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The impact of governance structures on the financial performance of Brazilian financial cooperatives

El impacto de las estructuras de gobernanza en el desempeño financiero de las cooperativas de crédito brasileñas

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Abstract

Financial cooperatives play an important role in promoting financial inclusion and community development. This study investigates how board characteristics, including size, gender diversity, and tenure, influence the financial performance of 930 Brazilian financial cooperatives between 2008 and 2022. Using panel data and the System Generalized Method of Moments (SYS-GMM), the results reveal that larger boards negatively affect performance due to coordination inefficiencies, while longer tenure on supervisory boards enhances stability and oversight. Female representation on the board of directors shows a significant negative association with financial performance, reflecting potential cultural and institutional challenges in governance. Cooperative size positively affects performance, reflecting economies of scale, while leverage and network affiliations pose financial challenges. The findings highlight the importance of designing governance structures that balance inclusivity, representation, and financial sustainability, providing insights for improving governance in cooperatives operating in emerging markets.

JEL Code: G23, G34, M14
Keywords: financial cooperatives; cooperate governance; board of directors; gender diversity; financial performance

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Resumen

Las cooperativas de crédito desempeñan un papel importante en la promoción de la inclusión financiera y el desarrollo comunitario. Este estudio investiga cómo las características del consejo, incluyendo el tamaño, la diversidad de género y la antigüedad, influyen en el desempeño financiero de 930 cooperativas financieras brasileñas entre 2008 y 2022. Utilizando datos de panel y el Método Generalizado de Momentos en Sistema (SYS-GMM), los resultados revelan que los consejos más grandes afectan negativamente el desempeño debido a ineficiencias de coordinación, mientras que una mayor antigüedad en los consejos de supervisión mejora la estabilidad y la supervisión. La representación femenina en el consejo de administración muestra una asociación negativa significativa con el desempeño financiero, lo que refleja posibles desafíos culturales e institucionales en la gobernanza. El tamaño de la cooperativa afecta positivamente el desempeño, reflejando economías de escala, mientras que el apalancamiento y las afiliaciones a redes plantean desafíos financieros. Los hallazgos subrayan la importancia de diseñar estructuras de gobernanza que equilibren la inclusión, la representación y la sostenibilidad financiera, aportando ideas para mejorar la gobernanza en cooperativas que operan en mercados emergentes.

Código JEL: G23, G34, M14
Palabras clave: cooperativas financieras; gobernanza cooperativa; consejo de administración; diversidad de género; desempeño financiero

Introduction

The governance of financial institutions has become a critical global issue, particularly for organizations operating under unique principles such as financial cooperatives (McKillop et al., 2020). In Brazil, financial cooperatives play a vital role in advancing financial inclusion and fostering economic development, especially in underserved regions where traditional banks are often absent (Bressan et al., 2017). Their democratic governance and commitment to member benefits uniquely position them to address the financial needs of diverse populations (Coelho et al., 2019; Kuznyetsova et al., 2022). However, governance challenges remain a critical concern as these institutions expand, influencing their financial performance and sustainability (Jamaluddin et al., 2023; McKillop et al., 2020).

The Brazilian financial cooperative sector has grown significantly, with assets increasing by 210% between 2018 and 2022, surpassing the 70% growth in other segments of the national financial system (Bacen, 2023). By December 2023, total membership reached 17.3 million, reflecting steady annual growth rates of 11.2%, 14.7%, and 13.7% in 2023, 2022, and 2021, respectively. Despite this growth, limited research has explored how governance structures, such as the board of directors, supervisory board, and executive management, impact financial performance in this sector.

Unlike publicly traded companies, financial cooperatives do not prioritize profit maximization (McKillop et al., 2020). While profitability is essential for growth, cooperative members receive only the nominal value of their investment upon exit, which discourages high-risk activities and promotes stable

returns across economic cycles (Coelho et al., 2019). However, many members may fail to recognize their dual role as owners and customers, viewing the cooperative primarily as a service provider.

Previous studies have identified factors influencing cooperative performance, including social capital (Yu & Nilsson, 2018), executive management (Cook & Burress, 2013), board characteristics (Ghosh & Ansari, 2018), and economic policy uncertainty (Singh et al., 2019). While these studies provide valuable insights, most focus on contexts outside Brazil, leaving a critical research gap. In Brazil, research has examined profitability (Bittencourt et al., 2017), governance and performance relationships (Santos, 2019; Santos, 2016; Silva et al., 2023; Utiyama, 2016), and credit risk management (Paula et al., 2019). However, few studies have analyzed the impact of governance characteristics, such as gender diversity, board size, and tenure, on financial performance within Brazilian financial cooperatives.

The competitive nature of Brazil's banking system requires financial cooperatives to operate efficiently to ensure their sustainability and maintain a competitive edge (Santos, 2019). Unda et al. (2019) analyzed Australian financial cooperatives, finding positive correlations between board financial expertise and performance metrics such as profitability and cost-efficiency. However, their study did not address endogeneity, leaving questions about causal relationships. Building on these gaps, this study investigates how governance characteristics, particularly gender diversity, board size, and tenure, influence the financial performance of Brazilian financial cooperatives.

The limited research on cooperative governance in emerging economies like Brazil underscores the importance of this study (Jamaluddin et al., 2023). As Bittencourt et al. (2017) recommend, understanding the relationship between governance structures and financial performance in the Brazilian context is critical. This research aligns with international studies, such as Unda et al. (2019), while addressing specific national challenges. It seeks to answer: What is the impact of governance characteristics, such as gender diversity, board size, and tenure, on the financial performance of Brazilian financial cooperatives?

Given the economic significance of financial cooperatives in Brazil, this study contributes to the academic discourse by examining key governance aspects and their influence on performance. Financial cooperatives play a pivotal role in expanding credit access in underserved regions, fostering financial inclusion and economic growth (Bressan et al., 2017; Kuznyetsova et al., 2022). Initially established to support economically disadvantaged areas, these cooperatives continue to provide essential financial services to resource-constrained communities (McKillop et al., 2020). Recognizing their importance, policymakers, managers, and scholars are increasingly interested in understanding their governance structures and their impact on both financial and societal outcomes (Railienė & Sinevičienė, 2015; Utiyama, 2016).

Theorical framework

Governance in financial cooperatives

The agency problem in financial cooperatives arises when conflicts of interest emerge between members and the cooperative's governing bodies, with officeholders potentially prioritizing their own interests over those of the broader membership (Lima, 2017; Paula et al., 2019). Grounded in agency theory, this study examines how governance mechanisms such as board composition, size, and tenure can mitigate these conflicts by aligning decision-making with member interests. Agency theory, as significantly advanced by Jensen and Meckling (1976), is particularly relevant to cooperatives because democratic governance and member ownership may dilute individual accountability and exacerbate agency challenges (McKillop et al., 2020). Effective governance is crucial to aligning the actions of the board of directors, supervisory board, and executive management with the interests of the cooperative's members. This theoretical perspective emphasizes how well-designed governance structures reduce agency costs, enhance transparency, and improve long-term performance, particularly in member-owned organizations such as cooperatives (Chaves et al., 2008; Santos, 2019).

Good governance, as defined by Jamaluddin et al. (2023), is fundamental to the success of any cooperative, ensuring that decision-making processes contribute to the sustainability and performance of the institution. By establishing clear and effective structures and processes for management and control, governance practices help guide strategic decisions and ensure long-term success (Ventura, 2009). In cooperatives, governance is shaped by the relationships between members, the management, and the board, all of whom work together to achieve the cooperative's goals (Jamaluddin et al., 2023). Strong governance practices foster trust among stakeholders, which can lead to increased long-term value for the cooperative (Mathuva et al., 2017). However, without adequate governance mechanisms, cooperatives face inherent challenges tied to their dual nature as member-driven organizations and financial institutions. These challenges include internal disputes, strategic misalignment, and, in extreme cases, organizational failure (Chaves et al., 2008; Villavicencio & Solares, 2019). Therefore, understanding the link between governance and cooperative performance is essential, particularly in the areas of economic, social, and sustainability outcomes (Co-operatives UK, 2013).

Hypothesis development

Gender diversity

Gender diversity has been highlighted as a critical factor in enhancing the effectiveness of governance structures. Women often bring diverse perspectives to boards, improving oversight, decision-making, and accountability (Carter et al., 2003). Gender-diverse boards can strengthen independence and reduce the risk of groupthink, particularly in organizations where strategic alignment with member interests is essential.

In Brazilian cooperatives, initiatives to increase female representation align with global efforts to achieve gender equality in governance (Bacen, 2023). However, corporate settings remain predominantly male-dominated, and the impact of female participation on performance has been understudied in the Brazilian context (Dwaikat et al., 2021).

Empirical studies reveal varying outcomes regarding the influence of gender diversity on cooperative performance. Research in Spanish cooperatives has demonstrated that boards with greater female representation can achieve better financial outcomes and enhanced operational risk management (Hernández-Nicolás et al., 2019). Conversely, other studies, such as those by Esteban-Salvador et al. (2019), found no significant relationship between gender diversity and financial performance. Similarly, findings from Indian cooperatives indicate that the inclusion of women on boards may negatively impact financial results, possibly due to contextual and structural differences in governance practices (Ghosh & Ansari, 2018). Given the limited research specifically addressing gender diversity within Brazilian cooperatives, this study explores its effects through the following hypothesis:

H1. Increasing female representation on the board of directors is positively correlated with the performance of financial cooperatives.

Supervisory boards, which are tasked with monitoring management and mitigating risks, can also significantly benefit from gender diversity. Studies in Spanish agricultural cooperatives suggest that supervisory boards with greater female representation strengthen risk management processes and improve financial outcomes (Hernández-Nicolás et al., 2019; Esteban-Salvador et al., 2019). Beyond financial metrics, gender-diverse supervisory boards foster collaborative dynamics and encourage long-term strategic thinking, which enhances governance quality (Bozhinov et al., 2021; Périlleux & Szafarz, 2022).

However, in Brazilian cooperatives, women remain underrepresented in supervisory boards, which limits the potential benefits of diversity in enhancing transparency and governance accountability (Grashuis, 2020; Mathuva et al., 2017). Therefore, the following hypothesis is proposed:

H2. Increasing female representation on the supervisory board is positively associated with the performance of financial cooperatives.

Executive management teams are pivotal in shaping organizational strategy and balancing financial and social goals. Gender diversity within these teams promotes innovative problem-solving and strategic adaptability (Bozhinov et al., 2021). Female executives are associated with fostering collaboration, promoting ethical governance, and aligning operational strategies with long-term sustainability goals (Périlleux & Szafarz, 2022).

In cooperatives, where financial and social objectives must be balanced, gender-diverse executive management is particularly valuable. Women in leadership roles contribute to inclusivity and enhance strategic adaptability, which are vital for cooperatives to address economic and social challenges successfully (Hernández-Nicolás et al., 2019; Suherman et al., 2021). Based on this reasoning, the following hypothesis is presented:

H3. Increasing female representation in executive management is positively associated with the performance of financial cooperatives.

Board size

Empirical studies in corporate enterprises (Assenga et al., 2018; Brahma et al., 2021; Livnat et al., 2021) have produced mixed findings regarding the relationship between board size and effectiveness. For example, Ghosh and Ansari (2018) reported that, after accounting for various factors, board size did not significantly affect the performance of cooperative banks in India. These findings suggest that the impact of board size on performance may vary based on regional and economic contexts. Conversely, Franken and Cook (2019) discovered that board size negatively affected the performance of U.S. agricultural cooperatives, indicating potential inefficiencies associated with larger boards. Given the complexity of this issue and its importance in academic discussions, the following hypothesis is formulated:

H4. A larger number of board members is positively associated with the performance of financial cooperatives.

Grashuis (2020) explored the influence of both board and executive management sizes, finding positive associations between board size, management size, and agency costs in U.S. farmer cooperatives. In contrast, Yamori et al. (2017) found that larger boards reduced efficiency in stock and cooperative banks, highlighting the nuanced impact of board size across different organizational types. Mathuva et al. (2017) showed that adequately sized supervisory boards in Kenyan financial cooperatives enhanced governance and positively affected social and environmental disclosures, suggesting that larger supervisory boards may provide better oversight and align more effectively with cooperative objectives.

However, Hemrit (2020) identified that larger board sizes detracted from the financial performance of cooperative insurance firms in Saudi Arabia, likely due to coordination difficulties and slower decision-making processes. Similarly, Höhler and Kühl (2017) argued that member heterogeneity, as reflected in board composition, could increase governance costs. Despite these challenges, effectively structured larger boards can improve representation and address diverse member interests, enhancing cooperative governance (Grashuis, 2020). Given the mixed findings and the significant role of supervisory boards in governance, the next hypothesis is articulated as follows:

H5. A larger number of supervisory board members is positively associated with the performance of financial cooperatives.

Executive management, serving as the operational core of cooperatives, is also affected by team size. Larger management teams can foster innovative problem-solving and distribute responsibilities more effectively. Mathuva et al. (2017) found that robust management structures in Kenyan financial cooperatives led to improved governance, especially in aligning strategic goals with social and financial outcomes. Nevertheless, Yamori et al. (2017) cautioned that overly large management teams could face inefficiencies, such as slower decision-making and increased operational costs. Despite these risks, the adaptability and diversity provided by larger management teams are valuable in cooperatives, where balancing financial performance with member satisfaction is essential. Thus, the following hypothesis is proposed:

H6. A larger number of executive management members is positively associated with the performance of financial cooperatives.

Tenure

In the corporate context, tenure has been shown to play a dual role in governance effectiveness. Livnat et al. (2021) found that organizational performance improves with average board member tenure, peaking at around 6-8 years, after which it stabilizes or slightly declines. While extended tenure may occasionally hinder monitoring due to entrenchment, longer-serving members often bring valuable experience, dedication, and insight into organizational dynamics (Cook & Burress, 2013). In environments with limited external monitoring mechanisms, such as financial cooperatives, longer tenures have been linked to tighter control and reduced agency problems (Unda et al., 2019). Given this theoretical background, the first hypothesis on tenure is formulated as follows:

H7. The tenure of board of directors' members is positively associated with the performance of financial cooperatives.

Although the results on tenure are sometimes conflicting, its impact extends beyond just the board of directors. Supervisory boards and executive management teams also play distinct and complementary roles in governance. Cook and Burress (2013) observed that cooperatives led by CEOs with less than a decade of tenure were 1.52 times more likely to engage in strategic development, demonstrating the strategic benefits of experienced leadership. Similarly, Hakelius (2018) analyzed the effects of long-serving directors in Swedish farmer cooperatives and noted that extended tenures often foster strategic insight and deep understanding of cooperative operations, though they may also reduce flexibility or innovation. Given the importance of experience and insight for supervisory boards, the following hypothesis is articulated:

H8. The tenure of supervisory board members is positively associated with the performance of financial cooperatives.

Supervisory boards, tasked with oversight and strategic guidance, often benefit from longer tenures as members gain deeper knowledge of governance challenges and foster trust among stakeholders. However, balance is essential, as excessively long tenures can lead to risks of entrenchment or reduced responsiveness (Hakelius, 2018). In cooperatives, where trust and alignment with social objectives are crucial, the benefits of longer tenures frequently outweigh the drawbacks, provided that proper governance mechanisms remain in place (Cook & Burress, 2013; Unda et al., 2019).

For executive management, tenure plays a critical role in the operationalization of cooperative goals. Longer tenures allow executives to build trust with stakeholders and refine governance practices, contributing to organizational adaptability and resilience (Cook & Burress, 2013; Unda et al., 2019). Suherman et al. (2021) found that CEOs in Indonesian cooperatives with longer tenures demonstrated improved decision-making resilience, emphasizing the importance of experienced leadership for fostering long-term sustainability. Franken and Cook (2019) similarly noted that experienced CEOs paired with smaller, effective boards positively influence cooperative performance. Given these findings, the following hypothesis is proposed:

H9. The tenure of executive management members is positively associated with the performance of financial cooperatives.

Executive management, together with supervisory boards, ensures a cohesive governance framework. The complementary roles of these entities, strategic oversight by supervisory boards and operational execution by executive management, are critical for aligning governance structures with member needs and market demands. By incorporating institutional knowledge and fostering collaboration, leaders with longer tenures contribute to both resilience and adaptability, which are essential for the long-term success of cooperatives (Cook & Burress, 2013; Unda et al., 2019). To provide a clearer visualization

of the relationships between the variables and the formulated hypotheses, the research framework is presented below.

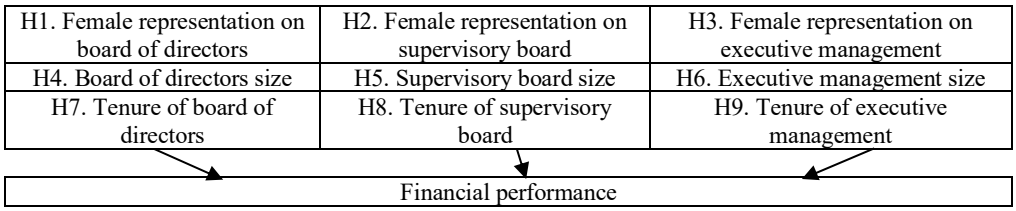

Figure 1. Research framework illustrating the relationships between board characteristics and performance.
Source: Elaborated by the authors (2025)

Methodological procedures

Data and sample

The collection of board data from financial cooperatives has been challenging because this information is not publicly available, unlike data from companies or banks, which are easily accessed through commercial databases. To address this limitation, the data from boards were directly requested from the Central Bank of Brazil through the "Request information from the Bacen" platform. These data were structured in an Excel spreadsheet and organized in a cross-sectional manner, forming a panel dataset.

For this study, we employed a non-probabilistic sampling method, specifically a convenience sampling approach, as the sample was derived from the population of all financial cooperatives regulated by the Central Bank of Brazil and for which complete statutory and accounting information was available. This selection process ensured the inclusion of all cooperatives meeting the criteria for analysis.

The sample size was determined by identifying all cooperatives regulated by the Central Bank of Brazil with complete data available across the study period. This process resulted in a final sample of 930 financial cooperatives, comprising individual cooperatives, federations, and cooperative confederations. The panel dataset spans the years 2008 to 2022 and includes 8,745 annual observations, derived from the total number of cooperatives multiplied by the years of available data. Missing values were removed to achieve a well-balanced panel dataset.

The accounting information used in this study comprises secondary data extracted from the IF.data platform of the Central Bank of Brazil. Data were collected and organized by a unique legal entity identifier (Cadastro Nacional da Pessoa Jurídica [CNPJ] in Portuguese).

To address the impact of outliers and ensure robust results, all continuous variables were winsorized at both the first and ninety-ninth percentile levels. This step minimizes the influence of extreme values while retaining the variability in the data. The analyses were conducted using the R software, and the script is available for reference if needed.

Definition of the variables

Profitability metrics serve as a means of evaluating performance. The choice of these financial performance indicators aligns with the PEARLS monitoring system, established by the World Council of Credit Unions (WOCCU). This system provides a comprehensive set of performance metrics to oversee financial cooperatives on a global scale. Following the precedent set by previous cooperative studies (Franken & Cook, 2019; Unda et al., 2019), two profitability measures are employed: Return on Equity (ROE), calculated as net income divided by equity, and Return on Assets (ROA), determined by dividing net income by total assets. While the use of these indicators aims to optimize outcomes, it is acknowledged that such optimization may be more challenging for cooperatives due to their dual financial and social objectives. Nevertheless, these metrics have been widely adopted in the literature (Bittencourt et al., 2017).

The formula for performance measures, as well as the determinants of governing bodies considered in this paper, is shown in Table 1.

Table 1
Description of the study variables

Variable name	Description of the variable	Abbreviation	Type of data & measurement scale	Authors in the context of financial cooperatives
Dependent Variables (Performance Variables)				
Return on Equity	Net Income / Equity	ROE	Numerical (Continuous, Ratio Scale)	Franken & Cook (2019); Unda et al. (2019).
Return on Assets	Net Income / Total Assets	ROA	Numerical (Continuous, Ratio Scale)	Franken & Cook (2019); Singh et al. (2019); Unda et al. (2019).
Independent Variables (Statutory Bodies Characteristics Variables)				
Gender of the Board of Directors	Percentage of Women on the Board of Directors	FemBOD	Numerical (Continuous, Ratio Scale)	Ghosh & Ansari (2018); Unda et al. (2019).
Gender of the	Percentage of Women on the Supervisory Board	FemSB	Numerical (Continuous, Ratio Scale)	Mathuva et al. (2017).

Supervisory Board Gender of the Executive Management	Percentage of Women on the Executive Management	FemEM	Numerical (Continuous, Ratio Scale)	Mathuva et al. (2017).
Board of Directors Size	Number of Directors on the Board of Directors	BoardBOD	Numerical (Discrete, Ratio Scale)	Franken & Cook (2019); Ghosh & Ansari (2018); Grashuis (2020); Unda et al. (2019).
Supervisory Board Size	Number of Directors on the Supervisory Board	BoardSB	Numerical (Discrete, Ratio Scale)	Mathuva et al. (2017).
Executive Management Size	Number of Directors on the Executive Management	BoardEM	Numerical (Discrete, Ratio Scale)	Grashuis (2020); Mathuva et al. (2017).
Board of Directors' Tenure	Average Years of Activity per Board of Directors' Member	TenBOD	Numerical (Continuous, Ratio Scale)	Unda et al. (2019).
Supervisory Board' Tenure	Average Years of Activity per Supervisory Board' Member	TenSB	Numerical (Continuous, Ratio Scale)	Franken & Cook (2019); Unda et al. (2019)
Executive Management' Tenure	Average Years of Activity per Executive Management' Member	TenEM	Numerical (Continuous, Ratio Scale)	Franken & Cook (2019).
Control Variables				
Financial Cooperative Size	Natural Logarithm of Total Assets	FCSize	Numerical (Continuous, Ratio Scale)	Santos (2019); Singh et al. (2019); Unda et al. (2019); Zancan et al. (2023).
Financial Cooperative Leverage	Total Debt / Total Assets	FCLev	Numerical (Continuous, Ratio Scale)	Singh et al. (2019).
Financial Cooperative's Affiliation	Dummy variables: Federation or Confederation = 1 and Individual = 0	AF	Categorical (Nominal Scale)	Santos (2019); Unda et al. (2019); Ventura (2009).
Type of Financial Cooperative	Dummy variables: If Free Admission = 1 and if not Free Admission = 0	Type	Categorical (Nominal Scale)	Sallaberry et al. (2024); Santos (2019); Santos (2016); Ventura (2009).
Operational region	North = N; Central-West = CW; South = S; Southeast = SE; Northeast = NE.	Region	Categorical (Nominal Scale)	Santos (2019); Santos (2016); Ventura (2009).

Source: Elaborated by the authors (2025)

Gender metrics were calculated for the Board of Directors (FemBOD), Supervisory Board (FemSB), and Executive Management (FemEM) by determining the percentage of women in each

respective body. To classify gender, we used data on Brazilian names from the 2010 Demographic Census provided by the Instituto Brasileiro de Geografia e Estatística (IBGE) and compiled by Justen (2019). These metrics enable the examination of gender diversity's influence on performance, following prior studies such as Ghosh & Ansari (2018), Mathuva et al. (2017) and Unda et al. (2019).

The sizes of the Board of Directors (BoardBOD), Supervisory Board (BoardSB), and Executive Management (BoardEM) were measured by the total number of directors in each body. Prior literature (Franken & Cook, 2019; Grashuis, 2020) highlights the role of board size in influencing decision-making and monitoring capacity.

The average tenure of members was calculated for the Board of Directors (TenBOD), Supervisory Board (TenSB), and Executive Management (TenEM), reflecting members' experience and institutional memory. While extended tenure may pose risks of entrenchment, it also enhances governance stability and strategic resilience, particularly in executive roles (Franken & Cook, 2019; Unda et al., 2019).

To account for other factors potentially impacting performance, several control variables were introduced. The Financial Cooperative Size (FCSize) is measured as the natural logarithm of total assets. Larger cooperatives are anticipated to benefit from economies of scale, as highlighted by Santos (2019) and Zancan et al. (2023). Leverage (FCLev), calculated as total debt divided by total assets, reflects financial structure and risk exposure (Singh et al., 2019).

Affiliation (AF) is a categorical variable that distinguishes cooperatives affiliated with federations or confederations (coded as 1) from independent ones (coded as 0), as affiliation is associated with enhanced efficiency and operational security (Ventura, 2009). The Type of Financial Cooperative (Type) identifies cooperatives with free admission policies (coded as 1) versus restricted ones (coded as 0), reflecting governance practices and performance impacts (Sallaberry et al., 2024; Santos, 2016).

Finally, regional variables account for geographic differences across Brazil's five regions: North, Central-West, South, Southeast, and Northeast. These divisions, informed by prior research (Santos, 2016; Ventura, 2009), facilitate comparative analysis of cooperatives within distinct socio-economic landscapes.

Econometric model and procedures

To investigate the relationship between governance characteristics and the performance of Brazilian financial cooperatives, we estimate a series of econometric models, beginning with Ordinary Least Squares (OLS) and Fixed Effects (FE) approaches, followed by the System Generalized Method of Moments (SYS-GMM) to address endogeneity concerns. The baseline model for OLS and FE estimation is expressed in equation (1):

$$Performance_{i,t} = \alpha + \beta_1 Female_{i,t} + \beta_2 BoardSize_{i,t} + \beta_3 Tenure_{i,t} + \theta X_{i,t} + \nu_t + \varepsilon_i \quad (1)$$

In this model, $Performance_{i,t}$ refers to the dependent variable, represented by ROE or ROA for cooperative i in year t. The explanatory variables include Female, BoardSize, and Tenure, which capture governance characteristics such as gender diversity, board composition, and experience. A set of control variables ($\theta X_{i,t}$) including cooperative size (FCSize) and leverage (FCLev) accounts for other factors influencing performance. Year-specific effects (ν_t) and the error term (ε_i) capture unexplained variation.

OLS and FE models provide initial insights into the associations between governance variables and performance but may suffer from endogeneity due to omitted variables, measurement errors, or reverse causality. To address endogeneity, a frequent concern in corporate governance studies (Wintoki et al., 2012) and corporate finance (Barros et al., 2020), we employed the System Generalized Method of Moments (SYS-GMM) shown in equation (2):

$$Performance_{i,t} = \alpha + Performance_{i,t-1} + Performance_{i,t-2} + \beta_1 Female_{i,t} + \beta_2 BoardSize_{i,t} + \beta_3 Tenure_{i,t} + \theta X_{i,t} + \mu_i + \nu_t + \varepsilon_{i,t} \quad (2)$$

To account for the dynamic nature of the governance-performance relationship, we include two lags of the dependent variable ($Performance_{i,t-1}$ and $Performance_{i,t-2}$) in the SYS-GMM model. These lagged terms capture the potential persistence of performance over time and mitigate potential endogeneity issues, as suggested by Wintoki et al. (2012). Unobserved, time-invariant effects (μi) control for heterogeneity across cooperatives, while year-specific effects (νt) account for temporal shocks. The idiosyncratic error term (εi) represents unexplained variations.

The SYS-GMM approach is particularly suitable for this study due to the dynamic nature of the governance-performance relationship and the inclusion of lagged dependent variables as explanatory variables. Unlike the difference GMM, SYS-GMM accounts for potential biases from weak instruments by combining equations in both levels and first differences, enhancing efficiency and robustness (Blundell & Bond, 1998).

To ensure the robustness of the SYS-GMM model, we performed additional specification tests, including the Hansen test for overidentifying restrictions and the AR(2) test for second-order serial correlation in the residuals. These tests validate the instruments and confirm the appropriateness of the model. Detailed results of these tests are presented in the results section.

Results

Descriptive statistics and association analysis

Table 2 presents descriptive statistics for Brazilian financial cooperatives over the 15-year period (2008–2022), with data winsorized at the 1% level. Financial performance indicators, ROE and ROA, showed relative stability, with ROE fluctuating between 8% and 8%, improving slightly in later years, and ROA maintaining a steady level of approximately 1%. This reflects modest but consistent profitability, consistent with Unda et al. (2019), who highlighted conservative performance metrics in cooperatives due to their dual financial and social objectives.

Governance structures evolved throughout the study period. The Board of Directors averaged 8 members annually, ranging from 3 to 21, with minor fluctuations in early years, aligning with findings on balancing representation and decision-making efficiency (Franken & Cook, 2019; Unda et al., 2019). The Supervisory Board maintained an average size of 5.7 members, reflecting governance standards (Mathuva et al., 2017), while Executive Management showed a slight decline, from an average of 3 members in earlier years to 2.6 members by 2022.

Gender diversity showed mixed trends across governance bodies. Female representation on the Board of Directors ranged from 12% to 16%, with no year achieving parity. The Supervisory Board started with 21% female participation in 2008, increasing modestly to 23% in 2022. Executive Management displayed the most progress, rising from 13% in 2008 to 22% in 2022, including 185 instances of all-female management boards across 75 cooperatives. These results highlight varying levels of inclusivity, with Executive Management leading in gender diversity.

Board member tenure increased consistently, reflecting improved governance stability and institutional memory. The tenure of the Board of Directors rose from 3.56 to 4.98 years, while the Supervisory Board exhibited the most growth, with tenure increasing from 1.45 to 3.46 years. Executive Management tenure also increased, rising from 3.47 to 4.06 years. These trends align with resource-dependence theory, which emphasizes the strategic benefits of longer tenures, such as enhanced advisory capacities and institutional knowledge (Dou et al., 2015).

Financial cooperatives experienced significant growth, with size (measured by the natural logarithm of total assets) increasing from 8.85 in 2008 to 12.65 in 2022. Leverage also rose, from 0.60 to 0.77, reflecting a greater reliance on debt financing to support expansion. While leverage can fuel growth, it underscores the need for careful risk management to ensure sustainability.

Overall, the descriptive statistics reveal a dynamic governance environment characterized by increasing gender diversity, longer board tenures, and growing leverage ratios. These trends highlight

cooperatives' efforts to adapt to internal priorities and external challenges, balancing operational growth with inclusivity and governance stability.

Model validation and variable relationships

The Anderson-Darling test indicated significant non-normality in residuals for ROE and ROA ($p<0.001$), but visual inspection of histograms suggested near-normal distributions. Given the large sample size and robust estimation techniques, concerns about non-normality were minimized (Pierce & Gray, 1982). Heteroskedasticity identified by the Breusch-Pagan test ($p<0.001$) was addressed with robust standard errors, while serial correlation revealed by the Breusch-Godfrey/Wooldridge test ($p<0.001$) justified the use of fixed effects (FE) models and SYS-GMM. Model selection tests supported these choices: the Chow test favored fixed effects over pooled OLS, and the Hausman test confirmed fixed effects as preferable to random effects ($p<0.001$).

Table 3 presents the Pearson correlation matrix. No correlations exceeded 0.8, mitigating multicollinearity concerns (Gujarati & Porter, 2011). VIF analysis further supported this, with all values below 2.5 (Field, 2014).

Gender diversity metrics revealed mixed relationships. Female representation on the Board of Directors correlated negatively with ROE (-0.13) and cooperative size (-0.26), but positively with female participation on the Supervisory Board (0.36). Female representation in Executive Management correlated positively with FemaleBOD (0.40) and FemaleSB (0.21), while showing a slight negative correlation with ROE (-0.07).

Board size demonstrated varying impacts. The size of the Board of Directors correlated positively with ROE (0.07) and cooperative size (0.32), indicating that larger boards enhance oversight and access to resources (Franken & Cook, 2019; Ghosh & Ansari, 2018). Supervisory Board and Executive Management sizes showed slight positive correlations with ROE (0.06 and -0.04, respectively), reflecting their operational and supervisory governance roles.

Tenure metrics highlighted the importance of experience. Tenure of the Board of Directors and Supervisory Board correlated positively with ROE (0.08 and 0.07), suggesting that longer tenures contribute to stability and strategic insights. Executive Management tenure showed modest positive correlations with ROE (0.03) and cooperative size (0.04), underscoring its role in governance continuity and organizational growth.

These results underscore the interplay of governance structures, gender diversity, and experience in shaping cooperative performance. Board size and tenure emerge as key factors influencing oversight, stability, and outcomes.

Regression results

The econometric models were validated to ensure robust findings, using the System Generalized Method of Moments (SYS-GMM) to address endogeneity concerns in governance-performance relationships. Key diagnostic tests, including the Sargan test for overidentifying restrictions and the Arellano-Bond tests for serial correlation (AR(1) and AR(2)), confirmed model validity. The Sargan test indicated valid instruments ($p = 0.13$ for ROE and 0.05 for ROA). The AR(1) test showed first-order serial correlation ($p < 0.01$), while AR(2) confirmed no second-order serial correlation ($p = 0.99$ for ROE and 0.62 for ROA). These results validate the choice of instruments and the SYS-GMM model.

Table 4 presents the regression results, with ROE and ROA as dependent variables. The overall F-tests are highly significant ($p < 0.01$), confirming that independent variables collectively explain variations in performance. The R^2 values range from 0.05 to 0.23, consistent with other studies on Brazilian financial cooperatives (Santos, 2019; Silva et al., 2023; Zancan et al., 2023), where performance variability is partially driven by external factors like macroeconomic conditions (Sallaberry et al., 2024).

The findings reveal predominantly negative evidence regarding gender diversity. Female representation on the Board of Directors (FemaleBOD) showed a significant negative association with ROE and ROA in OLS models; however, this association was not robust in FE or GMM results. This outcome aligns with Ghosh and Ansari (2018), who observed similar trends in Indian cooperative banks, and Esteban-Salvador et al. (2019), who highlighted the influence of cultural and institutional factors on gender diversity outcomes. These results do not support H1, indicating that FemaleBOD's impact may depend on governance practices and societal norms, particularly in Brazil, where gender diversity in leadership is a relatively recent development (Hernández-Nicolás et al., 2019).

For the Supervisory Board (FemaleSB), OLS models indicated a marginally negative impact on ROE and ROA, but GMM results showed no significant effects, failing to support H2. These findings align with studies like Bozhinov et al. (2021) and Mathuva et al. (2017), which highlight the complex dynamics of gender diversity in supervisory roles. Gender diversity often fosters collaborative decision-making and long-term strategies (Périlleux & Szafarz, 2022), but its immediate financial impacts may be limited.

Board size emerged as a critical factor. SYS-GMM results showed a significant negative impact of BoardSizeBOD on ROE and ROA, contradicting H4, which posited a positive association. Larger boards may reduce decision-making efficiency and increase governance costs, as noted by Höhler and Kühl (2017) and Yamori et al. (2017). In cooperatives, where boards must balance diverse member priorities, larger sizes can exacerbate inefficiencies, as highlighted by Grashuis (2020).

Tenure demonstrated varying impacts. Supervisory Board tenure (TenureSB) showed a marginally positive and significant effect on ROE in GMM results, partially supporting H8. Longer tenures provide institutional knowledge and governance stability, critical for oversight roles (Franken & Cook, 2019). However, extended tenures may also reduce adaptability, as noted by Hakelius (2018). These findings emphasize the trade-off between stability and flexibility in governance structures.

Among control variables, cooperative size (FCSize) positively influenced both ROE and ROA, reflecting the benefits of economies of scale and professional management (Grashuis, 2020). Leverage (FCLev), however, showed a negative association with performance, highlighting risks associated with higher debt levels, consistent with Singh et al. (2019). Network affiliation (Affiliation, AF) negatively affected performance, likely due to resource redistribution obligations, corroborating Santos (2019). Free membership admission (Type) positively impacted performance, supporting growth in deposits and revenue (Canassa et al., 2022).

Lagged performance variables (ROE(t-1) and ROA(t-1)) were significant predictors of current performance, underscoring persistence in financial outcomes. This aligns with studies by Farooq et al. (2023), Nguyen (2014), and Wintoki et al. (2012), emphasizing the importance of historical performance in dynamic models.

Overall, the findings highlight the complexity of governance-performance relationships in Brazilian financial cooperatives. Gender diversity shows inconsistent effects on performance, while board size and tenure emerge as critical factors. Larger cooperatives demonstrate stronger financial performance, while network affiliation and leverage negatively influence outcomes. These results underscore the importance of tailoring governance structures to cooperative needs, balancing inclusivity, representation, and decision-making efficiency.

Conclusions

This study investigated the relationship between governance characteristics, focusing on board size, gender diversity, and tenure, as well as their impact on the financial performance of Brazilian financial cooperatives. By analyzing a comprehensive dataset covering 930 cooperatives from 2008 to 2022, this research provides significant insights into how the board of directors, supervisory board, and executive management influence performance in a uniquely cooperative context. The findings contribute to addressing critical research gaps highlighted in prior studies, particularly concerning the governance structures of cooperatives in emerging markets like Brazil.

The results confirm that governance plays a pivotal role in shaping cooperative performance, particularly under the distinctive features of the Brazilian financial cooperative system. Consistent with

the study's objectives, we examined the effects of board size, gender diversity, and tenure, revealing that while governance mechanisms commonly discussed in corporate governance literature are relevant, their influence is context-dependent. For instance, the negative relationship observed between board size and financial performance aligns with prior research emphasizing inefficiencies in larger boards, particularly in cooperatives where democratic decision-making and diverse member representation may exacerbate coordination challenges (Grashuis, 2020; Hemrit, 2020; Höhler & Kühl, 2017; Yamori et al., 2017).

Gender diversity did not present consistent positive associations with financial performance, with female representation in governance bodies showing predominantly negative results. This aligns with international studies highlighting the contextual and cultural dimensions of gender diversity in boards (Bozhinov et al., 2021; Esteban-Salvador et al., 2019). In Brazil, where the historical underrepresentation of women in governance remains pronounced, these findings suggest that the integration of women into cooperative boards must be accompanied by broader organizational and cultural changes to unlock its potential benefits. These results point to the need for further research into how institutional and cultural factors mediate the effects of gender diversity on cooperative outcomes, particularly in emerging economies.

Tenure emerged as an important determinant of performance, particularly for supervisory boards, where longer tenure contributed positively to financial stability and governance oversight. This finding reinforces the role of experience and institutional knowledge in enhancing governance practices, while also underscoring the importance of balancing continuity with adaptability to avoid risks of entrenchment (Cook & Burress, 2013; Hakelius, 2018).

Among the control variables, cooperative size positively influenced performance, reflecting economies of scale and improved operational efficiencies in larger cooperatives, as also noted by Grashuis (2020) and Santos (2019). Conversely, leverage negatively affected performance, highlighting the financial risks associated with higher debt levels in cooperative structures (Singh et al., 2019). Additionally, affiliation with networks was associated with reduced performance, supporting the notion that redistributive obligations within cooperative networks may constrain financial efficiency (Santos, 2019).

The dynamic nature of financial performance was also evident in the significance of lagged dependent variables, underscoring the importance of accounting for historical performance when evaluating governance structures. This is particularly critical in cooperative settings where performance patterns are shaped by long-term member relationships, governance continuity, and the balancing of financial and social objectives (Farooq et al., 2023; Nguyen, 2014; Wintoki et al., 2012).

This research advances the understanding of governance-performance relationships in financial cooperatives by addressing governance mechanisms in a context that has received limited empirical

attention. The study contributes to both academic literature and practice by demonstrating the need for governance structures that balance representation with efficiency. Insights from this study can guide cooperative leaders in optimizing board composition, promoting gender diversity, and fostering director expertise to align governance practices with cooperative objectives.

Furthermore, the findings highlight the importance of contextualizing governance research to the specific characteristics of cooperatives. Unlike publicly traded companies, financial cooperatives must balance financial sustainability with their mandate to serve members and communities, particularly in underserved regions (McKillop et al., 2020). This dual focus requires governance frameworks that are not only efficient but also inclusive and aligned with member priorities.

Future research should further explore the interplay between governance, strategy, and external factors, such as macroeconomic conditions and regulatory changes, which may influence cooperative performance. Comparative analyses across countries and longitudinal studies during economic crises, such as COVID-19, could provide additional insights into how governance structures impact resilience and sustainability. Expanding access to granular data on board characteristics, such as director expertise and training, could also refine future analyses. By deepening the understanding of governance in financial cooperatives, researchers can continue to support their evolution as vital institutions in financial inclusion and regional development.

Table 2
Descriptive statistic – full sample by year

	2008		2009		2010		2011		2012		2013		2014	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
ROE	0.06	0.11	0.05	0.09	0.06	0.10	0.05	0.10	0.05	0.09	0.05	0.08	0.07	0.08
ROA	0.02	0.04	0.02	0.03	0.02	0.04	0.02	0.03	0.02	0.03	0.02	0.03	0.02	0.02
FemaleBOD	0.14	0.17	0.14	0.16	0.15	0.16	0.14	0.17	0.14	0.16	0.14	0.16	0.13	0.16
FemaleSB	0.21	0.21	0.20	0.21	0.22	0.22	0.21	0.21	0.20	0.21	0.19	0.21	0.18	0.20
FemaleEM	0.13	0.23	0.12	0.22	0.13	0.23	0.12	0.22	0.12	0.22	0.13	0.23	0.13	0.23
BoardSizeBOD	8.04	2.88	8.19	2.85	8.30	2.89	8.25	2.91	8.34	3.13	8.60	3.38	8.79	3.59
BoardSizeSB	5.79	0.53	5.85	0.43	5.81	0.47	5.73	0.55	5.64	0.64	5.68	0.60	5.74	0.55
BoardSizeEM	3.01	0.51	3.03	0.52	3.02	0.56	2.99	0.60	2.88	0.64	2.80	0.65	2.77	0.68
TenureBOD	3.56	0.88	4.01	1.08	4.34	1.10	4.57	1.26	4.69	1.30	4.86	1.37	5.03	1.46
TenureSB	1.45	0.40	1.64	0.46	2.27	0.92	2.70	0.97	3.04	0.97	3.35	1.00	3.54	1.11
TenureEM	3.47	1.17	4.02	1.44	4.35	1.61	4.47	1.88	4.41	2.04	4.47	2.13	4.45	2.25
FCSize	8.85	1.74	9.03	1.68	9.22	1.71	9.47	1.73	9.87	1.78	10.35	1.82	10.73	1.89
FCLev	0.60	0.28	0.60	0.27	0.60	0.27	0.61	0.27	0.63	0.26	0.65	0.25	0.67	0.25

	2015		2016		2017		2018		2019		2020		2021		2022	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
ROE	0.06	0.08	0.07	0.07	0.07	0.06	0.05	0.08	0.06	0.07	0.06	0.06	0.07	0.05	0.08	0.07
ROA	0.02	0.03	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.01	0.01	0.02
FemaleBOD	0.13	0.15	0.12	0.15	0.12	0.15	0.13	0.15	0.13	0.15	0.14	0.15	0.14	0.15	0.15	0.15
FemaleSB	0.18	0.20	0.18	0.19	0.19	0.20	0.18	0.19	0.20	0.20	0.20	0.20	0.21	0.20	0.23	0.20
FemaleEM	0.14	0.23	0.15	0.23	0.15	0.23	0.17	0.24	0.18	0.24	0.20	0.27	0.21	0.27	0.22	0.28
BoardSizeBOD	8.73	3.51	8.55	3.45	8.45	3.34	8.52	3.37	8.49	3.20	8.42	3.12	8.33	3.04	8.30	3.08
BoardSizeSB	5.70	0.57	5.69	0.61	5.64	0.70	5.66	0.66	5.70	0.61	5.68	0.64	5.65	0.65	5.71	0.61
BoardSizeEM	2.71	0.70	2.68	0.67	2.62	0.66	2.66	0.66	2.64	0.66	2.61	0.68	2.62	0.67	2.63	0.69
TenureBOD	5.24	1.52	5.66	1.50	5.77	1.63	5.85	1.65	6.01	1.71	5.87	1.77	5.50	1.86	4.98	2.00
TenureSB	3.75	1.17	3.92	1.24	4.08	1.31	4.20	1.38	4.34	1.43	4.32	1.46	4.20	1.48	3.46	1.60
TenureEM	4.49	2.30	4.98	2.50	5.11	2.52	4.97	2.58	4.98	2.54	4.86	2.57	4.52	2.62	4.06	2.68
FCSize	11.06	1.85	11.30	1.82	11.50	1.82	11.71	1.81	11.93	1.75	12.22	1.78	12.45	1.75	12.65	1.78
FCLev	0.69	0.23	0.70	0.23	0.71	0.23	0.71	0.23	0.72	0.23	0.75	0.23	0.76	0.22	0.77	0.22

	2008		2009		2010		2011		2012		2013		2014	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
ROE	- 0.40	0.23	-0.40	0.23	-0.40	0.23	-0.40	0.23	-0.40	0.23	-0.40	0.23	-0.40	0.23
ROA	- 0.13	0.08	-0.13	0.08	-0.13	0.08	-0.13	0.08	-0.13	0.08	-0.13	0.08	-0.13	0.08
FemaleBOD	0.00	0.67	0.00	0.67	0.00	0.67	0.00	0.67	0.00	0.67	0.00	0.67	0.00	0.67

FemaleSB	0.00	0.83	0.00	0.83	0.00	0.83	0.00	0.83	0.00	0.83	0.00	0.83	0.00	0.83		
FemaleEM	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00		
BoardSizeBOD	3.00	21.00	3.00	21.00	3.00	21.00	3.00	21.00	3.00	21.00	3.00	21.00	3.00	21.00		
BoardSizeSB	3.00	6.00	3.00	6.00	3.00	6.00	3.00	6.00	3.00	6.00	3.00	6.00	3.00	6.00		
BoardSizeEM	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00		
TenureBOD	1.53	7.75	1.53	7.58	1.53	7.75	1.53	8.62	1.53	8.62	1.53	9.39	1.53	9.39		
TenureSB	0.84	4.83	0.84	4.83	0.84	5.27	0.84	5.35	0.99	6.30	0.84	6.74	0.98	7.49		
TenureEM	0.80	7.96	0.98	8.42	0.80	8.76	0.80	10.16	0.80	10.93	0.80	11.97	0.80	11.97		
FCSize	4.96	13.89	4.96	14.00	4.96	14.26	4.96	14.43	4.96	14.50	4.96	15.27	4.96	15.27		
FCLev	0.02	0.97	0.02	0.97	0.02	0.97	0.02	0.97	0.02	0.97	0.02	0.97	0.02	0.97		
	2015		2016		2017		2018		2019		2020		2021		2022	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
ROE	- 0.40	0.23	-0.40	0.23	-0.40	0.23	-0.40	0.23	-0.40	0.23	-0.40	0.23	-0.40	0.23	-0.40	0.23
ROA	- 0.13	0.08	-0.13	0.08	-0.13	0.08	-0.13	0.08	-0.13	0.08	-0.13	0.08	-0.13	0.08	-0.13	0.08
FemaleBOD	0.00	0.67	0.00	0.67	0.00	0.67	0.00	0.67	0.00	0.67	0.00	0.67	0.00	0.67	0.00	0.67
FemaleSB	0.00	0.83	0.00	0.83	0.00	0.83	0.00	0.83	0.00	0.83	0.00	0.83	0.00	0.83	0.00	0.83
FemaleEM	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
BoardSizeBOD	3.00	21.00	3.00	21.00	3.00	21.00	3.00	21.00	3.00	21.00	3.00	21.00	3.00	21.00	3.00	21.00
BoardSizeSB	3.00	6.00	3.00	6.00	3.00	6.00	3.00	6.00	3.00	6.00	3.00	6.00	3.00	6.00	3.00	6.00
BoardSizeEM	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00	1.00	5.00
TenureBOD	1.53	9.39	1.96	9.39	1.78	9.39	1.53	9.39	1.53	9.39	1.53	9.39	1.53	9.39	1.53	9.39
TenureSB	0.91	7.49	1.11	7.49	1.30	7.49	1.00	7.49	1.10	7.49	0.84	7.49	0.84	7.49	0.84	7.49
TenureEM	0.80	11.97	0.80	11.97	0.80	11.97	0.80	11.97	0.80	11.97	0.80	11.97	0.80	11.97	0.80	11.97
FCSize	5.25	15.27	5.43	15.27	4.96	15.27	4.96	15.27	5.20	15.27	5.88	15.27	6.09	15.27	6.34	15.27
FCLev	0.02	0.97	0.02	0.97	0.02	0.97	0.02	0.97	0.02	0.97	0.02	0.97	0.02	0.97	0.02	0.97

Notes: ROE is Return on Equity, ROA is Return on Assets, FemBOD is Gender of the Board of Directors, FemSB is Gender of the Supervisory Board, FemEM is Gender of the Executive Management, BoardBOD is Board of Directors Size, BoardSB is Supervisory Board Size, BoardEM is Executive Management Size, TenBOD is Board of Directors' Tenure, TenSB is Supervisory Board' Tenure, TenEM is Executive Management' Tenure, FCSize is Financial Cooperative Size, FCLev is Financial Cooperative Leverage.
Source: Elaborated by the authors (2025).

Table 3
Correlation coefficients

Variables	ROE	ROA	FemaleBOD	FemaleSB	FemaleEM	BoardSizeBOD	BoardSizeSB	BoardSizeEM	TenureBOD	TenureSB	TenureEM	FCSize
ROE	1											
ROA	0.68**	1										
FemaleBOD	-0.13**	0.00	1									
FemaleSB	-0.11**	-0.01	0.36**	1								
FemaleEM	-0.07**	-0.03*	0.40**	0.21**	1							
BoardSizeBOD	0.07**	-0.02*	-0.05**	-0.07**	-0.10**	1						
BoardSizeSB	0.06**	0.03**	-0.04**	-0.02*	-0.04**	0.09**	1					
BoardSizeEM	-0.04**	0.04**	0.07**	0.06**	-0.07**	0.08**	0.05**	1				
TenureBOD	0.08**	0.03*	-0.07**	-0.05**	-0.02	0.09**	0.03**	-0.03**	1			
TenureSB	0.07**	-0.02	-0.05**	-0.07**	0.05**	0.01	-0.04**	-0.19**	0.34**	1		
TenureEM	0.03**	0.05**	0.03**	0.03**	-0.09**	0.06**	0.03**	0.08**	0.45**	0.14**	1	
FCSize	0.28**	0.04**	-0.26**	-0.21**	-0.09**	0.32**	0.06**	-0.19**	0.25**	0.31**	0.04**	1
FCLev	0.14**	-0.30**	-0.32**	-0.26**	-0.13**	0.23**	0.07**	-0.18**	0.06**	0.15**	-0.08**	0.59**

Notes: ** Correlation is significant at the 0.01 level, * Correlation is significant at the 0.05 level. ROE is Return on Equity, ROA is Return on Assets, FemBOD is Gender of the Board of Directors, FemSB is Gender of the Supervisory Board, FemEM is Gender of the Executive Management, BoardBOD is Board of Directors Size, BoardSB is Supervisory Board Size, BoardEM is Executive Management Size, TenBOD is Board of Directors' Tenure, TenSB is Supervisory Board' Tenure, TenEM is Executive Management' Tenure, FCSize is Financial Cooperative Size, FCLev is Financial Cooperative Leverage.
Source: Elaborated by the authors (2025).

Table 4
The effect of lagged board structure on current cooperative performance

Variables	ROE			ROA		
	OLS	FE	GMM	OLS	FE	GMM
Intercept	-0.0945***			-0.0026		
	(0.0106)			(0.0058)		
FemaleBOD	-0.0197**	0.0019	0.0097	-0.0069	-0.0004	-0.0086
	(0.0061)	(0.0104)	(0.0120)	(0.0036)	(0.0035)	(0.0079)
FemaleSB	-0.0142**	0.0076	0.0042	-0.0049*	-0.0012	0.0032
	(0.0043)	(0.0065)	(0.0076)	(0.0021)	(0.0022)	(0.0046)
FemaleEM	-0.0001	-0.0083	0.0035	0.0002	-0.0021	0.0044
	(0.0037)	(0.0075)	(0.0053)	(0.0017)	(0.0026)	(0.0036)
BoardSizeBOD	-0.0002	-0.0003	-0.0029***	-0.0001	-0.0002	-0.0010***
	(0.0003)	(0.0006)	(0.0008)	(0.0001)	(0.0002)	(0.0002)
BoardSizeSB	0.0019	0.0023	-0.0007	0.0009	0.0008	-0.0005
	(0.0013)	(0.0016)	(0.0018)	(0.0006)	(0.0005)	(0.0005)
BoardSizeEM	0.0005	0.0027	0.0037	-0.0001	-0.0002	0.0010
	(0.0013)	(0.0021)	(0.0025)	(0.0006)	(0.0006)	(0.0007)
TenureBOD	0.0014*	0.0001	0.0008	0.0001	-0.0002	0.0000
	(0.0006)	(0.0008)	(0.0008)	(0.0003)	(0.0002)	(0.0002)
TenureSB	0.0013	0.0010	0.0019*	0.0005	0.0006*	0.0001
	(0.0007)	(0.0009)	(0.0009)	(0.0003)	(0.0003)	(0.0003)
TenureEM	0.0006	0.0002	0.0004	0.0001	0.0000	0.0001
	(0.0004)	(0.0005)	(0.0005)	(0.0002)	(0.0002)	(0.0002)
FCSize	0.0160***	0.0366***	0.0262***	0.0058***	0.0138***	0.0094***
	(0.0006)	(0.0039)	(0.0052)	(0.0004)	(0.0014)	(0.0016)
FCLev	-0.0299***	-0.1693***	-0.0546	-0.0566***	-0.0945***	-0.0515***
	(0.0043)	(0.0288)	(0.0331)	(0.0031)	(0.0087)	(0.0110)
AF	-0.0704***			-0.0139***		
	(0.0047)			(0.0018)		
Type	0.0138***			0.0035***		
	(0.0021)			(0.0010)		
ROE (t-1)			0.2079***			
			(0.0466)			
ROE (t-2)			0.0959*			
			(0.0406)			
ROA (t-1)						0.2062***
						(0.0513)
ROA (t-2)						0.0219
						(0.0387)
Observations						
R^2	0.16	0.05		0.23	0.12	
adj. R^2	0.16	-0.06		0.23	0.01	
F-statistic (p.value)	53.03 (0.00)	9.05 (0.00)		23.77 (0.00)	15.83 (0.00)	
Region Effect	Yes			Yes		
Year Effect	Yes	Yes	Yes	Yes	Yes	Yes
No. of cooperatives	930	930	930	930	930	930
No. of instruments			4			13
Sargan test			17.46			28.58
			(0.13)			(0.05)
AR (1)			-6.06 (0.00)			-5.71 (0.00)
AR (2)			-0.01 (0.99)			-0.49 (0.62)
Wald test for coef.			155.21			95.05
			(0.00)			(0.00)
Wald test for t. dum.			115.29			109.62
			(0.00)			(0.00)

Notes: All t-statistics are based on robust standard errors (in parentheses). ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively. ROE refers to Return on Equity, and ROA refers to Return

on Assets. FemBOD, FemSB, and FemEM indicate the gender composition of the Board of Directors, Supervisory Board, and Executive Management, respectively. BoardBOD, BoardSB, and BoardEM represent the sizes of the Board of Directors, Supervisory Board, and Executive Management. TenBOD, TenSB, and TenEM capture the tenure of the Board of Directors, Supervisory Board, and Executive Management. FCSize denotes Financial Cooperative Size, while FCLev represents Financial Cooperative Leverage. AF indicates the affiliation dummy, and Type represents the free admission dummy for cooperatives.
AR(1) and AR(2) refer to tests for first-order and second-order serial correlation in the first-differenced residuals, under the null hypothesis of no serial correlation. The GMM estimations are based on the Two-way effects, Two-step model System GMM. Instruments used in the GMM estimation include lagged levels and lagged first differences of the dependent and independent variables.
Source: Elaborated by the authors (2025).

References

Assenga, M. P., Aly, D., & Hussainey, K. (2018). The impact of board characteristics on the financial performance of Tanzanian firms. Corporate Governance: The international journal of business in society, 18(6), 1089-1106. https://doi.org/10.1108/CG-09-2016-0174.

Banco Central do Brasil [Bacen]. (2023). Panorama do Sistema Nacional de Crédito Cooperativo. Data-base: dezembro/2023. Available at: https://www.bcb.gov.br/content/estabilidadefinanceira/coopcredpanorama/relatorio_panorama_cooperativas_2023_FINAL.pdf.

Barros, L. A., Bergmann, D. R., Castro, F. H., & Silveira, A. D. M. D. (2020). Endogeneidade em regressões com dados em painel: Um guia metodológico para pesquisa em finanças corporativas. Revista Brasileira de Gestão de Negócios, 22, 437-461. https://doi.org/10.7819/rbgn.v22i0.4059

Bittencourt, W. R., Bressan, V. G. F., Goulart, C. P., Bressan, A. A., Costa, D. R. de M., & Lamounier, W. M. (2017) Rentabilidade em bancos múltiplos e cooperativas de crédito brasileiras. Revista de Administração Contemporânea, 21(2), 22–40. https://doi.org/10.1590/1982-7849rac2017150349

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics, 87(1), 115-143. https://doi.org/10.1016/S0304-4076(98)00009-8

Bozhinov, V., Joecks, J., & Scharfenkamp, K. (2021). Gender spillovers from supervisory boards to management boards. Managerial and Decision Economics, 42(5), 1317-1331. https://doi.org/10.1002/mde.3311

Brahma, S., Nwafor, C., & Boateng, A. (2021). Board gender diversity and firm performance: The UK evidence. International Journal of Finance & Economics, 26(4), 5704-5719. https://doi.org/10.1002/ijfe.2089

Bressan, V. G. F., Souza, D. C. de, & Bressan, A. A. (2017). Income smoothing: a study of the health sector's credit unions. Review of Business Management, 19(66), 643. https://doi.org/10.7819/rbgn.v0i0.2617

Canassa, B. J., Costa, D. R. D. M., & Bonacim, C. A. G. (2022). Transformations in the Ownership Structure of Credit Unions: Banking Service Rates and the Expectations of Members and Directors. BBR. Brazilian Business Review, 19, 607-625. https://doi.org/10.15728/bbr.2022.19.6.2.en

Carter, D. A., Simkins, B. J., & Simpson, W. G. (2003). Corporate governance, board diversity, and firm value. Financial review, 38(1), 33-53. https://doi.org/10.1111/1540-6288.00034

Chaves, R., Soler, F., & Sajardo, A. (2008). Co-operative governance: The case of Spanish credit co-operatives. Journal of co-operative studies, 41(2), 30-37. Available from https://www.ukscs.coop/resources/journal-of-co-operative-studies-vol-41-no-2

Coelho, R., Mazzillo, J. A., Svoronos, J. P., & Yu, T. (2019). Regulation and supervision of financial cooperatives. Bank for International Settlements, Financial Stability Institute. Available from https://www.bis.org/fsi/publ/insights15.pdf

Cook, M. L., & Burress, M. J. (2013). The impact of CEO tenure on cooperative governance. Managerial and decision economics, 34(3-5), 218-229. https://doi.org/10.1002/mde.2585

Co-operatives UK. (2013). Simply performance: A guide to creating member value by aligning co-operative strategy, performance measurement and reporting. Available from https://www.uk.coop/sites/default/files/2020-10/simply_performance_0.pdf

Dou, Y., Sahgal, S., & Zhang, E. J. (2015). Should independent directors have term limits? The role of experience in corporate governance. Financial Management, 44(3), 583-621. https://doi.org/10.1111/fima.12091

Dwaikat, N., Qubbaj, I. S., & Queiri, A. (2021). Gender diversity on the board of directors and its impact on the Palestinian financial performance of the firm. Cogent Economics & Finance, 9(1), 1948659. https://doi.org/10.1080/23322039.2021.1948659

Esteban-Salvador, L., Gargallo-Castel, A., & Pérez-Sanz, J. (2019). The presidency of the governing boards of cooperatives in Spain: A gendered approach. Journal of Co-operative Organization and Management, 7(1), 34-41. https://doi.org/10.1016/j.jcom.2019.03.002

Field, A. (2014). Discover Statistics Using IBMM SPSS Statistics, Sage Publications, London.

Franken, J. R., & Cook, M. L. (2019). Do corporate governance recommendations apply to US agricultural cooperatives? Sustainability, 11(19), 5321. https://doi.org/10.3390/su11195321

Ghosh, S., & Ansari, J. (2018). Board characteristics and financial performance: Evidence from Indian cooperative banks. Journal of Co-operative organization and management, 6(2), 86-93. https://doi.org/10.1016/j.jcom.2018.06.005

Grashuis, J. (2020). The agency cost of ownership and governance adaptations in farm producer organizations. Agricultural Finance Review, 80(2), 200-211. https://doi.org/10.1108/AFR-07-2019-0079

Gujarati, D. N., Porter, D. C. (2011). Econometria Básica. AMGH Ed., 5th ed.

Hakelius, K. (2018). Understanding the board of Swedish farmer cooperatives–Cases focusing on board composition and interaction patterns. Journal of Co-operative Organization and Management, 6(2), 45-52. https://doi.org/10.1016/j.jcom.2018.06.001

Hemrit, W. (2020). Determinants driving Takaful and cooperative insurance financial performance in Saudi Arabia. Journal of Accounting & Organizational Change, 16(1), 123-143. https://doi.org/10.1108/JAOC-03-2019-0039

Hernández-Nicolás, C. M., Martín-Ugedo, J. F., & Mínguez-Vera, A. (2019). The effect of gender diversity on the board of Spanish agricultural cooperatives on returns and debt: An empirical analysis. Agribusiness, 35(4), 639-656. https://doi.org/10.1002/agr.21608

Höhler, J., & Kühl, R. (2017). Dimensions of member heterogeneity in cooperatives and their impact on organization–a literature review. Annals of public and cooperative economics, 89(4), 697-712. https://doi.org/10.1111/apce.12177

Jamaluddin, F., Saleh, N. M., Abdullah, A., Hassan, M. S., Hamzah, N., Jaffar, R., Abdul Ghani Aziz, S. A., & Embong, Z. (2023). Cooperative Governance and Cooperative Performance: A Systematic Literature Review. SAGE Open, 13(3). https://doi.org/10.1177/21582440231192944

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Justen, A. (Ed.). (2019, May 31). Gênero dos Nomes. Brasil.io. Available from https://brasil.io/dataset/genero-nomes/nomes/

Kuznyetsova, A., Boiarko, I., Khutorna, M., & Zhezherun, Y. (2022). Development of financial inclusion from the standpoint of ensuring financial stability. Public and Municipal Finance, 11(1), 20-36. http://dx.doi.org/10.21511/pmf.11(1).2022.03

Lima, G. H. (2017). Características do conselho de administração e análise do desempenho em cooperativas de crédito, Master's thesis, Universidade Federal de Minas Gerais, Belo Horizonte). Available from http://hdl.handle.net/1843/BUOS-BAAFNF

Livnat, J., Smith, G., Suslava, K., & Tarlie, M. (2021). Board tenure and firm performance. Global Finance Journal, 47, 100535. https://doi.org/10.1016/j.gfj.2020.100535

Mathuva, D. M., Mboya, J. K., & McFie, J. B. (2017). Achieving legitimacy through co-operative governance and social and environmental disclosure by credit unions in a developing country. Journal of Applied Accounting Research, 18(2), 162-184. https://doi.org/10.1108/JAAR-12-2014-0128

McKillop, D., French, D., Quinn, B., Sobiech, A. L., & Wilson, J. O. (2020). Cooperative financial institutions: A review of the literature. International Review of Financial Analysis, 71, 101520. https://doi.org/10.1016/j.irfa.2020.101520

Paula, D. A. V. D., Artes, R., Ayres, F., & Minardi, A. M. A. F. (2019). Estimating credit and profit scoring of a Brazilian credit union with logistic regression and machine-learning techniques. RAUSP Management Journal, 54, 321-336. https://doi.org/10.1108/RAUSP-03-2018-0003

Périlleux, A., & Szafarz, A. (2022). Women in the boardroom: a bottom–up approach to the trickle-down effect. Small Bus Econ, 58, 1783–1800. https://doi.org/10.1007/s11187-021-00475-8

Pierce, D. A., & Gray, R. J. (1982). Testing normality of errors in regression models. Biometrika, 69(1), 233-236. https://doi.org/10.1093/biomet/69.1.233

Railienė, G., & Sinevičienė, L. (2015). Performance valuation of credit unions having social and self-sustaining aim. Procedia-Social and Behavioral Sciences, 213, 423-429. https://doi.org/10.1016/j.sbspro.2015.11.561

Sallaberry, J. D., Venturini, L. D. B., Lerner, A. F., & Flach, L. (2024). Income smoothing in Brazilian credit unions: the effects of default. Revista Ambiente Contábil, Universidade Federal do Rio Grande do Norte, 16(1), 1–22. https://doi.org/10.21680/2176-9036.2024v16n1ID34807

Santos, M. B. D. (2019). Governança e desempenho em cooperativas de crédito, Doctoral dissertation, Centro de Ciências Sociais e Humanas, Universidade Federal de Santa Maria, RS, Brazil. Available from https://repositorio.ufsm.br/handle/1/20333

Santos, S. D. (2016). Práticas de Governança e Desempenho Financeiro em Cooperativas de Crédito, Master's thesis, Faculdade de Economia, Administração e Contabilidade, Universidade de São Paulo, SP, Brazil. https://doi.org/10.11606/D.12.2016.tde-12082016-121333

Silva, A., Santos, J. F., & Ranciaro Neto, A., (2023). Performance of Brazilian credit unions: An analysis from PEARLS indicators. Revista de Administração Mackenzie, 24(1), 1–28. https://doi.org/10.1590/1678-6971/eRAMR230057.en

Singh, K., Misra, M., Kumar, M., & Tiwari, V. (2019). A study on the determinants of financial performance of US agricultural cooperatives. Journal of Business Economics and Management, 20(4), 633-647. https://doi.org/10.3846/jbem.2019.9858

Suherman, S., Usman, B., Mahfirah, T. F., & Vesta, R. (2021). Do female executives and CEO tenure matter for corporate cash holdings? Insight from a Southeast Asian country. Corporate Governance: The International Journal of Business in Society, 21(5), 939-960. https://doi.org/10.1108/CG-07-2020-0290

Unda, L. A., Ahmed, K., & Mather, P. R. (2019). Board characteristics and credit-union performance. Accounting & Finance, 59(4), 2735-2764. https://doi.org/10.1111/acfi.12308

Utiyama, D. P. R. (2016). Governança corporativa em cooperativas de crédito: A adoção de boas práticas de governança corporativa e sua relação com desempenho e risco, Master's thesis, Universidade Federal do Paraná, Curitiba. Available from http://hdl.handle.net/1884/42933

Ventura, E. C. F. (Ed.). (2009). Governança cooperativa: diretrizes e mecanismos para fortalecimento da governança em cooperativas de crédito. Brasília: Bacen. Available at: https://www.bcb.gov.br/Pre/microFinancas/coopcar/pdf/livro_governanca_cooperativa_internet.pdf

Villavicencio R., Solares M. (2019). Cooperative corporate governance manual for boards of directors, supervisory boards and management. Fairtrade Access Fund. Available from https://incofinfaf.com/wp-content/uploads/2019/01/Cooperative-governance-toolkit-English-version.pdf

Wintoki, M. B., Linck, J. S., & Netter, J. M. (2012). Endogeneity and the dynamics of internal corporate governance. Journal of Financial Economics, 105(3), 581-606. https://doi.org/10.1016/j.jfineco.2012.03.005

Yamori, N., Harimaya, K., & Tomimura, K. (2017). Corporate governance structure and efficiencies of cooperative banks. International Journal of Finance & Economics, 22(4), 368–378. https://doi.org/10.1002/ijfe.1593

Yu, L., & Nilsson, J. (2018). Social capital and the financing performance of farmer cooperatives in Fujian Province, China. Agribusiness, 34(4), 847-864. https://doi.org/10.1002/agr.21560

Zancan, F., Canassa, B. J., & Valle, M. R. (2023). Capital structure in Brazilian credit unions: which factors are really determinants? Revista Brasileira de Gestão de Negócios, 25(2), p.199-214. https://doi.org/10.7819/rbgn.v25i2.4223