCID: <https://orcid.org/0000-0001-5839-9614>

Abstract

This study examines the financial performance of Savings and Loan Cooperatives in Badung Regency during the 2019–2022 period using a descriptive-analytical panel approach. The analysis focuses on three core dimensions of financial performance, namely solvency, profitability, and activity, in order to describe their level, year-to-year development, relative stability, and overall performance pattern. The study uses panel data consisting of 404 cooperative-year observations from 143 cooperatives, with a balanced subset of 62 cooperatives employed for repeated-measures comparison. The analytical procedure combines descriptive statistics, trend analysis, distributional assessment, coefficient of variation, category-based profiling, nonparametric tests, and a composite Financial Performance Index. The results indicate that there was no common evolution for the financial performance in the three dimensions of the analysis. Profitability is the most evident indicator of worsening financial situation, with a continuous decrease starting from 2020 and significant year-to-year variability in both the total panel and in the balanced panel. Activity has been the most stable dimension. Solvency has shown a high variability in time, caused by the weight of extreme values. The composite index suggests a moderate financial worsening in the last years instead of an extremely serious systemic crisis. In conclusion, the results seem to confirm that the financial performance of cooperatives must be considered as a complex and multifaceted phenomenon, which requires a balanced approach, considering at the same time the financial solidity, the returns on investment and the continuity of operations.

Keywords: Savings and Loan Cooperatives; financial performance; solvency; profitability; panel data

1. Introduction

Financial performance represents one of the core elements of institutional sustainability for a number of reasons. The financial performance of an institution reflects how well the institution can continue to operate, fulfill obligations and provide returns to stakeholders (both internal and external) into the future. Specifically, in the case of Savings and Loan Cooperatives, financial performance is critical because they are simultaneously member-based organizations and financial intermediaries. As such, their ability to continue operating will depend not only on their ability to continue to engage in operational activities, but also on their ability to protect their financial soundness, generate sufficient profits and efficiently utilize their assets. Consequently, assessing cooperative performance will require a multi-dimensional view of the financial position of the cooperatives (Siahaan et al., 2023; Silva et al., 2017; Vargas et al., 2023).

In practice, financial performance is rarely reflected in a single indicator. Solvency, profitability, and activity represent distinct dimensions of organizational performance and may reveal different signals regarding financial health. Solvency reflects the ability of an institution to maintain financial soundness and meet its obligations, profitability indicates the capacity to generate returns from operations, and activity captures the effectiveness of asset utilization or operational turnover. When examined together, these indicators provide a more balanced and informative picture of performance than any single ratio considered in isolation. The multi-dimensional nature of assessing cooperative financial performance is particularly important in the cooperative sector. While financial stability, operational continuity and the generation of returns are all related, they do not always develop in concert with each other (Esomar & Titioka, 2021; Siahaan et al., 2023; Yitayaw, 2021).

Although financial ratio analysis is widely used in evaluating institutional performance, the interpretation of cooperative financial condition remains analytically challenging. Aggregate values may conceal substantial variation across institutions, and some indicators may be highly sensitive to extreme observations. As a result, simple average-based interpretation may not always represent the typical condition of a cooperative sector, especially when performance is unevenly distributed. This issue becomes even more important when financial performance is examined over time, because temporal change may reflect not only shifts in average performance, but also changes in dispersion, stability, and the relative position of institutions within the broader distribution. A more careful descriptive approach is therefore needed to understand how cooperative financial performance evolves across years (Barros et al., 2020; Paudel, 2021; Silva et al., 2017).

This study was designed to address that need by analyzing the financial performance of Savings and Loan Cooperatives in Badung Regency from 2019 to 2022. As opposed to providing a causal explanation, this study used a descriptive-analytical panel method to develop a systematic account of the financial performance of cooperatives over time. The study analyzed four connected objectives: First, it analyzed the degree of cooperative financial performance in terms of solvency, profitability, and activity levels. Second, it analyzed how each indicator changed from one year to the next as part of a panel framework. Third, it identified which aspect(s) of financial performance are relatively more consistent over time while identifying those aspects that are less consistent. Fourth, it provided a comprehensive analysis of the overall performance of cooperatives using category-based profiles and a composite Financial Performance Index. Combining these components will provide a more complete and detailed empirical depiction of cooperative financial performance than could have been done with a single measure or a static, cross-sectionally based study (Siahaan et al., 2023; Esomar & Titioka, 2021).

Additionally, studying the period of 2019–2022 is important because it allows for the ability to analyze financial performance over multiple consecutive years and therefore identify whether certain measures of financial performance are relatively consistent or if they fluctuate significantly over time. A panel-based descriptive analysis is particularly useful in this case because it allows researchers to analyze not only the level of financial performance of cooperatives, but also the patterns, variability and consistency of their financial performance throughout the course of the study period. A panel-based descriptive analysis is particularly useful when studying cooperative organizations due to the fact that even though cooperative organizations operate in the same geographic region, there can exist significant variability in their financial conditions (Bontot & Wibowo, 2023; Juma & Maseko, 2022; Suryathi, 2018).

The contribution of this study is therefore twofold. Empirically, the study will provide a systematic description of the financial performance of Savings and Loan Cooperatives in the region of Badung Regency over a four-year period of time (2019-2022), specifically regarding solvency, profitability and activity. Empirically, the study will demonstrate the necessity of

considering cooperative financial performance through multiple lenses, including distributional patterns, relative stability, non-parametric inter-year comparison and overall performance index. The study aims to contribute a more nuanced conceptualization of cooperative financial health and identify whether apparently negative changes in performance indicate either a general trend within the cooperative sector, relative stability or distortion due to extreme values (Barros et al., 2020; Siahaan et al., 2023; Silva et al., 2017).

Based on the results of the study, it was determined that cooperative financial performance did not increase in the same way across the three identified areas of solvency, profitability and activity. The study found that profitability clearly indicated a decrease in financial strength in 2020, activity remained the least volatile area, and solvency showed significant variation resulting from the effects of extreme observations. Furthermore, when evaluated collectively by the Financial Performance Index, these findings suggest a moderate degree of financial deterioration during the latter years of the period studied as opposed to a catastrophic downturn in the system-wide performance of the cooperatives. These findings highlight the need for a balanced and multi-dimensional perspective when analyzing the financial status of cooperatives (Juma & Maseko, 2022; Siahaan et al., 2023; Yitayaw, 2021).

In summary, the authors argue that the financial performance of Savings and Loan Cooperatives cannot be evaluated solely through a single ratio or through an average-based perspective. Rather, the authors believe that financial performance is a heterogenous and multi-dimensional construct that encompasses operational continuity, return generation and financial soundness. On that basis, the current study contributes to a better understanding of the empirical description of cooperative financial performance and serves as a useful reference point for further studies on the institutional, managerial and economic factors affecting cooperative financial resilience (Kusuma et al., 2022; Messabia et al., 2022; Vargas et al., 2023).

2. Methods

2.1 Research Design

This study adopted a descriptive-analytical panel design to examine the financial performance of Savings and Loan Cooperatives in Badung Regency during 2019–2022. The study was intended to describe the level, annual development, distribution, and relative stability of financial performance rather than to identify causal relationships. In line with this objective, financial performance was assessed through three dimensions, namely solvency, profitability, and activity, because these indicators reflect financial soundness, return generation, and operational efficiency (Bărbuță-Mișu et al., 2019; Ježovita, 2015; Musah et al., 2019).

2.2 Data and Unit of Analysis

The study used annual cooperative-level panel data for KSPs in Badung Regency from 2019 to 2022. The unit of analysis was the cooperative-year observation. The full dataset comprised 404 observations from 143 cooperatives, indicating an unbalanced panel. This full panel was used for the descriptive, trend, distributional, and categorical analyses in order to retain the broadest possible coverage of observations. For the repeated-measures comparison across years, a balanced subset of 62 cooperatives with complete observations for all four years was analyzed separately. This panel structure made it possible to observe both cross-sectional variation and year-to-year movement in cooperative financial performance, which is consistent with prior work emphasizing the value of longitudinal financial analysis for organizational assessment and managerial decision-making (Bărbuță-Mișu et al., 2019; Tsiouni et al., 2023).

2.3 Variables and Measurement

Financial performance was measured using three indicators. Solvency, expressed as a percentage, represented the cooperative's ability to meet its obligations and maintain financial soundness. It was measured as the ratio of total assets to total liabilities. Profitability, also expressed as a percentage, reflected the cooperative's ability to generate net surplus from gross revenue. It was measured as the ratio of residual profit to gross revenue. Activity, expressed in times, captured the effectiveness of asset utilization in generating operating revenue. It was measured as the ratio of operating revenue to total assets. These indicators were analyzed for the full panel and by year to identify differences in level, dispersion, and performance patterns over time. The selection of these indicators corresponds to the broader literature on financial ratios, which has identified solvency, profit, and activity-based measures as essential means for assessing both an organization's financial condition and its quality of performance and operation (Ježovita, 2015; Musah et al., 2019; Tsiouni et al., 2023; Zielińska-Chmielewska et al., 2021).

In order to make it easier to interpret the results, each indicator was categorized annually as low, moderate or high. To further enhance this interpretive process, a Financial Performance Index was used to assess the total performance over time. Because the study was conducted descriptively, these variables were utilized to characterize performance trends as opposed to estimating a structural model. This is similar to many prior studies demonstrating that using a combination of financial indicators can offer a more complete view of a firm's performance than relying upon a single ratio, particularly when the goal is to support managerial evaluations and interpretations (Bărbuță-Mișu et al., 2019; Tsiouni et al., 2023).

2.4 Analytical Procedure

The analysis was conducted in several stages. Descriptive statistics were first generated for the full panel and for each year from 2019 to 2022 to summarize the central tendency and dispersion of solvency, profitability, and activity. Trend analysis was then used to examine year-to-year movement in the three indicators. Distributional patterns and relative stability were also assessed, with stability evaluated using the coefficient of variation and extreme values identified through the interquartile range approach. Such procedures are appropriate for financial performance analysis because ratio-based indicators may vary considerably across entities and over time, making dispersion and stability as important as average values in interpreting organizational performance (Ježovita, 2015; Tsiouni et al., 2023).

To provide a more interpretable profile of performance, observations were further classified into low, moderate, and high categories for each year, and the Financial Performance Index was used to summarize overall performance across periods. Inter-year differences were then assessed using nonparametric procedures. The Kruskal-Wallis test was applied to the full panel, while the Friedman test was used for the balanced panel of cooperatives with complete observations across all four years. This analytical sequence was intended to ensure consistency between the panel structure of the data and the descriptive objective of the study. The emphasis on efficiency, stability, and multidimensional performance assessment is also consistent with prior research on cooperative and firm-level financial analysis, which highlights the importance of combining several complementary measures when evaluating institutional financial conditions (Musah et al., 2019; Paudel, 2021).

3. Results

3.1 Overall Descriptive Profile of Financial Performance

The year-specific descriptive results showed that the financial performance of Savings and Loan Cooperatives in Badung Regency did not move uniformly across the three indicators during the 2019–2022 period (Table 1). Across the full panel, solvency showed a mean of

431.03 percent and a median of 123.50 percent, with a very large standard deviation of 5009.80 and an extremely wide range extending from 14.11 to 99,799.91 percent. The large gap between the mean and the median indicated that the solvency distribution was highly skewed and strongly influenced by extreme values. By contrast, profitability showed a mean of 4.28 percent and a median of 3.08 percent, with a standard deviation of 6.95 and values ranging from -23.60 to 68.95 percent. Activity displayed a mean of 0.88 times and a median of 0.80 times, with a standard deviation of 0.64 and a range from 0.04 to 6.94 times. Overall, these results suggested that the central tendency of financial performance was much more stable than the raw mean values of solvency alone might imply, particularly because the solvency series was heavily affected by a small number of extreme observations.

Table 1. Annual Descriptive Statistics of Solvency, Profitability, and Activity

Solvency (%)						
Year	Count	Mean	Median	Std	Min	Max
2019	83.00	135.82	123.68	45.92	14.11	330.58
2020	114.00	142.91	124.80	55.40	102.15	456.28
2021	101.00	159.96	120.85	154.52	100.32	1304.34
2022	106.00	1230.35	124.25	9768.66	102.76	99799.91
Profitability (%)						
Year	Count	Mean	Median	Std	Min	Max
2019	83.00	4.62	3.76	4.43	0.24	30.04
2020	114.00	5.06	3.67	7.00	-0.83	68.95
2021	101.00	4.16	2.84	7.97	-23.60	68.95
2022	106.00	3.27	2.03	7.43	-11.88	68.95
Activity (x)						
Year	Count	Mean	Median	Std	Min	Max
2019	83.00	0.92	0.80	0.62	0.22	5.16
2020	114.00	0.95	0.81	0.69	0.04	6.25
2021	101.00	0.81	0.77	0.66	0.12	6.94
2022	106.00	0.84	0.80	0.57	0.13	5.56

The annual descriptive results showed distinct temporal patterns across the three indicators. The trend of solvency pattern suggested that the dramatic increase in the 2022 mean was not representative of the typical cooperative, but instead reflected the influence of highly extreme observations (Figure 1a). Profitability followed a different trajectory. The trend of profitability captures the rise from 2019 to 2020 and the subsequent decline through 2022 (Figure 1b). The trend of activity illustrates the relatively narrow fluctuation in activity over time compared with the other two indicators, which suggested a relatively stable operational profile despite some year-to-year fluctuation (Figure 1c). Collectively, these trend figures reinforced the descriptive evidence that profitability exhibited the clearest downward movement after 2020, activity remained comparatively stable, and solvency appeared highly erratic when assessed through mean values (Figure 1). The trend analysis confirms that the three indicators moved in different directions and therefore should not be interpreted as if they reflected a single uniform process of financial change.

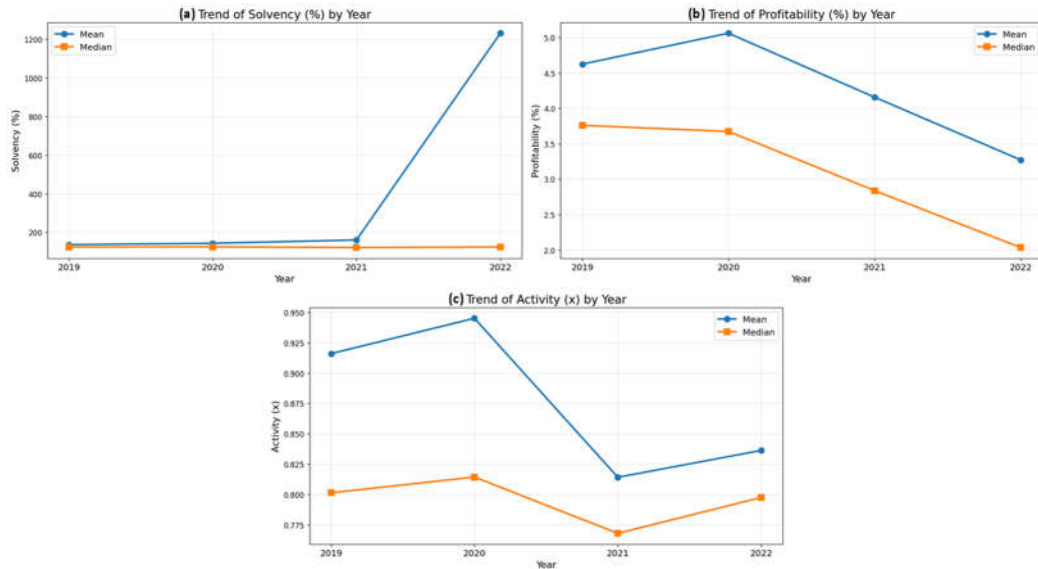


Figure 1. Trend of (a) Solvency (%), (b) Profitability (%), and (c) Activity (x) by Year

3.2 Distribution and Stability of Financial Performance

The distributional analysis showed that the three indicators differed substantially in their degree of spread and relative stability. The distributional analysis shows marked differences in the spread of the three indicators. Solvency had by far the widest distribution, the highly uneven distribution of solvency values and the presence of very large observations in the later years (Figure 2a). Profitability showed moderate dispersion but still dispersed pattern, including negative and high positive values (Figure 2b). Activity was the most tightly clustered, it shows a much tighter concentration of values around the center of the distribution (Figure 2c). These results consistent with the broader interpretation that solvency was the most irregular indicator, activity was the most compactly distributed, and profitability occupied an intermediate position (Figure 2).

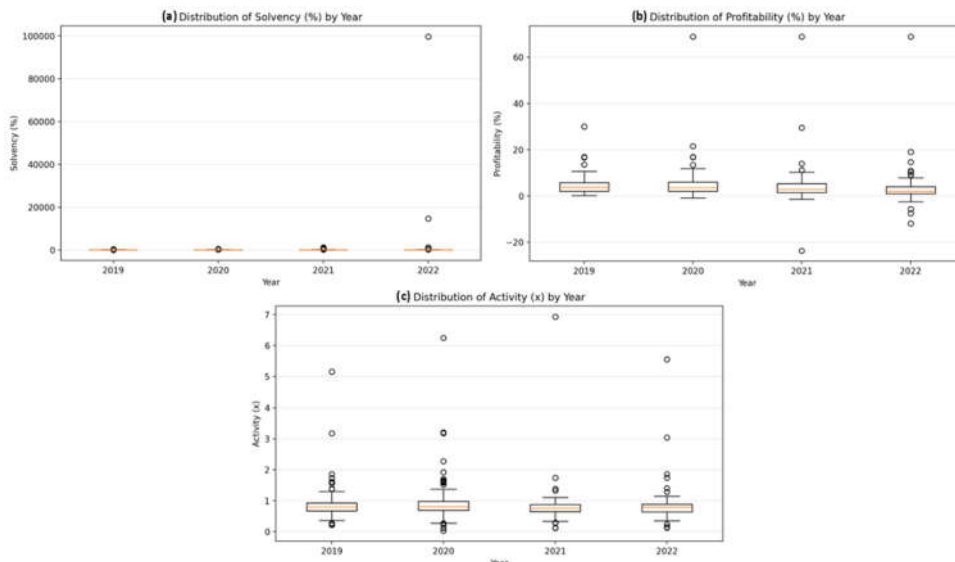


Figure 2. Distribution of (a) Solvency (%), (b) Profitability (%), and (c) Activity (x) by Year

The stability analysis further clarified these differences. Based on the coefficient of variation, activity was the most stable variable, with a CV of 72.59 percent, followed by profitability at 162.59 percent, while solvency was by far the most volatile indicator, with a CV of 1162.28 percent (Figure 3). These values indicated that the dispersion of solvency was

extremely large relative to its mean, whereas activity remained the most consistent dimension of financial performance in the panel. The stability pattern was fully consistent with the automatic summary in the document, which identified activity as the most stable variable and solvency as the most fluctuating one.

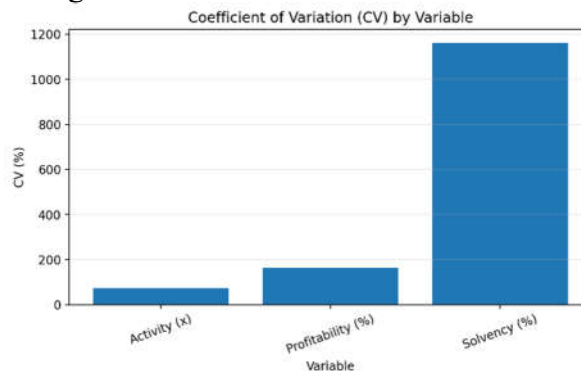


Figure 3. Coefficient of Variation (CV) by Variable

3.3 Category-Based Performance Profiles

The category-based analysis provided a more interpretable picture of how financial performance was distributed across low, moderate, and high-performance groups in each year. The annual category profile of solvency provides a useful counterpart to the earlier evidence showing that the mean solvency values were heavily influenced by extreme observations (Figure 4a). The category profile of profitability has the mean and median declined after 2020 (Figure 4b). Activity remained the most consistent dimension in terms of performance grouping, profitability showed signs of deterioration after 2020, and solvency continued to reflect substantial heterogeneity across cooperatives (Figure 4c). Viewed together, this confirms that cooperative financial performance in Badung Regency was not homogeneous and that the three indicators captured different aspects of financial condition over time (Figure 4).

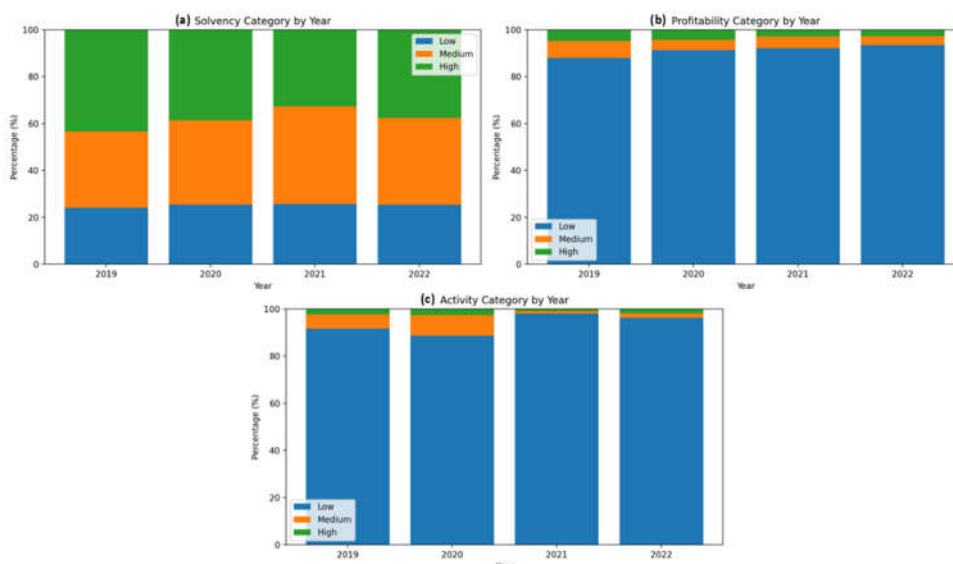


Figure 4. Category by Year of (a) Solvency, (b) Profitability, (c) Activity

3.4 Inter-Year Differences in Financial Performance

The nonparametric tests show that profitability was the only variable with a statistically significant year effect in the full panel (Table 2). The Kruskal-Wallis’s test was not significant

for solvency ($H = 0.395, p = 0.941$), indicating that the annual distributions of solvency did not differ significantly at the full-panel level despite the very large mean value recorded in 2022. By contrast, profitability showed a statistically significant difference across years ($H = 20.711, p < 0.001$), which was consistent with the descriptive and graphical evidence showing a downward trajectory after 2020. Activity did not differ significantly across years ($H = 5.202, p = 0.158$), reinforcing the earlier interpretation that it was the most stable financial indicator. The balanced-panel analysis produced a somewhat different result. The Friedman test for the 62 cooperatives with complete observations across all four years showed statistically significant differences for solvency ($\chi^2 = 14.990, p = 0.002$) and profitability ($\chi^2 = 47.069, p < 0.001$), whereas activity again remained nonsignificant ($\chi^2 = 2.584, p = 0.460$). This pattern suggested that when the analysis was restricted to the same cooperatives over time, solvency also exhibited meaningful temporal variation, even though such variation was not detected in the full unbalanced panel. Overall, these confirmed that profitability showed the clearest and most consistent inter-year change, while activity remained stable across both inferential procedures.

Table 2. Nonparametric Tests of Inter-Year Differences in Solvency, Profitability, and Activity

Variable	Levene P	Kruskal-Wallis Test	P Value	N Balanced Friedman	Friedman Test	P Value
Solvency (%)	0.303	0.395	0.941	62	14.990	0.002
Profitability (%)	0.979	20.711	0.000	62	47.069	0.000
Activity (x)	0.557	5.202	0.158	62	2.584	0.460

3.5 Composite Financial Performance

The Financial Performance Index provides a more integrated perspective on the annual pattern of cooperative financial performance (Figure 5). The mean index was 25.20 in 2019 and 25.07 in 2020, then declined to 20.79 in 2021 and 20.68 in 2022. The median remained constant at 25 throughout the four-year period, while the standard deviation declined from 13.27 in 2019 to 10.43 in 2022. These results suggest that overall financial performance weakened after 2020, although the center of the distribution remained relatively stable. In other words, the cooperatives appear to have shifted toward a somewhat lower but more compressed overall performance level in the later years of observation.

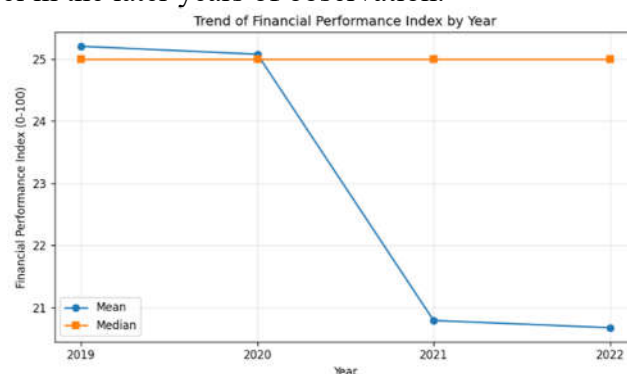


Figure 5. Trend of Financial Performance Index by Year

The index trend is also consistent with the earlier descriptive and inferential findings. The decline in the composite measure aligns most closely with the weakening pattern observed in profitability, while the relative stability of activity and the distributional distortion of solvency help explain why the overall deterioration appears moderate rather than severe. The composite analysis therefore supports the interpretation that the post-2020 period was characterized by

measurable weakening in cooperative financial performance, but not by a generalized systemic collapse.

4. Discussions

4.1 *Understanding the Overall Pattern of Financial Performance*

The findings indicate that the financial performance of Savings and Loan Cooperatives in Badung Regency evolved unevenly across the three dimensions examined in this study. Rather than moving in a single direction, the cooperatives' solvency, profitability and activity moved in different ways during the 2019-2022 period, indicating that the evaluation of cooperative financial performance needs to consider multiple dimensions, instead of considering it as a unique internal status. The descriptive results showed that profitability tended to weaken after 2020, activity remained relatively stable, and solvency became increasingly irregular in mean terms because of the strong influence of extreme observations. This combination of results suggests that the cooperatives did not experience a uniform financial decline or a uniform financial improvement. Instead, their financial condition appears to have been shaped by a divergence between earnings performance, operational continuity, and balance-sheet variability (Silva et al., 2017; Siahaan et al., 2023; Vargas et al., 2023).

The above broader pattern is relevant because it presents evidence for the analytical potential of studying many indicators at once. The evaluation based on a single indicator may have resulted in the simplification of empirical realities. For instance, the steep rise in the mean solvency levels in 2022 may have been interpreted as the positive trend in the entire cooperative sector when viewed in isolation. Nevertheless, this view would have been incorrect since the median has shown very little change, and the distribution of the solvency level was extremely wide. Therefore, this finding supports the more general methodological literature stating that the extreme cases can significantly affect the conclusions based on averages and thus need to be treated carefully in the empirical studies (Dastjerdy et al., 2023; André, 2022; Farnè & Vouldis, 2018). In contrast to the development of solvency, the decrease in profitability has followed a more similar trend through both the mean and median values. Activity has remained relatively stable throughout the period. Overall, these findings indicate that although the cooperatives have maintained their ability to continue operating, they have experienced increasing constraints in their ability to convert their operational activities to increased levels of financial returns (Paudel, 2021; Barros et al., 2020).

4.2 *Profitability Decline as the Most Consistent Empirical Finding*

Among the three indicators, profitability emerged as the clearest and most consistent sign of financial weakening. The evidence supporting this conclusion are based on both the descriptive statistics and yearly trends as well as the inferential findings. As noted above, profit margins were the only year effect to show statistical significance using the full panel Kruskal-Wallis Test, and they continued to be the only year effect to show statistical significance in the balanced panel Friedman test. The fact that this pattern was confirmed in both the unbalanced and balanced data structures suggests that the decline in profitability was not merely a product of changing sample composition. Instead, it reflected a broader and more systematic shift in the earnings performance of the cooperatives during the period under study. This pattern is broadly consistent with previous studies showing that cooperative and credit-based financial institutions are highly sensitive to changing operational, managerial, and external conditions, particularly in periods of economic pressure (Juma & Maseko, 2022; Muhsyaf, 2024; Yitayaw, 2021).

Substantively, declining profitability indicates that the cooperatives' ability to generate returns from their operations became weaker after 2020. Because this study was primarily descriptive in nature, and not causal in nature, we cannot determine which factors contributed

to the decline in profit margin experienced by the cooperatives participating in this study. However, the fact that the average (mean) and median profitability declined simultaneously support the notion that the decline in profitability was not simply a result of a few individual cooperatives experiencing difficulties. Instead, these data suggest that the decline in profitability had a broad impact on the central tendency of the entire cooperative industry. Therefore, profitability is the single most useful measure of the cooperative industry's financial condition over time. Activity measures whether or not an operation continues to operate, while profitability measures whether or not those operations produce a sufficient level of financial productivity. Thus, the declining trend in profitability represents the most compelling empirical evidence of the growing pressure placed upon the cooperative industry to maintain acceptable levels of financial return from their operations during the latter years of the period studied (Yitayaw, 2021; Siahaan et al., 2023; Silva et al., 2017).

The findings of this study further highlight an important analytical distinction between the ability of an organization to continue operating in a routine sense (i.e., operational continuity), versus the ability of an organization to operate effectively in an economic sense (i.e., financial effectiveness). Organizations may continue to function in routine terms; however, their economic performance may still deteriorate due to the generation of lower returns. The findings of this study appear to be consistent with that distinction. The cooperatives did not show a dramatic collapse in activity, but they did show a reduction in profitability. This suggests that the challenge facing the sector may have been less about sustaining the existence of operations and more about preserving the financial quality of those operations over time. Similar distinctions between operational sustainability, efficiency, and financial outcomes have also been emphasized in studies of credit cooperatives and related financial institutions, which show that organizational continuity does not automatically translate into stronger financial performance (Barros et al., 2020; Messabia et al., 2022; Vargas et al., 2023).

4.3 The Relative Stability of Activity Performance

In contrast to profitability, activity emerged as the most stable dimension of financial performance in the study. Results from multiple lines of evidence support this conclusion. Activity had the smallest coefficient of variation of all three variables; its means and medians across years were relatively close together; and neither the nonparametric tests on the full data set nor those run on the balanced data set detected statistically significant yearly differences in either variable. Together, these findings indicate that activity was the least volatile and least time-sensitive dimension of cooperative performance during the 2019–2022 period. This pattern is broadly consistent with prior studies showing that activity and efficiency-related indicators in savings and credit cooperatives often reflect operational continuity more than short-term fluctuation in overall financial outcomes (Dewi & Abundanti, 2021; Syamni & Majid, 2016; Yaspita & Gustika, 2021).

This relative stability is analytically meaningful because it suggests that the cooperatives were able to maintain a fairly consistent operational pattern even when profitability weakened. In other words, the basic rhythm of asset use or turnover appears to have remained intact. This may reflect institutional continuity, member demand, or the organizational resilience of cooperative structures. However, the stability of activity should not be interpreted as evidence that the cooperatives were financially unaffected during the study period. On the contrary, when activity remains stable while profitability declines, the most plausible interpretation is that the organizations continued operating but did so under conditions that produced lower returns. Stable activity therefore signals continuity, but not necessarily strength. The cooperative literature has similarly made this same distinction of operational performance, efficiency and a more general set of financial results as has Mushonga et al. (2019), and Paudel (2021) when

examining the relationship between institutional resilience and improved profitability/financial performance.

Therefore, it is relevant to practice. Cooperatives may be viewed as more operationally resilient than they are financially if the cooperatives' performance is evaluated using only operational indicators. The present results suggest that activity should be interpreted as a complementary measure rather than as a substitute for broader financial assessment. The cooperatives were operationally consistent, but their financial efficiency appears to have weakened. For this reason, activity is best understood as an indicator of continuity rather than of comprehensive financial health (Fahriani & Zubaidah, 2023; Hakim, 2021).

4.4 Solvency Dispersion and Distributional Distortion

Solvency was the variable that presented the greatest degree of complexity for interpretation in the current research. While it appears as though there has been a major improvement in the overall financial condition of cooperatives based on the large increase in average solvency from 2021 to 2022, the results do not entirely support this conclusion based on the distribution of the data collected. As the median solvency values remained relatively constant from year to year, while the coefficient of variation for solvency was extremely high and the outlier analysis indicated a significant number of extreme values, these results suggest that the solvency distribution was highly skewed and that a limited number of extreme values have had a disproportionately larger impact on the average solvency value each year. These findings are consistent with prior research that has suggested that solvency-based and ratio-based assessments of cooperative financial performance can generate inconsistent results and therefore must be carefully evaluated, particularly when there is considerable variability in the financial conditions experienced by cooperatives (Dewi & Abundanti, 2021; Fahriani & Zubaidah, 2023; Pranoto et al., 2024).

Therefore, the primary inference that can be drawn from the results is that the mean solvency value, and specifically the mean solvency value in 2022, is not indicative of the typical cooperative. Instead, the median solvency value is a better indicator of the central solvency profile of the cooperatives studied, as the median solvency values remained relatively constant from one year to the next. Therefore, although the annual mean solvency value increased sharply in 2022, the results suggest that the central solvency profile of the cooperatives studied changed much less than would be inferred from the increase in the annual mean solvency values. Consequently, the sharp increase in the mean solvency values should not be viewed as an indication of sector-wide improvements, but rather as indicating that solvency outcomes became more disparate during this time frame, with a few cooperatives reporting exceptional solvency values while the majority of the cooperatives reported solvency values similar to those reported in prior years. Such disparate results are consistent with the broader literature on cooperatives, which has shown that financial indicators can vary greatly among cooperatives, regardless of the institutional framework under which they operate (Adusei et al., 2020; Alonzo, 2024; Klimenko et al., 2017).

The results of the inferential analyses provide additional support for this interpretation. Specifically, solvency did not differ significantly across years in the full unbalanced panel, which supports the notion that the apparent increase in the mean solvency value was primarily due to the effects of the distribution rather than changes in solvency across time. On the other hand, the Friedman test conducted on the balanced panel of cooperatives with complete records across all four years provided strong evidence of inter-year differences, suggesting that solvency is not only unstable but also sensitive to panel composition. Thus, when the same group of cooperatives is tracked consistently across multiple years, meaningful trends become more apparent. Conversely, when all possible observations are combined into a single dataset, such as an unbalanced panel, the dynamics occurring at the individual cooperative level are

masked by greater heterogeneity. Therefore, solvency should be treated differently than the other two variables, and should be considered to be both unstable and structurally sensitive, and should receive special consideration. To the extent that the results of the present study support this position, the results are consistent with prior research that emphasizes the importance of recognizing institutional diversity, changing operating conditions, and the sustainability of credit-based organizations when assessing cooperative financial conditions (Mushonga et al., 2019; Siregar et al., 2020; Yaspita & Gustika, 2021).

4.5 Heterogeneity in Cooperative Financial Outcomes

One of the most important themes emerging from the results is the strong heterogeneity in financial outcomes across cooperatives. The variation of cooperatives in Badung Regency is evident in multiple aspects of the research, such as the distribution of the measures of central tendency and variability, the outlier profiles and the distribution of the categories for the cooperative performance on the basis of their position as a low-performing, moderately performing, or high-performing cooperative. The results indicate that the cooperative sector in Badung Regency was characterized by significant variations in terms of solvency, profitability and activity among cooperatives, despite being placed within the same broad institutional category. These variations of cooperative performance are consistent with previous studies which have demonstrated that cooperative performance can vary significantly from one institution to another due to differences in size, governance, financial structure and operational conditions (Adusei et al., 2020; Alonzo, 2024; Vargas et al., 2023).

These variations matter because they will influence the interpretation of the findings both analytically and substantively. Analytically, it indicates that average values of solvency should be treated with caution, especially if they are used as indicators of the cooperative's overall financial condition. Substantively, these variations suggest that cooperatives were likely experiencing varying degrees of financial pressures and constraints during the same time period. In addition, some cooperatives may have remained in relatively strong or stable positions, while others may have been experiencing declining profitability or more unstable solvency during the same time period. The category-based data presented in the table above are particularly useful in this regard, as they provide a way to interpret the distribution of the cooperatives into more meaningful performance groups each year. The differences in internal performance structure previously documented in cooperative research demonstrate the importance of factors such as capital composition, financial ratio analysis and institutional context in determining uneven outcomes across organizations (Bation et al., 2023; Choez et al., 2024; Pranoto et al., 2024).

A deeper implication is that sector-wide conclusions should avoid assuming uniformity in institutional experience. Financial weakening in the cooperative sector may not have occurred in the same way or with the same intensity across all entities. This suggests that future evaluation and policy response would benefit from recognizing subgroup differences rather than relying exclusively on aggregate summaries. The empirical evidence points to a sector characterized by meaningful variation, not only across years, but also across cooperatives themselves. This interpretation is in line with prior work showing that cooperative sustainability and performance should be assessed with attention to organizational diversity, efficiency differences, and local institutional conditions rather than through uniform sector-wide assumptions alone (Mashudi et al., 2018; Mushonga et al., 2019; Syamni & Majid, 2016).

4.6 Integrated Interpretation Through the Financial Performance Index

The Financial Performance Index provides a useful integrative perspective on the overall pattern of financial change. The index mean remained essentially unchanged between 2019 and 2020, then declined in 2021 and remained lower in 2022. At the same time, the median stayed

constant and the standard deviation gradually decreased. This combination of results suggests that overall financial performance weakened after 2020, but that the distribution of the composite index also became somewhat more compressed over time. In short, the industry appears to have moved towards a lower, but a little more concentrated, general level of performance. A multi-index composite reading such as this is similar to studies that demonstrate the nature of cooperative financial performance should be analyzed using multiple metrics (ratios) instead of only a single ratio at a time (Dewi & Abundanti, 2021; Fahriani & Zubaidah, 2023; Yaspita & Gustika, 2021).

The value of the composite result also lies in how well it reconciles the different messages contained within the individual indicators of the index. Clearly, profitability decreased, but there were no signs of a decrease in activity and solvency was severely affected by outliers/abnormalities. However, when all three of the above-mentioned aspects are combined into a single index, the overall picture that emerges is one of gradual decline as opposed to complete collapse. While the results do not suggest that the entire system has collapsed dramatically, they do suggest that the quality of overall financial performance for cooperatives decreased during the last two years of the period examined. Similar studies of both cooperative and credit-based institutions similarly suggest that the assessment of the trend of institutional performance will typically be more accurate if the trends in profitability, liquidity, operational efficiency and financial structure are evaluated simultaneously (Choez et al., 2024; Hakim, 2021; Paudel, 2021).

The index therefore serves as an important interpretive anchor for the study. It confirms that the later years were associated with weaker overall performance, while also showing that this decline was structured and measured rather than chaotic. A more balanced conclusion can be determined by reviewing all variables together rather than individually. The results suggest that the cooperatives were able to continue operating over time at a relatively constant level of performance while the overall financial performance of the cooperatives was decreasing after 2020. In addition, the results support a larger view expressed in the cooperative literature: that as long as an organization has a continuous institutional presence (i.e. the same governance structure), the organization's ability to function financially may still exist, even if its financial health has weakened. Therefore, it is important to use multiple dimensions when evaluating the true condition of cooperative organizations (Alonzo, 2024; Mushonga et al., 2019; Vargas et al., 2023).

4.7 Managerial and Policy Implications

The findings carry several practical implications for cooperative management and sectoral oversight. First, profitability seems to have been the best single factor to use as an indicator for detecting potential signs of early-stage weakness in the financial condition of cooperatives. Since profitability has the largest trend decline and the greatest amount of inferential evidence regarding change from year-to-year, profitability is probably the most useful to monitor regularly. Cooperatives which continue to operate, but whose profits decline could be experiencing significant inefficiencies or returns issues, which would be less apparent through examination of their other indicators. The implications of this finding are supported by previous research demonstrating that both profit growth and operating surplus in cooperative and village-based financial institution systems are generally reflective of the cooperatives' internal operations and financial health, therefore, profitability should be used as one of the key metrics for manager's review and analysis of cooperatives' performance (Suharmiyati & Iskandar, 2021; Agustina et al., 2024).

Second, the results suggest that solvency should be interpreted with greater diagnostic caution. The extreme skewness and strong outlier influence observed in the data show that simple averages can be misleading. For both managers and regulators, this means that solvency

assessment should incorporate more robust descriptive approaches, including median-based interpretation and closer examination of distributional patterns. Without this, exceptionally large observations may create the false impression of improvement at the sector level. This point is consistent with broader studies of financial performance assessment, which emphasize that institutional financial conditions should be interpreted through multiple indicators rather than through single aggregate measures alone (Ariningsih, 2016; Wurarah & Mokodompit, 2020).

Third, the evidence of financial heterogeneity implies that managerial and policy responses should be differentiated rather than uniform. Not all cooperatives appear to have faced the same level or form of financial strain. Some may require support related to profitability improvement, while others may need closer supervision because of unstable solvency behavior. The stability of activity is encouraging because it suggests continuity of operations, but it should not lead to overly optimistic conclusions if financial returns continue to weaken. Effective intervention will therefore depend on recognizing that sectoral resilience in operational terms may coexist with financial fragility in earnings or balance-sheet performance. This interpretation aligns with earlier work emphasizing the importance of adaptive policy, institutional strengthening, and context-sensitive performance management in cooperative and regional economic settings (Soetrisno et al., 2019; Zamzami & Rakhman, 2023).

4.8 Overall Interpretation of the Findings

Taken together, the discussion suggests that the main financial issue facing Savings and Loan Cooperatives in Badung Regency during the 2019–2022 period was not operational collapse, but rather a gradual weakening in return-generating performance accompanied by increasingly uneven solvency outcomes. Although the cooperatives were able to maintain relatively continuous operations with respect to their activities, the continuity in the level of their operations did not translate to improved or even stable profit levels for the cooperatives. Furthermore, the cooperatives' ability to measure their solvency using average measures decreased significantly due to an increased number of extreme values in their distributions. This trend is also supported by current research which demonstrates that institutional financial performance may be operationally resilient while at the same time, experiencing reduced profitability or more variability in terms of their financial quality, particularly under changing economic conditions (Sundari et al., 2023; Altin et al., 2023).

Therefore, the overall message of the study reflects multidimensional and differential financial changes experienced by cooperatives. The performance of cooperatives did not experience a decline uniformly with respect to all performance indicators, and cannot be described adequately using a single ratio. The profitability indicator showed the most significant decline, activity continued to reflect continuous performance, and solvency was the most variable and unstable of the three. The composite index illustrated the connection between these trends, reflecting a moderate degree of overall decline beginning in 2020. Overall, the results indicate that although the cooperative sector remains functionally active, it has been subject to increasing challenges in maintaining the quality and consistency of its financial performance. Therefore, this is the primary interpretative conclusion from the findings and should provide the foundation for the concluding narrative of the article. In this respect, the study supports a broader perspective in the financial performance literature that emphasizes multidimensional evaluation and cautions against interpreting institutional performance through isolated indicators alone (Agustina et al., 2024; Ferdiana & Sugiyarto, 2022; Wurarah & Mokodompit, 2020).

5. Conclusions

This study assessed the financial performance of Savings and Loans Cooperatives in the Badung Regency from 2019 – 2022 using a descriptive analytical panel framework on solvency, profitability, and activity. In addition to indicating that the financial performance of S&L Cooperatives has been non-uniform across these three financial performance areas; the financial performance indicators demonstrated that profitability is the best single indicator of financial weakness, with a continuous decline shown in the financial performance indicators since 2020 in both the descriptive and analytical assessments. Activity is the steadiest area of financial performance indicating that the Savings and Loans Cooperatives have mostly maintained business continuity throughout the 2019–2022-time frame, while the solvency ratio has been the most unstable indicator and has been heavily affected by extreme values (specifically in 2022), limiting the interpretability of means in providing a good representation of the overall financial condition of the average S&L Cooperative. Therefore, the assessment of the cooperatives' financial performance collectively provides insight into a trend of mild financial decline in the latter years of the 2019–2022-time frame, and not a catastrophic failure of the system.

The study contributed to the existing literature by providing a multi-dimensional and empirical understanding of cooperative financial performance within a panel design. Specifically, it demonstrated that the use of solvency, profitability, and activity as separate indicators of cooperative financial performance can provide different indications of financial position and therefore, should be used collectively, rather than independently. Further, the study reinforced the value of supplementing traditional descriptive statistics with additional statistical methods (i.e., distributional and stability analysis) in assessing financial performance ratios that are significantly skewed by outliers. Practically, the study's findings support the necessity of monitoring profitability as an early indication of potential financial decline, and to exercise a high degree of caution when interpreting solvency ratios due to their susceptibility to outliers, thereby distorting the overall picture of cooperative performance in a given region. Furthermore, the relatively stable nature of activity supports the idea that maintaining operational continuity does not necessarily equate to maintaining financial stability.

As stated earlier, the conclusions of this study must be viewed within the confines of the study's descriptive scope, which precludes the ability to make causal statements about the causes of the observed changes in the cooperative financial performance indicators. Therefore, future studies could benefit from building upon the findings of this study, including exploring the various institutional, managerial, and economic influences that shape the long-term financial resilience of Savings and Loans Cooperatives and/or employing explanatory longitudinal designs and comparative regional analyses. Collectively, the study provided evidence that the financial performance of Savings and Loans Cooperatives in the Badung Regency, Indonesia, between 2019 and 2022 included stable operations, declining profitability, and varied levels of solvency performance, and therefore, necessitates a comprehensive and multi-dimensional evaluation of cooperative financial health over-time.

6. Acknowledgement

The authors would like to express their sincere appreciation to all institutions and parties that supported the completion of this study, particularly in facilitating access to the data and providing academic support during the preparation of the manuscript. The authors also gratefully acknowledge the valuable input and constructive comments that helped improve the quality of this article.

7. Conflict of Interest Declaration

The authors declare that there are no conflicts of interest regarding the publication of this article.

8. Authors' Contributions

Made Yudi Darmita contributed to conceptualization, methodology, data curation, formal analysis, visualization, and writing the original draft. Ida Bagus Raka Suardana contributed to methodology, supervision, and writing review and editing. A.A. Ngurah Eddy Supriyadinata Gorda contributed to conceptualization, supervision, and writing review and editing. Ida Ayu Oka Martini contributed to supervision, validation, and writing review and editing. All authors have read and agreed to the published version of the manuscript.

9. References

- Adusei, M., Adeleye, B., & Okafor, A. (2020). Drivers of credit union penetration: An international analysis. *Managerial and Decision Economics*, 42(3), 710–723. <https://doi.org/10.1002/mde.3267>
- Agustina, P., Praningtyas, E., & Subekti, R. (2024). Determine the factors that influence profit growth at village credit institutions in Badung District. *Ekonomis: Journal of Economics and Business*, 8(1), 571. <https://doi.org/10.33087/ekonomis.v8i1.1589>
- Alonzo, R. (2024). Navigating financial landscapes: An in-depth analysis of farmer cooperative performance in Bulacan, Philippines. *JOMEINO*, 129–147. <https://doi.org/10.31039/jomeino.2024.8.2.7>
- Altin, D., Vehtasvili, V., & Eprianto, I. (2023). The effect of Covid-19 pandemic on regional financial performance in Indonesia: Meta-analysis. *Asian Management and Business Review*, 36–47. <https://doi.org/10.20885/ambr.vol3.iss1.art4>
- André, Q. (2022). Outlier exclusion procedures must be blind to the researcher's hypothesis. *Journal of Experimental Psychology: General*, 151(1), 213–223. <https://doi.org/10.1037/xge0001069>
- Ariningsih, E. (2016). Financial performance of sugarcane cooperatives in East Java. *Analisis Kebijakan Pertanian*, 12(1), 35–49. <https://doi.org/10.21082/akp.v12n1.2014.35-49>
- Barros, M., Moraes, M., Salgado, A., & Souza, M. (2020). Efficiency of credit unions in Brazil: An analysis of the evolution in financial intermediation and banking service. *RAUSP Management Journal*, 55(3), 289–308. <https://doi.org/10.1108/RAUSP-06-2018-0029>
- Bărbuță-Mișu, N., Madaleno, M., & Ilie, V. (2019). Analysis of risk factors affecting firms' financial performance—Support for managerial decision-making. *Sustainability*, 11(18), 4838. <https://doi.org/10.3390/su11184838>
- Bontot, I., & Wibowo, M. (2023). Implementation of the Blue Ocean strategy to the financial performance of village credit institutions (LPD) in Bali. *Proceeding of the International Seminar on Business Economics Social Science and Technology (ISBEST)*, 3(1). <https://doi.org/10.33830/isbest.v3i1.1422>
- Dastjerdy, B., Saeidi, A., & Heidarzadeh, S. (2023). Review of applicable outlier detection methods to treat geomechanical data. *Geotechnics*, 3(2), 375–396. <https://doi.org/10.3390/geotechnics3020022>
- Dewi, D., & Abundanti, N. (2021). The effect of liquidity, solvency and activities on profitability in saving and loan cooperatives (SLC) in Klungkung Regency, Bali, Indonesia. *European Journal of Business Management and Research*, 7(1), 324–328. <https://doi.org/10.24018/ejbmr.2022.7.1.1245>
- Esomar, M., & Titioka, B. (2021). Pearls analysis to assess the health level of Hati Amboina Service Office (KP) Saumlaki Cooperative Credit Union (CU). *The Accounting Journal of Binaniaga*, 6(1), 19. <https://doi.org/10.33062/ajb.v6i1.415>

- Fahriani, D., & Zubaidah, T. (2023). Financial performance analysis of the saving and loan cooperative. *JKIE (Journal Knowledge Industrial Engineering)*, 10(1), 38–49. <https://doi.org/10.35891/jkie.v10i1.4125>
- Farnè, M., & Vouldis, A. (2018). *A methodology for automatised outlier detection in high-dimensional datasets: An application to euro area banks' supervisory data*. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3224300>
- Ferdiana, N., & Sugiyarto, T. (2022). State-owned enterprises (SOEs): The role in economic development and the determinant of its performance. *Jurnal Ekonomi dan Kebijakan Pembangunan*, 11(2), 91–107. <https://doi.org/10.29244/jekp.11.2.2022.91-107>
- Hakim, F. (2021). Analysis of the performance and financial performance of the credit cooperative (Case study of Koperasi Swastisari in Kupang). *De Jure Jurnal Ilmiah Ilmu Hukum*, 2(2), 1. <https://doi.org/10.33387/dejure.v2i2.3123>
- Ježovita, A. (2015). Variations between financial ratios for evaluating financial position related to the size of a company. *Review of Innovation and Competitiveness*, 1(1), 115–136. <https://doi.org/10.32728/ric.2015.11/7>
- Juma, M., & Maseko, F. (2022). Factors affect financial performance of savings and credit cooperative societies during Covid-19 pandemic in Dodoma Region. *European Journal of Accounting Auditing and Finance Research*, 10(11), 104–124. <https://doi.org/10.37745/ejaaf.2013/vol10n104124>
- Klimenko, V., Sokolová, A., & Hasii, O. (2017). Status and prospects for the development of credit unions in Ukraine. *Problems and Perspectives in Management*, 15(4), 124–133. [https://doi.org/10.21511/ppm.15\(4\).2017.11](https://doi.org/10.21511/ppm.15(4).2017.11)
- Kusuma, S., Sumarwan, A., & Kusumajati, T. (2022). The role of integrative approach for enhancing credit union sustainability: A reflection on the Indonesian credit union movement. *Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi dan Pembangunan*, 31–41. <https://doi.org/10.23917/jep.v23i1.17851>
- Messabia, N., Beauvoir, E., & Kooli, C. (2022). Governance and management of a savings and credit cooperative: The successful example of a Haitian SACCO. *Vision: The Journal of Business Perspective*, 27(3), 397–409. <https://doi.org/10.1177/09722629221074130>
- Muhsyaf, S. (2024). Impact of economic crises on banking sector performance: A comparative analysis of conventional and Islamic banks across OIC countries. *Jurnal Ilmiah Tata Sejuta STIA Mataram*, 10(2), 225–242. <https://doi.org/10.32666/tatasejuta.v10i2.646>
- Musah, M., Kong, Y., & Mensah, I. (2019). Exploring the link between operational efficiency and firms' financial performance: An empirical evidence from the Ghana Stock Exchange GSE. *International Journal of Trend in Scientific Research and Development*, 3(4), 842–848. <https://doi.org/10.31142/ijtsrd23954>
- Mushonga, M., Arun, T., & Marwa, N. (2019). The cooperative movement in South Africa: Can financial cooperatives become sustainable enterprises? *Strategic Change*, 28(4), 259–271. <https://doi.org/10.1002/jsc.2268>
- Paudel, G. (2021). Risk management and efficiency of works: A study of Nepalese cooperatives societies. *Business & IT*, 11(2), 10–25. <https://doi.org/10.14311/bit.2021.02.02>
- Pranoto, S., Sarbullah, S., & Prahmawati, K. (2024). Analysis of financial ratio on influencing the growth of residual operating results in savings and loan cooperatives (KSP). *Jurnal STIE Semarang (Edisi Elektronik)*, 16(2), 162–180. <https://doi.org/10.33747/stiesmg.v16i2.720>
- Siahaan, M., Sipahutar, M., Sinambela, T., Pardede, P., Naibaho, P., & Pasaribu, R. (2023). Financial ratio analysis to measure financial performance of Cum Anugerah Bekasi Cooperative. *International Journal of Professional Business Review*, 8(7), e02371. <https://doi.org/10.26668/businessreview/2023.v8i7.2371>

- Siregar, A., Samsudin, A., & Abdulrahman, M. (2020). Dynamics of village unit co-operative development (Case study on KUD Tani Makmur in Kasihan District). *Agroland: The Agricultural Sciences Journal (E-Journal)*, 7(1), 17–28. <https://doi.org/10.22487/agroland.v7i1.445>
- Silva, T., Leite, M., Guse, J., & Gollo, V. (2017). Financial and economic performance of major Brazilian credit cooperatives. *Contaduría y Administración*, 62(5), 1442–1459. <https://doi.org/10.1016/j.cya.2017.05.006>
- Soetrisno, S., Soejono, D., Zahrosa, D., Maharani, A., & Hanafie, S. (2019). Strategy and policy for strengthening the agricultural cooperative business in East Java, Indonesia. *Journal of Socioeconomics and Development*, 2(1), 12. <https://doi.org/10.31328/jсед.v2i1.886>
- Suharmiyati, S., & Iskandar, Y. (2021). Impact of member's deposits and member's loans on the rest of business profits on Cooperative Partner Mandiri, Lirik Districts, Indragiri Hulu. *Jurnal Manajemen dan Bisnis*, 10(2), 55–67. <https://doi.org/10.34006/jmbi.v10i2.341>
- Sundari, M., Rahayu, E., Irianto, H., Handayani, S., & Setyowati, S. (2023). Financial performance analysis of food SMEs: A case study in Sukoharjo Regency. *SEPA: Jurnal Sosial Ekonomi Pertanian dan Agribisnis*, 20(1), 124. <https://doi.org/10.20961/sepa.v20i1.65047>
- Suryathi, N. (2018). The effect of Tri Hita Karana local wisdom on financial performance of UP3HP Jempiring Group in Regency Badung. *SEAS (Sustainable Environment Agricultural Science)*, 2(1), 27–40. <https://doi.org/10.22225/seas.2.1.577.27-40>
- Syamni, G., & Majid, M. (2016). Efficiency of saving and credit cooperative units in North Aceh, Indonesia. *Signifikan: Jurnal Ilmu Ekonomi*, 5(2), 99–118. <https://doi.org/10.15408/sjie.v5i2.3193>
- Tsiouni, M., Kountios, G., Kousenidis, K., Kousenidis, D., Tzamaloukas, O., & Simitzis, P. (2023). Financial ratio analysis as an advisory tool for sustainable pig farm management in Greece. *Sustainability*, 15(21), 15536. <https://doi.org/10.3390/su152115536>
- Vargas, M., García, M., & Oquendo-Torres, F. (2023). Sustainable finance: The role of savings and credit cooperatives in Ecuador. *Annals of Public and Cooperative Economics*, 94(3), 951–980. <https://doi.org/10.1111/apce.12428>
- Wurarah, R., & Mokodompit, M. (2020). Financial performance analysis of rural banks in Manokwari: A case study of Arfak Indonesia Rural Bank. *Journal of Applied Business Administration*, 4(2), 212–220. <https://doi.org/10.30871/jaba.v4i2.2142>
- Yaspita, H., & Gustika, G. (2021). Analysis of financial performance at the KP-RI Kopeka saving and loan cooperation (KSP) Kopeka Indragiri Hulu Regency. *Jurnal Manajemen dan Bisnis*, 10(2), 165–183. <https://doi.org/10.34006/jmbi.v10i2.354>
- Yitayaw, M. (2021). Determinants of profitability and financial sustainability of saving and credit cooperatives in Eastern Ethiopia. *International Journal of Rural Management*, 17(2), 239–261. <https://doi.org/10.1177/0973005220980599>
- Zamzami, F., & Rakhman, F. (2023). Determinants of local government financial performance in Indonesia. *Academic Journal of Interdisciplinary Studies*, 12(5), 332. <https://doi.org/10.36941/ajis-2023-0148>
- Zielińska-Chmielewska, A., Kaźmierczyk, J., & Jaźwiński, I. (2021). Quantitative research on profitability measures in the Polish meat and poultry industries. *Agronomy*, 12(1), 92. <https://doi.org/10.3390/agronomy12010092>