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# Credit union movement and the national countercyclical effect the union perspective on monetary policy

## Abstract

This paper examines the contrasting dynamics between union banks and commercial banks regarding the basic interest rate. Union banks experienced negative effects on financial performance variables in response to increases in the interest rate, a trend that is opposite to that of commercial banks. In a countercyclical manner, union banks showed more robust growth compared to commercial banks, even under a monetary tightening regime. Additionally, we examine the underlying elements of this resilience, highlighting the unique strategies and union values that drive the expansion of these financial institutions, such as shared management and a focus on members rather than on financial results. The findings indicate how union banks are able to thrive even in challenging scenarios, a feature which underscores their relevance within the banking and economic marketplace.

**Keywords:** union banks, interest rate, performance, countercyclical

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## Introduction

The year 2020 was marked by a shift in global monetary policy, with cycles of fiscal stimulus aimed at mitigating the most adverse effects of the COVID-19 pandemic on national production capacity. At the same time, however, inflation became a global concern, prompting monetary authorities to implement more or less aggressive responses, which subsequently affected local and global economies.

Both banking regulation and the impacts of macroeconomic variables on financial institutions, such as monetary policy, are essential for the financial system regulator (Central Bank) to analyze and understand the results of stimulus packages, monetary control and price stability.

This article investigates how credit unions responded to the monetary authority's contractionary policies in a crisis scenario. The responses indicate whether there was an increase or decrease in credit to households (including union members), as well as the quality of the credit and the level of default.

Based on those responses, we analyze the impact of the recent monetary tightening on the efficiency, performance and credit volume of union financial institutions. We argue that these institutions will respond differently to monetary tightening than traditional banks, mainly regarding the volume of credit. Union financial institutions tend to promote a pro-cyclical result, reinforcing the nature of the credit cycle.

The financial results of commercial banks are correlated with the credit cycle. Kern and Amri[1] examine the positive correlation between credit expansion and the election cycles. Although several single-country studies point to this relationship, the link between electoral cycles and credit expansion - both government and private credit - increases significantly in election years.

The data presented in this article encompasses the electoral cycle from 2018 to 2022. The approach regarding monetary policy in Brazil goes against international evidence. Despite the global trend of lowering interest rates to stimulate economic growth, the Central Bank of Brazil (BACEN) recently raised interest rates in response to rising inflation. This decision has been the subject of criticism from experts who argue that it could harm the recovery of the Brazilian economy. On the other hand, another group argues that controlling inflation and ensuring fiscal discipline is necessary Figure 1.

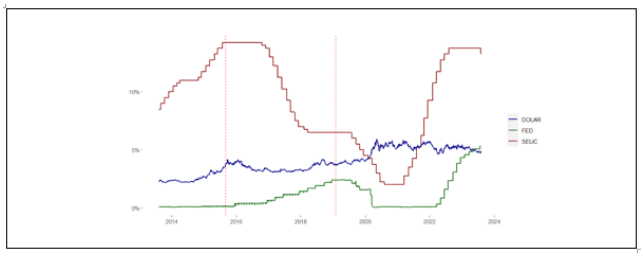

**Figure 1** National interest rates in the United States and the impact on the exchange rate.

**Source**: Author's own elaboration

While interest rates in the United States (on average) remained stable but with intense volatility during the 2016-2020 cycle, in Brazil, the 2018-2022 election cycle resulted in an increase in the average interest rates. As demonstrated by Holmstrom and Tirole,[2] the impact of monetary tightening on the economy is such that all forms of capital constraint (credit constraint, collateral constraint or savings constraint) affect small-cap companies more severely. However, the effects on interest rates and the intensity of monitoring depend on relative changes in various capital components. Consequently, the trend is towards rising unemployment and inequality rates and towards slow economic growth.

In addition to the obstacles regarding internal and external debt, the increase in non-payment and the drop in production and efficiency reduce wages, which can lead to severe recessions.[3]

As Gerali et al.[4] have observed, data from the 2008 financial crisis show that the banking sector and, specifically, sticky interest rates mitigate the effects of monetary policy shocks, while financial intermediation increases the propagation of supply shocks. The majority of the contraction in economic activity observed in 2008 can be attributed to shocks originating in the banking sector, with

macroeconomic shocks playing a limited role. The unexpected destruction of bank capital can have substantial effects on the economy.

Consequently, relevant literature indicates that monetary contraction generates contradictions in production, employment and income and may produce even more adverse cycles in the future.

Regarding the local information issue and the reduction of information asymmetry, Agarwal et al.,[5] highlight that proximity to the borrower favors the collection of qualitative information. This balances the availability and pricing of credit, which is more accessible to nearby companies, although with higher interest rates *ceteris paribus*. The findings also indicate that banks employ strategic use of private information. Nonetheless, distance hinders the ability to collect proprietary information and create local markets, indicating that the necessary qualitative information is mainly local.

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Jordà et al.,[6] indicate that economic recessions caused by the credit cycle tend to have a greater economic and social cost. They can cause even more severe effects and feedback into inflation in the case of poor calibration of interest rate policy. The impacts were measured in terms of gross domestic product (GDP), investments, new loans, interest and inflation.

Regarding small businesses, Perez-Quiros and Timmermann[7] find evidence indicating that smaller companies display the greatest degree of asymmetry in their risk during recession and expansion states, which translates into a greater sensitivity of their expected stock returns in relation to variables that measure credit market conditions.

Therefore, there would be market failures in credit, which could cause more damaging effects on smaller companies, given their greater information asymmetry. Adding this to the recession issue, we have an even more biased effect in terms of financial crisis for smaller companies, which tend precisely to be the ones which generate more jobs in developing economies.[8]

In this context, when companies have access to credit, monetary policy can influence both current and future economic activity.[9] The literature also highlights the role of the labor union movement or community banks in economic growth and development. This even contradicts the effect of state banks, which tend to promote an increase in credit directed towards large institutions and companies.[10] In the case of credit union movement, its targeting towards small and medium-sized companies can lead to an economically superior result,[11] especially in developing economies.

Taking into account the Brazilian context, there is a critical contagion effect in the financial market between Brazil and the United States. Significant evidence shows that many aspects affect the structure of Brazilian debt: among them, the US interest rate (US Fed Funds rate), the Brazilian inflation, the Brazilian interest rate and market confidence factors, which can be influenced by internal and external political and economic events.[12] As shown in Figure 1, the Brazilian market reacted simplistically to the rise in interest rates in international markets as a way of combating inflation. However, the US was going through an election cycle. According to Kern and Amri,[1] this event provokes a reaction in the behavior of governors, who increase the supply of credit to stimulate the economy and increase their chances of reelection. This phenomenon, known as the political credit cycle, is influenced by the financial conditions of institutions, and political and regional factors.

However, in the Brazilian market, there are several investment alternatives necessary to improve social well-being, efficiency, and productivity. Luz et al.[13] investigate the possibility of generating energy from urban solid waste, with positive environmental impacts in terms of air, water and soil pollution, as well as the generation of direct and indirect jobs. Viability depends not only on the size of the municipalities, but also on the minimum acceptable rate of return, which made the simulations viable only within a range of 7.5% to 15.8% per year (pa). According to the simulations presented in Figure 2 for the SELIC rate, it would only occur after 2027, given that the interest rate would still be above 8% until the latest forecasts made in August/2023.

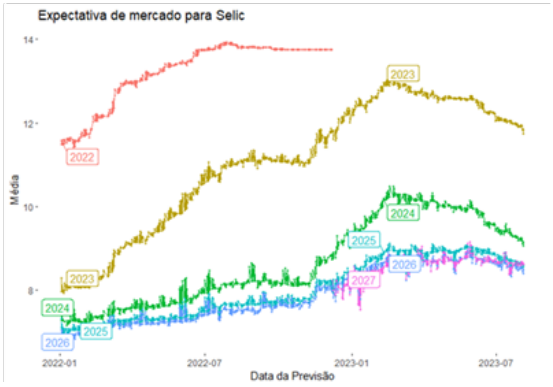


**Figure 2** Average Estimate of the SELIC Rate at the End of Each Year Based on the Focus Bulletin.

**Source:** Author's own elaboration, based on data extracted from the FOCUS Bulletin in November 2023.

In this context, interest rates and monetary policy are fundamental to economic development when driven by a credit market, able to promote an appropriate financial flow to small and medium-sized companies.[9] Glocker and Towbin[14] discuss this issue, showing that Brazil goes against international evidence. Required reserves are used because they mainly affect domestic bank lending. When banks have to hold more required reserves, they may reduce the amount of loans they offer; however, this measure can affect overall economic activity, such as investment, consumption and employment.

In this sense, we argue that inflationary control can be achieved through several channels, each with its limitations and advantages. Interest rates are widely recognized as an essential tool for controlling inflation. Nevertheless, the exclusive use of high interest rates can have undesirable side effects, such as the appreciation of the local currency and the increase in the cost of borrowing for households and businesses.

In this regard, monetary control can be exercised by required reserves, which help avoid excessive credit creation. This factor might be an inflation catalyst by reducing credit volatility and increasing financial confidence in a banking system.[14]

Our central idea is to identify macroeconomic effects on the financial management of unions. What are the impacts on returns, costs, profitability (surplus) and credit operations, financial spread and other performance variables, based on credit contraction measures and lack of monetary control?

We identified effects of resilience in management, in which even with monetary tightening, the spread and average return of unions increased, a result that aligns with an anti-cyclical movement of credit maintenance. As Chen and Zhan[8] predict, union banks tend to have credit directed towards small and micro-companies, strengthening economic results and generating production and employment.

This article is divided into five sections: introduction; theoretical framework, in which we explore the effect of the financial system on local economies and the role of credit unions; methodology, in which we [...]; a subsection for the data we used, that is, a collection of financial data presented by BACEN and analyzed by the Organization of Brazilian Unions (OCB), as well as the estimates and interpretations of the econometric model; results, in which we present the referred data; and, finally, the conclusion.

## Theoretical framework

As mentioned before, this article examines the impact of monetary policy on financial institutions, with a specific focus on union banks. This literary review will provide the theoretical basis for the empirical analysis developed later in this article.

The union movement originated from farmers, artisans and workers' need to organize themselves as a form of defense against market situations. The Rochdale Equitable Pioneers Society Limited, created in 1843, is considered the most expressive embodiment of cooperative thinking. Its 28 founders intended to improve their living conditions and carry out a broader social reform. They came together, drafted a company's articles of association, listed principles and determined their social values. The union grew, met its consumption needs, and still exists 150 years later, providing the basis for all unions in the world.[15]

The credit union movement in Brazil began in 1902, in Nova Petrópolis (RS), based on the missionary work of the Jesuit priest Teodoro Amstadt, who spread the union doctrine in the German-settled region of Rio Grande do Sul. The first credit union emerged in this region grounded in the German agricultural model. Following this initiative, the rural credit union movement grew and expanded across the country, with particular emphasis on the state of Rio Grande do Sul, which even established a central office responsible for monitoring all individual unions. At the same time, mainly in the South and Southeast regions, there were Luzzati-type unions, societies based on the Italian union credit model, which accepted all economic categories in their membership.[15]

Jacques and Gonçalves[16] argue that credit unions are of unique importance for Brazilian society, as they promote the application of private resources and assume the corresponding risks in favor of the community in which they develop. The importance of this sector has augmented in recent years, providing financial inclusion for the lower-income segment of the population, generating employment and income, helping to reduce poverty and constituting an essential element in the economic growth of economically depressed areas. Despite the advances, there is still a low representation in the percentage of the volume of credit offered by the National Financial System compared to more mature economies.

Cooperative values emerge as a differential between credit unions and traditional banks since the former focuses on the development of local communities and the fair distribution of financial resources. Credit unions seek to promote financial inclusion and local economic development by encouraging savings and access to credit for individuals and legal entities often excluded from the financial market.

Regarding the theme of self-managed housing production through government programs that provide financing for low-income families, the article discusses the struggle of popular movements to guarantee access to credit and overcome bureaucratic obstacles to operationalize housing finance programs. One of the conclusions is that these movements put pressure on the government in order to potentialize the implementation of public policies that allow access to credit for people in situations of social vulnerability.[17]

Credit unions are major financial institutions that provide financial services to their member-owners based on principles of mutual aid, solidarity, and cooperation. They play an important role in the financial market, increasing the participation of small savers in the banking system and promoting the economic and social development of local communities. The economic and social importance of credit unions can be illustrated by the number of members of these unions, which has increased significantly in Brazil in recent decades.[18]

The role of universalization against financial exclusion was investigated by Solo[19] According to the author, the reasons for low financial inclusion are the lack of response from formal financial institutions to the majority of the population, especially those from the low-income layers, who pay a premium for financial services in the informal sector, and the concentration of risks from formal financial institutions on a small part of the population. This results in a lack of investment in improvements in low-income neighborhoods, hence perpetuating this cycle of poverty. Furthermore, the growing tendency of banks to invest in government securities reduces the capacity to aggregate savings and, consequently, aggregate investments, harming economic growth. Financial exclusion also appears to perpetuate regressive income distribution, resulting in a redistribution of income from the poor to the rich, which is undesirable in developing countries with a high percentage of the population below the poverty line.

Solo (2008) mentions that credit unions may have significant potential to improve financial inclusion, as their business model allows for more inclusive member participation compared to traditional banks. Credit unions are generally more inclined to work with low-income entrepreneurs who may have difficulty obtaining credit from commercial banks. Credit unions can also provide access to essential banking services to low-income people who would otherwise be excluded from the formal financial system.

The author also highlights the importance of encouraging the structuring and strengthening of community unions, as they are more likely to emerge in marginal areas and play a significant role in the local communities' financial inclusion. However, it must be emphasized that even with the potential of credit unions, the study highlights that no financial innovation can replace the need for adequate macroeconomic policies that allow the banking inclusion of low-income segments of the population.

Furthermore, credit unions play a decisive role in economic development based on their governance relationship and ability to be regulated, paving the way for unions to lead the economic development of certain regions and identifying new opportunities for members.[20]

However, Carvalho, Diaz, Bialoskorski Neto, and Kalatzis[18] investigated the factors that affected the exit of Brazilian credit unions from the market between 1995 and 2009, listing the determinants of various types of market exit. The authors investigate whether profitability is a significant factor for the survival of the credit union. The results show that there is no statistical evidence to guarantee this correlation. Authors argue that the size and investment management

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of credit unions are fundamental determinants of their survival and longevity, while profitability and cooperative principles versus economic efficiency are less significant.

The resilience of credit unions in periods of economic crisis is one of the main topics of studies on the sector. Some studies point to an improvement in the management environment, including in the issue of social responsibility, through the reduction of the banking spread for companies with a social bias.[21]

Monetary policy plays a fundamental role in the performance of credit unions. It refers to the actions of central banks to control the money supply and inflation, directly affecting interest rates and the availability of credit in the market. In this sense, monetary policies can influence the ability of credit unions to offer credit and the quality of the credit provided.[22]

The literature on monetary policy and credit unions indicates that high interest rates have a negative impact on the profitability of credit unions, especially on the return on assets (ROA) and return on equity (ROE).[14] However, the adverse effects of the monetary policy are mitigated by the credit unions' resilience to keep their credit lines active in periods of financial instability.[11] Some studies also highlight the countercyclical role of credit unions in promoting lending during periods of recession, helping to keep credit available to local communities.[23]

In sum, the literature on the credit union movement highlights the importance of unions in promoting local economic development and financial inclusion. Furthermore, it is a current thesis that credit unions are particularly resilient in periods of economic crisis and that specific monetary policies are relevant to the performance of these financial institutions.

Although the literature provides a robust theoretical understanding of the performance of union banks under different monetary regimes, there is a need for more detailed and data-driven analyses, particularly in the Brazilian context. To address this gap, the following section describes the methodological approach used in this research, including the econometric models and data sources applied to empirically test the hypotheses derived from the literature.

## Methodology

In this section, we will discuss the upcoming methodology. Two econometric exercises will be done to estimate the effect of monetary policy on credit unions' financial and operational results.

The models will be presented on a panel data structure, with estimates based on a random effect estimator and then by the generalized method of moments (GMM), in order to confirm the results and their interpretation from a more rigorous theoretical premise of endogeneity between the dependent and independent variables.

The results are contended by a panel model for credit unions, which is, as Nauleau[24] presents, a logistic model that estimates the effects of the decision to invest in energy efficiency.

Regarding non-performing loans (NPL), Radivojević et al. (2017) use different econometric techniques to analyze the relationship between the quality of bank loans and several explanatory variables. Using the panel structure, the author describes that the unemployment rate (UNR) and the return on assets (ROA) significantly impact on loan quality.

Islam and McGillivray[25] present an empirical analysis of the impact of wealth and income inequality on the gross domestic product (GDP) per capita growth rate. The authors utilize a GMM model of dynamic systems to analyze data from 45 countries from 2000 to 2012. The results show that wealth inequality negatively impacts on GDP per capita growth, while income inequality has no statistically significant effect. Other factors, such as investment rate, education, market build-up and population growth, are also considered, affecting economic growth positively.

The panel data model was chosen due to its ability to handle data that vary over time and between different units, in this case, Brazilian credit unions. This model allows us to analyze the intra and inter-union variations, offering a complete view of the behavior of these institutions in response to variations in monetary policies.

The random effects approach was initially employed, assuming that the unobserved characteristics that affect the performance of unions are randomly distributed and uncorrelated with the explanatory variables. This methodology ideally captures the heterogeneity among unions without losing sight of variability over time.

The estimation method is based on GMM, which is frequently used mainly regarding the presence of heterogeneity and endogeneity bias in estimations. As we are talking about a model that will use financial measures as endogenous and exogenous variables, we may have some kind of problem that would not be testable in light of the usual panel method. However, we understand that this model is more efficient than the IV method[26] since it also handles stationary restrictions better. Hence, it potentially serves as a better method for estimating causal relationships in series with a temporal idiosyncratic component.[27]

$$\Delta y_{it} = \alpha \Delta y_{(i,t-1)} + \beta' \Delta X_{it} + \Delta \varepsilon_{it} \#1$$

where Δ represents the first difference operator. The method is consistent because it uses information of the moments of the variables in order to establish causal relationships between them. It is capable of dealing with problems of endogeneity and measurement error in the data, as it uses instrumental variables to capture exogenous variations of the endogenous variables. Furthermore, GMM is a nonparametric method, making it robust to nonnormal data distributions.[25]

GMM was used as a complementary approach to deal with possible endogeneity problems. GMM is widely used in dynamic econometric models, being particularly effective when dealing with dependent variables that their own lagged values can influence, as is the case with the financial performance of credit unions. This technique allows the correction of biases caused by correlations between the explanatory variables and the error term, using appropriate instrumental variables. The application of GMM was based on the assumption that endogenous variables are correctly instrumented, thus ensuring the consistency of the estimates.

Endogeneity, a common challenge in studies involving interdependent economic variables, was carefully addressed by selecting instrumental variables. These variables must be correlated with the explanatory variables but not with the residual error, ensuring the instruments' validity. In the case of this study, lags of the explanatory variables themselves, such as the lags of the SELIC rate, were utilized as instruments. This allowed the capturing of exogenous variations in the monetary variables, thus eliminating the risk of spurious correlations and providing more accurate estimates of the impact of monetary policy on the performance of the unions.

To secure the robustness of the results, additional tests were conducted, including the Hansen test, to validate the instruments used

in the GMM. The Arellano-Bond autocorrelation test, which checks for the absence of serial correlation in the model's residuals, was also used. These tests are primaries to confirm that the instruments are valid and that the results are consistent and sturdy. Additionally, alternative estimates were conducted using different lag periods for the variables and various model specifications to test the sensitivity of the results. These complementary analyses confirmed the sturdiness of the main findings, reinforcing the conclusions' validity.

The hypotheses can also be adapted to the panel data model.[28] Based on them, the data used will be estimated for comparison with the results from the methodology proposed by Bond, Hoeffler, and Temple (2001).[27]

The estimation of the panel equation is given by:

$$y_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_{it} + \alpha_i \#2$$

where $\alpha$ is an idiosyncratic factor with a zero mean, which will determine the heteroscedasticity involved in the stochastic term of each observed unit, where each unit is a credit union.

## Data

The data collected comes from the Central Bank of Brazil (BACEN) and is tabulated and structured by the Organization of Unions of Brazil (OCB). The financial analysis covers data from 2018 to 2022, with quarterly frequency, regarding the financial consolidation of 27 states and the five regions of Brazil, along with the national consolidation. A total of 945 unions are monitored and are part of the panel.

The financial and economic data of the unions are complemented with inflation and interest rate data from the Brazilian economy, thus measuring the impact of monetary policy on credit unions. The data will be incorporated into the model presented in the preceding section. In the following section, we present the estimated results of the model, together with a compilation of descriptive statistics for the data. After developing a solid methodological framework, we proceed to present the empirical results. The data collected from various financial institutions and macroeconomic indicators will be analyzed using the GMM and panel data models. This approach will allow us to test hypotheses and verify how monetary variables impact the performance of credit unions.

# Results

In this section, we will present the compilation of data used and how the estimated models, in a random effect panel and by GMM, estimate the relationships between the financial and operational performance variables of the unions, as well as between the monetary policy and its cycle Table 1.

**Table 1** Descriptive Statistics

| Variable | Obs | Average | SD | Min. | Max. |
|---|---|---|---|---|---|
| Year | 330 | 2,020,000 | 1,416 | 2,018 | 2,022 |
| Day | 330 | 1,000 | 0,000 | 1 | 1 |
| DURATION | 322 | $-$1,563,435 | 1,410,013 | $-$9,048 | 328 |
| SELIC rate | 231 | 7,036 | 4,363 | 2,000 | 13,750 |
| AVERAGE PAYMENT PERIOD | 322 | 3,272,152 | 1,498,295 | 647 | 9,271 |
| AVERAGE COLLECTION PERIOD | 322 | 1,770,075 | 438,970 | 741 | 3,512 |
| ACCOUNTS PAYABLE/ TOTAL ASSETS (%) | 322 | 0,799 | 0,053 | 0,630 | 0,889 |
| SPREAD (\%) | 322 | 0,056 | 0,031 | 0,001 | 0,219 |
| WACC | 322 | 0,167 | 0,037 | 0,105 | 0,325 |
| COST OF DEBT (\%) CREDIT | 322 | 0,018 | 0,012 | 0,003 | 0,085 |
| COST OF EQUITY (\%) CREDIT | 322 | 0,149 | 0,035 | 0,092 | 0,280 |
| SURPLUS AVAILABLE AGM (R$) | 322 | 593,262,600,000 | 1,347,717,138,000 | $-$10,605,078,000 | 11,824,944,938,000 |
| ROA A | 322 | 0,017 | 0,010 | $-$0,033 | 0,057 |
| ROE EQUITY | 322 | 0,094 | 0,051 | $-$0,191 | 0,242 |
| CREDIT PORTFOLIO PROFITABILITY (%) | 321 | 0,035 | 0,023 | $-$0,054 | 0,176 |
| ANNUAL CPA | 330 | 0,059 | 0,030 | 0,021 | 0,119 |
| RISK OPERATIONS LEVEL A TO C | 321 | 0,910 | 0,172 | 0,514 | 1,851 |
| RISK OPERATIONS LEVEL D TO H | 321 | 0,121 | 0,061 | 0,035 | 0,486 |
| OVERDUE OPERATIONS ON CREDIT PORTFOLIO (%) | 321 | 0,002 | 0,008 | 0,000 | 0,084 |
| REFERENCE EQUITY / TOTAL ASSETS | 322 | 0,189 | 0,056 | 0,100 | 0,370 |
| CREDIT OPERATIONS % ASSETS | 322 | 0,497 | 0,134 | 0,000 | 0,893 |
| TOTAL ASSETS (R$) | 322 | 39,515,221,825,000 | 86,435,862,949,000 | 20,018,810,000 | 669,965,628,031,000 |
| TOTAL REVENUES (CUMULATIVE) | 322 | 4,111,246,867,000 | 10,072,328,877,000 | 2,726,396,000 | 109,408,101,650,000 |
| TOTAL EXPENSES | 322 | 5,938,350,807,000 | 20,606,705,836,000 | 2,180,909,000 | 265,705,775,306,000 |
| TOTAL DELINQUENCY ON CREDIT (%) | 322 | 0,000 | 0,000 | 0 | 0 |
| DELINQUENCY RATE | 321 | 0,218 | 0,783 | 0,000 | 8,380 |

From a temporal perspective, the average growth of assets or total invested in credit unions grew by 150% on average, in the space of four years. This time window was marked by the COVID-19 pandemic, in 2020 and 2021, and by a bank loan agreement (Figure 1).

Besides that, the population's average real income fell, and there was an increase in the average default rate perceived by the financial system. However, it is noteworthy that the total invested in terms of capital in credit unions in Brazil grew 150% between 2019 and 2023.

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The growth of unions can also be examined according to the region, as shown in the Figure 4 below:

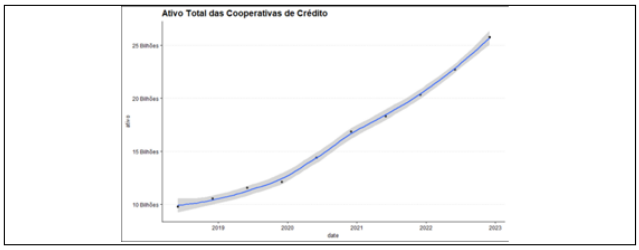


**Figure 3** Unions' Total Assets.

**Source:** Author's own elaboration.

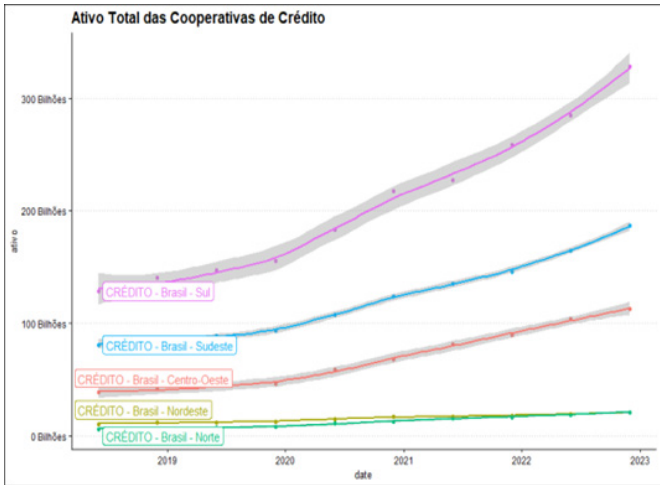


**Figure 4** Unions' Total Assets by Region.

**Source:** Author's own elaboration

A total of almost 945 monitored unions revealed that the South, Southeast and Central-West regions were responsible for a significant proportion of the growth in union assets.

Part of the concentration of this growth is related to the historical role of the formation of the credit union movement, which has historically been associated with the southern regions of the country. Dias et al.[29] argue that Resolution 4,434/2015, for example, created a classification of credit unions based on their performance and exposure risk, related to the rapid growth of the credit union movement since then.

Credit unions have been serving as an alternative financial institution in regions with low banking penetration and less economic development, addressing a gap in the market left by the majority of financial institutions This suggests that credit unions may be growing in less developed regions with a smaller presence of other financial institutions.

Credit unions have expanded their banking operations and have become an alternative source of credit for regions lacking bank branches, thereby filling a gap in the national banking system. In addition, the study also points out that the continuous expansion of the sector demonstrates the importance of unions in the market. Moreover, analyzing their financial performance becomes relevant as their incentives for expansion differ from other financial institutions.[30]

In this section, we will present the results of the GMM model, discussing the effects of monetary policy on the main macroeconomic variables of credit unions.

The results of the panel model, estimated using Equation 2, are shown in Table 2. When analyzing the results, it is clear that the SELIC rate has a negative effect on the profitability indexes on assets *ROA* and on equity *ROE*. This finding aligns with the results observed in several points in the financial literature.[11]

**Table 2** Panel Model Results

| Variable | ROA | ROE | Spread | NPL | VolCred | Rating aac | Rentcred |
|---|---|---|---|---|---|---|---|
| div | -0,079** | -0,046 | -0,339*** | 0,016 | -0,966** | 3,531*** | -0,084 |
| | (0,032) | (0,180) | (0,055) | (0,022) | (0,373) | (0,262) | (0,055) |
| SELIC | -0,001*** | -0,004*** | -0,002*** | -0,00002 | 0,005*** | 0,004*** | -0,002*** |
| | (0,0002) | (0,001) | (0,0004) | (0,0002) | (0,002) | (0,001) | (0,0003) |
| kdp | 0,184*** | 1,188*** | 1,009*** | -0,026 | -0,147 | -0,060 | 0,334*** |
| | (0,061) | (0,342) | (0,133) | (0,056) | (0,533) | (0,359) | (0,107) |
| kepc | -0,055 | -0,403 | -0,184** | 0,049 | -1,150** | 5,129*** | -0,057 |
| | (0,047) | (0,272) | (0,081) | (0,032) | (0,579) | (0,409) | (0,083) |
| Constant | 0,089*** | 0,191 | 0,349*** | -0,018 | 1,436*** | -2,747*** | 0,113** |
| | (0,032) | (0,183) | (0,055) | (0,022) | (0,384) | (0,270) | (0,056) |
| obs | 225 | 225 | 225 | 225 | 225 | 225 | 225 |
| R2 | 0,059 | 0,051 | 0,315 | 0,020 | 0,188 | 0,492 | 0,087 |
| Adjusted R2 | 0,042 | 0,034 | 0,303 | 0,002 | 0,173 | 0,483 | 0,071 |
| F Statistic | 20,531*** | 19,091*** | 97,527*** | 4,565 | 37,039*** | 185,319*** | 28,581*** |

**Source:** Author's own elaboration.

Thus, the SELIC rate has a positive impacts on the portfolio rating improvement, but a negative impact on the average for the bank spread. Holmstrom and Tirole (1997) explain this effect based on the change in the cost of capital, which makes it more difficult for companies (and individuals) with a worse credit rating profile (i.e., a higher probability of default) to acquire new loans.

However, the fundamental result of the panel estimate derives from the estimated (positive) impact of the SELIC rate on the volume of credit. It is estimated that, on average, for each 1 p.p. (percentage point) increase in the SELIC rate, there is a 0.5 p.p. increase in the volume of credit over total assets.

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This fact shows the countercyclical effect of credit unions. The interpretation is that with each increase in the SELIC rate, the price elasticity of the credit supply (volume sensitivity to interest rates) is inelastic. Therefore, it shows that, in this case, the supply will present a buffering behavior in the interest rate cycle promoted by the monetary authority Table 2.

The GMM estimation results are reported in Table 3. The model estimates once again that the SELIC rate positively affects the volume of credit. The effect of a short-term reduction in the spread and an improvement in the loan rating was also estimated. In addition, a medium-term impact on non-performing loans (NPLs) was observed, which aligns with the projected outcome of enhanced customer ratings and a reduction of the spread Figure 5.

**Table 3** GMM Result

| Var,Dep | ROA | ROE | SPREAD | NPL | RATING AAC | VOLCRED |
|---|---|---|---|---|---|---|
| $y_{t-1}\,(lag)$ | -1,1828054*** | -1,073863*** | | 2,691e-01*** | | |
| | 0,1384147 | 0,143359 | | 5,362 | | |
| L0.div | 0,0237877* | 0,203398*** | 0,0953276 | 0,2811 | 0,9740714** | 0,5197055*** |
| | 0,0097432 | 0,058256 | 0,1766551 | 1,463 | 0,0337621 | 0,0523895 |
| L0.SELIC | 0,0009555** | 0,008089*** | 0,0001337 | 6,998e-05*** | 0,0011779 | 0,0106486*** |
| | 0,0003415 | 0,002436 | 0,0008380 | 0,02185 | 0,0011270 | 0,0009088 |
| L1.SELIC | -0,0011977** | -0,009233*** | -0,0089510*** | -1 | -0,0047433*** | -0,0163563*** |
| | 0,0002303 | 0,001247 | 0,0020255 | 1,576e-05*** | 0,7809141** | 1,9289206*** |
| L0.kdp | -0,1294643 | -0,401023 | 4,7188534*** | 1,530e-01*** | 0,7809141** | 1,9289206*** |
| | 0,1573024 | 1149868 | 11012471 | 24,09 | 0,2404212 | 0,5730408 |
| L0.kepc | 0,1159917** | 0,275157 | -0,4152148 | -1,45 | 0,6562916** | -0,0760760 |
| | 0,0418198 | 0,297047 | 0,9578264 | 9,175 | 0,2169985 | 0,2508045 |
| Level of significance: 0 '***' 0,001 '**' 0,01 '*' 0,05 '.' 0,1 ' ' 1 | | | | | | |

**Source:** Author's own elaboration.

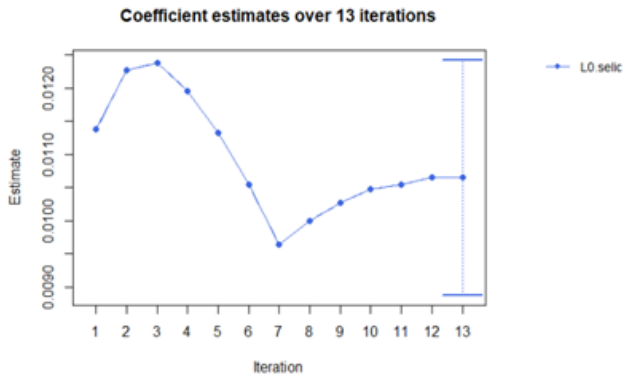


**Figure 5** Result of the Response of Credit Volume vs. SELIC Interest Rate.

**Source:** Author's own elaboration.

In light of the presented results, it is possible to discuss the broader implications of our findings. The following section summarizes the main results and assesses the role of credit unions in the economic scenario, especially in periods of monetary tightening. Moreover, implications for public policies will be discussed and directions for future research will be suggested.[31–51]

## Conclusion

This article aimed to discuss the existing literature on credit and banking worldwide, with a view of identifying patterns of response to monetary policy. The main focus is to understand the role of credit unions and, above all, to determine the responses of unions to the change in Brazilian monetary policy, which led to the most significant global increase in real interest rates during the period under examination. As an alternative form of financial institution, credit unions emerged a few decades ago and demonstrated significant growth in Brazil in recent years, especially in periods of economic uncertainty. In this article, we have explored the resilience of credit unions in the face of economic crises, especially in relation to the role of monetary policies implemented by the government.

Analysis of financial and economic data indicates that credit unions opt for a countercyclical movement, that is, to maintain credit in periods of monetary instability and financial tightening by the government. This means that, in contrast to the approach taken by other financial institutions, which involves reducing the availability of loans, credit unions intensify their efforts in order to keep credit lines active. This measure helps to keep the local economy functioning while lessening the negative impact of monetary policy on economic growth.

The data analysis indicates a correlation between the activities of credit unions (which have promoted financial inclusion), economic strengthening, and job creation. This is evidenced by the focus of these institutions on loans directed towards small and micro companies, which represent a significant proportion of the productive segment of the Brazilian economy The growth in credit unions' assets in the country in recent years demonstrates that these institutions have been a viable and competitive alternative to traditional banks.

Monetary policy plays an essential role in the performance of credit unions, directly impacting the granting of new loans and the quality of credit offered. The model presented in this article considers the hypotheses regarding the impact of monetary policies on the macroeconomic variables of credit unions. The model estimation indicates that the SELIC rate has a negative effect on the indexes

analyzed. Nevertheless, this effect is attenuated by the presence of local credit unions, which continue to operate with resilience in periods of financial tightness.

The conclusion of this study is that credit unions can potentially consolidate themselves as a competitive and sustainable alternative in the Brazilian financial market, contributing to financial inclusion and to the strengthening of small and medium-sized enterprises. The sector's resilience shown over the years, especially in periods of economic crisis, reinforces the importance of these institutions as agents of change in Brazilian economy. The relationship between credit unions and monetary policy, additionally to its effects on the economy, will be the subject of future analyses, aiming to improve models and actions that can expand financial inclusion and strengthen the local economy.

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## Conflcits of interest

The author declares there is no conflict of interest.

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