Income smoothing in Brazilian credit unions: the effects of default

Income smoothing en cooperativas de crédito brasileñas: los efectos del incumplimiento

Income smoothing nas cooperativas de crédito brasileiras: os efeitos da inadimplência

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Abstract

Purpose: This research aims to analyze whether credit unions manage their accounting results in order to smooth them through the provision for doubtful accounts (income smoothing), from a default perspective.

Methodology: The sample reaches 938 unique cooperatives considering the period from December 2010 to December 2018, with data from the Central Bank of Brazil, tested using the multiple regression statistical technique, in quarterly panels.

Results: The variation in the stock of credit operations and the adjusted net income were not statistically significant in the model, however it was not possible to accept the hypothesis that credit unions use the allowance for loan losses (PCLD) as a mechanism for managing results. The interest rate implicit in the result of income from credit operations was significant, and therefore related to the PCLD variation, while the condition of free admission did not show statistical significance. The variation in default was significant in the model, with a negative coefficient, implying consistency with the earnings management hypothesis, since in a

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scenario of higher default (risk) the relationship is negative and, therefore, PCLD levels are lower, avoiding potential negative results.

Contributions of the Study: The results indicate the absence of earnings management by PCLD in the sample and period, contributing to the discussion of the relationships between earnings management variables. This enables credit unions to reflect on their internal corporate governance structure. In addition, the evidence contributes to the progress of the literature on earnings manipulation in credit unions, for which there are few studies available and play an important role in the Brazilian market, ensuring funding flows to economic sectors not served by traditional banking institutions.

Keywords: Accruals; Earnings Management; Provision; Default; Banks; Cooperative.

Resumen
Objetivo: El objetivo del estudio es analizar si las cooperativas de ahorro y crédito gestionan sus resultados contables, con el fin de suavizarlos a través de provisiones para cuentas incobrables (alisamiento de ingresos), desde una perspectiva de incumplimiento.

Metodología: La muestra alcanza 938 cooperativas únicas entre el período de diciembre de 2010 a diciembre de 2018, con datos del Banco Central de Brasil, probados mediante la técnica estadística de regresión múltiple, en paneles trimestrales.

Resultados: La variación en el stock de operaciones de crédito y la utilidad neta ajustada no fueron estadísticamente significativas en el modelo, sin embargo no fue posible aceptar la hipótesis de que las cooperativas de ahorro y crédito utilizan la estimación preventiva para riesgos crediticios (PCLD) como mecanismo de gestión de resultados. La tasa de interés implícita en el resultado de los ingresos por operaciones de crédito fue significativa y, por tanto, relacionada con la variación del PCLD, mientras que la condición de entrada libre no mostró significación estadística. La variación de la morosidad resultó significativa en el modelo, con un coeficiente negativo, lo que implica coherencia con la hipótesis de gestión de resultados, ya que en un escenario de mayor morosidad (riesgo) la relación es negativa y, por tanto, los niveles de PCLD son menores, evitando posibles resultados negativos.

Contribuciones del Estudio: Los resultados indican ausencia de gestión de ganancias por parte de PCLD en la muestra y el período, lo que contribuye a la discusión de las relaciones entre las variables de gestión de ganancias. Esto permite a las cooperativas de ahorro y crédito reflexionar sobre su estructura interna de gobierno corporativo. Además, la evidencia contribuye al avance de la literatura sobre la manipulación de ganancias en cooperativas de ahorro y crédito, para la cual hay pocos estudios disponibles y juegan un papel importante en el mercado brasileño, asegurando flujos de financiamiento a sectores económicos no atendidos por instituciones bancarias tradicionales.

Palabras clave: Devengo; Gestión de Resultados; Provisión; Mora; Bancos; Cooperativa.

Resumo
Objetivo: O objetivo do estudo é analisar se as cooperativas de crédito gerenciam seus resultados contábeis, a fim de suavizá-los por meio da provisão para créditos de liquidação

duvidosa (*income smoothing*), sob uma perspectiva de inadimplência.

Metodologia: A amostra alcança 938 cooperativas singulares entre o período de dezembro de 2010 a dezembro de 2018, com dados do Banco Central do Brasil, testados por meio da técnica estatística de regressão múltipla, em painéis trimestrais.

Resultados: A variação do estoque de operações de créditos e o lucro líquido ajustado não foram estatisticamente significativos no modelo, no entanto não foi possível aceitar a hipótese de que as cooperativas de crédito utilizam a provisão de créditos de liquidação duvidosa (PCLD) como mecanismo para gerenciamento de resultados. A taxa de juros implícitos no resultado da renda de operação de crédito foi significativa, e, portanto, relacionada à variação da PCLD, enquanto a condição de livre admissão não demonstrou significância estatística. A variação da inadimplência apresentou significância no modelo, com coeficiente negativo, implicando coerência com a hipótese de gerenciamento de resultados, pois em cenário de maior inadimplência (risco) a relação é negativa e, portanto os níveis de PCLD são menores, evitando potenciais resultados negativos.

Contribuições do Estudo: Os resultados indicam ausência de gerenciamento de resultados por PCLD na amostra e período, contribuindo para a discussão das relações entre variáveis de gerenciamento de resultados. Isso possibilita as cooperativas de crédito refletir sobre sua estrutura interna de governança corporativa. Além disso, as evidências contribuem para o progresso da literatura sobre manipulação de resultados em cooperativas de crédito, para as quais existem poucos estudos disponíveis e exercem um papel importante no mercado brasileiro, garantindo fluxos de financiamento para setores econômicos não atendidos pelas instituições bancárias tradicionais.

Palavras-chave: *Accruals*; Gerenciamento de Resultados; Provisão; Inadimplência; Bancos; Cooperativa.

1. Introduction

Credit cooperatives contribute to regional economic growth, withmore useful financial alternatives, for example, a modest interest rate, in any order of activity, whether agricultural, industrial, commercial or professional, for the local user called small worker, who has less access to credit (Pinheiro, 2008), in addition to contributing to the expansion of the financial segment and increasing competition in the credit market. Credit cooperativism has grown significantly in recent decades, allowing greater social inclusion, due to enabling access to the financial market for small owners, and it has been found that the expansion of the cooperative network can even contribute to the reduction of interest rates (Banco Central do Brasil [BACEN], 2020).

Regardless of whether or not there is explicit market pressure for profits, cooperative members expect positive results, if possible with surplus funds at the end of the year. The obligation to present results in certain periods could pressure cooperatives to manage their results, as results with high volatility may indicate a risk situation (Maia et al., 2013), and the reduction of fluctuation in results is beneficial (Moyer & Shevlin, 1995; Trueman & Tilman, 1988), to avoid moments of loss, in which members are called to participate.

Managers usually monitor their management through indicators, and the financial result has been one of the main elements to evaluate the performance of an organization, even if the objective of cooperatives is not to earn profits. This perspective of financial result is captured through the financial statements, whose cooperatives have accountability and information obligations to regulators, such as the Central Bank of Brazil (BACEN) and to central cooperatives, in the case of singular cooperatives (Bressan et al., 2017; Meinen & Port, 2016).

Credit unions are an alternative to meet the demand for credit in the market, since one third of Brazilian municipalities do not have bank branches (Silva et al., 2017). They have been shown to be credit agents within the financial market (Dantas et al., 2018) responsible for regions and economic segments little explored by banking institutions. In addition, it is a segment in which its governance structure is formed by its own investors and collaborators, so it is expected that the restrictions imposed by cooperative philosophies, together with internal power issues, will encourage the use of accounting manipulations to the detriment of improved profitability to increase risk-weighted capital (Hillier et al., 2008). On the other hand,

Given the importance of cooperativism in the credit market (Dantas et al., 2018; Pinheiro, 2008), as well as its peculiar governance structure (Hillier et al., 2008; Jansen et al., 2018; Liang et al., 2014), we seek to answer the following research question: **do credit unions use the smoothing of accounting results as an object of earnings management**? Thus, the objective of the study is to analyze whether credit unions use the smoothing of accounting results as an object of earnings management.

With this, it will be possible to denote whether credit unions manage their accounting results, in order to reduce the variation in results and signal management consistency through the allowance for loan losses, from a perspective of volume growth and default.

Previous studies have analyzed earnings management behavior in credit unions in Brazil, including credit unions affiliated to Sicoob (Maia et al., 2013), credit cooperatives affiliated to Sicredi (Bressan et al., 2016), those affiliated with Unicred (Bressan et al., 2017) and the 500 largest credit unions (Dantas et al., 2018). Although this last survey significantly expanded the sample between the years 2013 to 2017, there is still the possibility of expanding the sample size and period.

This research reaches a larger sample, of 938 cooperatives, including those considered unique, with data collected from BACEN for all quarters between December 2010 and December 2018, which allows us to attribute greater reliability to the results. Another differential is the use of the default variation variable, expanding the studies by Bressan et al. (2017) and Dantas et al. (2018). Thus, the evidence from this research contributes to the progress of the literature on earnings manipulation in credit unions, since there are few studies available on the subject.

2 Theoretical Framework

Earnings management is an expression used to designate a set of organizational practices in order to obtain the desired accounting results (Rodrigues et al., 2007; Maia et al., 2013). Studies have adopted different theoretical approaches and methods to investigate this topic (Dechow et al., 2010; Jones, 2011).

Earnings management performed through accounting policies is called earnings management by accruals, while earnings management performed through the company's

operational activities is called Real Earnings Management (REM). These practices are used by managers to obtain certain profits, so that they have an impact on market valuation and, ultimately, on the value of the company (Darmawan et al., 2019). Examples of REM include, but are not limited to, projected overproduction to lower cost of goods sold, and cutting investment in Research and Development (R&D), to increase period earnings (Habib et al., 2022).

The focus of the study in question is based on discretionary appropriations – the accruals (Goulart, 2007), that is, on accounting supported by criteria defined by the manager.The best known in the literature are: target earnings – management of accounting earnings to increase or decrease profits; income smoothing – management to reduce variation and oscillations in results; and big bath – earnings management to reduce current earnings for the benefit of future years (Martinez, 2001).The term income smoothing is more associated with earnings manipulation, creative accounting and application of generally accepted accounting principles (Obeidat, 2021).

The estimation of discretionary accruals (accumulations) is a challenge, since it is the result accounts that are included in the calculation of profit, but which do not necessarily imply cash movements or equivalents, resulting in the difference between net income and operating cash flow liquid (Martinez, 2008). The calculation of accruals aims to demonstrate profit in its economic sense, by increasing or decreasing equity wealth, regardless of the financial flow, such as depreciation or provision for losses.

The fact is that the manager, exercising his discretionary decisions, can influence the increase or decrease of accruals in order to modify the result for the period (Martinez, 2008). Acharya and Lambrecht (2015) point out that one of the main reasons for companies to engage in income smoothing practices is the pressure imposed on managers to meet market profit expectations. Tucker and Zarowin (2006) found a positive association between earnings smoothing through accrual management. Baik et al. (2022) also denoted a significant positive relationship between smoothing through R&D accruals and earnings informativeness.

For operational purposes for the external user, the difficulty lies in segregating non-discretionary accruals – which are independent of the manager's opinion – and discretionary accruals – which the manager may eventually influence beyond the effective economic variation (Maia, 2012). These discretionary accruals, being artificial, are the commonly used proxy for accounting earnings management.

From the perspective of earnings management, the specific analysis of the allowance for loan losses account (PCLD) presents a positive correlation with the results of financial institutions (Martinez, 2008). The application of the Jones model, adapted for financial institutions, demonstrates a positive correlation and evidence of earnings management (Bressan et al., 2017). In Brazil, there are signs that banks use PCLD to manage earnings (Cinegaglia, 2019; Dantas et al., 2018; Freitas, 2020), that is, they make provisions higher than the regulated minimum, especially in periods of high bank profit, as a way of creating a "reserve" for later periods in which the profit will be lower (Bischoff & Lustosa, 2014), that is, Fuji (2004), Cupertino (2006), Xavier (2007), Marcondes (2008) and Perlingeiro (2008) also analyzed earnings management in traditional financial institutions.

In this line, Maia et al. (2013) considered the existence of income smoothing indicating that the greater the result before provisions for loan operations, the greater the variation in net provision expenses tends to be. Fuji (2004) and Zendersky (2005) identified a relationship between PCLD and the result of financial institutions, signaling smoothing of the result. Bressan et al. (2016) and Bressan et al. (2017), when applying a similar model to

cooperatives affiliated to the Sicredi and Unicred systems, respectively, obtained similar findings, corroborating the practice of income smoothing in credit cooperatives. Dantas et al. (2018) point out earnings management based on the significance of the relationship between profit and the discretionary portion of PCLD.

The proposition of the hypothesis considers that there is a possibility for credit unions to use records in expense accounts to smooth the results, with PCLD being considered relevant in this type of analysis, perhaps because it allows different movements between credit and debit, due to the common enrollment or reversal. PCLD is sometimes considered one of the main accruals; best predictor of the outcome of financial institutions defined by Dechow (1994), including credit unions (Dantas et al., 2018). Carvalho et al. (2018) verify that Brazilian financial institutions use the discretionary portion of PCLD as a capital management instrument. The authors analyzed quarterly data from 2000 to 2015 of the 50 largest conglomerates and financial institutions operating in the National Financial System. Test results revealed that there is no evidence that Brazilian banks use discretion in setting up PCLD for capital management purposes. On the other hand, they reinforced the evidence of previous national and international studies on the subject, in the sense that institutions use this discretion in PCLD in order to manage results.

Additionally, credit unions are financial institutions formed through a cooperative society, with the purpose of providing financial services to their members, who are also their owners (Bressan et al., 2017). Credit cooperatives play a significant role in regional economic development, by offering more accessible alternatives for those with less access to financial resources in conventional banks, allowing the availability of products and services in remote regions of the country (BACEN, 2020; Pinheiro, 2008).

Credit unions have received increasing attention in research. This is due to the fact that they are financial institutions created by the union of people with the objective of offering financial services exclusively to their members (BACEN, 2020). Consequently, cooperatives play a role of extreme social relevance in the communities where they are present. In the event of bankruptcy of credit unions or even inadequate performance, this can result in significant social and economic losses. For this reason, it is essential to closely monitor the performance of these institutions (Cordeiro et al., 2018). In addition, co-ops have a limitedly weak governance structure in which board directors are often internally or politically deliberate, i.e. few external members of the board are independent and still lack skills related to the management and monitoring of a financial institution (Hillier et al., 2008). Therefore, this business model favors an environment of practices that are biased towards earnings management, in addition to moral hazard relativized to the manager who needs to deliver satisfactory results to the associate.

Diniz (2020) studied earnings management through PCLD. The author used annual data from Brazilian credit unions, available on the BACEN website, from 2000 to 2018. As a result, he found that credit unions do not show evidence of earnings management with the use of PCLD. In the study conducted by Santos and Santos (2020), an analysis was carried out on the relationship between income smoothing practices and the level of conservatism of credit unions in Brazil. The authors used the models proposed by Eckel (1981), which classifies cooperatives with smoothed and non-smoothed results. The analysis period covered the years 2012 to 2018 and the survey results indicate a higher level of conservatism in credit unions that do not adopt smoothing practices,

Hillier et al. (2008) show that managers of credit unions at risk (capital ratios below 8%) engage in accounting practices that mask the accounting result instead of implementing

efficiency improvements to meet the required capital reserves. This is possible due to a combination of extended stakeholders and cooperative principles that give rise to internal management that has a strong bond with employees as an extension of the stakeholder group in cooperatives. That way, managers get a potentially large and influential block of votes or even combinations of bonuses or payroll deductions if they get good results.

Therefore, we anticipate that profitability is likely to be increased by endorsing adjustments in PCLD, where any adjustments are taken directly to shareholders' equity, rather than adjusted through the income statement, given that credit unions are not profit-oriented increasing rates, which would increase the direct cost of providing loans to members (Hillier et al., 2008).

Considering the information presented, the following research hypotheses are formulated:

H_1: *Credit unions use PCLD variation as a mechanism for earnings management.*

H_{1a}: Credit cooperatives use the PCLD variation as a mechanism for managing results based on profit.

H_{1b}: Credit unions use the PCLD variation as a mechanism for earnings management based on the credit operation portfolio.

H_2: *The variation in default is related to the variation in PCLD for losses on credit operations, applied in an earnings management model.*

From the test of these hypotheses, it will be possible to observe if the credit unions smooth their results, which avoids the reporting of a negative net result in the year, using both for adjustments in the variation of provisions and for losses in credit operations. In the study by Dantas et al. (2018), for example, corroborated the hypothesis that credit cooperative financial institutions use discretion in setting up provisions for loan losses for earnings management purposes, promoting income smoothing.

3 Methodological Procedures

The National Financial System (SFN) has a very extensive regulation, which makes it difficult to compare it with studies in other markets. Even so, signs of international research may point the way. The data collection base applied was the Balance Sheet of the Central Bank of Brazil (BACEN, 2023a). The research sample consists of 938 cooperatives, including those considered unique, for all quarterly periods between December 2010 and December 2018.

For the empirical test, the multiple regression procedure, in panel, was adopted due to the variation in time. Data collection focuses on available information. In the case ofFor financial institutions, the Chart of Accounts for Institutions of the National Financial System (COSIF) is used, which signals the accounting of the various operations carried out by banks and credit cooperatives (Lopes & Carvalho, 1999).

It should be noted that adaptations were made to the traditional earnings management analysis model, adopting a specific strategy for credit unions and financial institutions, due to the limitations imposed by the SFN on applying the COSIF chart of accounts, and with that, using it if typical accounts of credit operations and their risk ratings, and, in addition, cooperatives do not have conventional capital market databases, with share prices and

dividends. Therefore, it was necessary to adjust the variables, which in the present case followed the model applied by Dantas et al. (2018), with an increase in some general market variables such as changes in default, Selic rate, GDP and IPCA that significantly affect liquidity and credit conditions in the market, which is shown in Equation 1.

$$\Delta PCLDd_{it} = \beta_0 + \beta_1 LLAJ_{it} + \beta_2 \Delta OpC_{it} + \beta_3 INT_{it} + \beta_4 LA_{it} + \beta_5 \Delta Inad_{it} + \beta_6 \Delta PIB_{it} + \beta_7 \Delta IPCA_{it} + \beta_8 Selic_{it} + \epsilon_{it} \tag{1}$$

The variables are operationalized and substantiated according to Table 1.

Table 1
Model Variables

Variable and Theoretical Basis	Description and Operation
$\Delta PCLDd$ (Dantas et al., 2018)	Variation of the discretionary PLCD of cooperative *i* (PCLDd), considering the difference in the variation of the PCLD constituted between t and t-1, and the variation of the mandatory PCLD of the period, divided by the total assets of the period t-1, and corresponds to the discretionary portion of expenses with PCLD. PCLD expense = PCLD - PCLD$_{-1}$ PCLDnd = PCLD.Min (DS) VarPCLDd = PCLDd – PCLDd$_{-1}$ PCLDd = Exp PCLD – PCLDnd Accounts Involved 1.6.9.00.00-8 (-) Provisions for Credit Operations 3.9.9.99.99-3 Grand Total Assets 3.1.2.00.00-6 Level A Risk Operations 3.1.3.00.00-9 Level B Risk Operations 3.1.4.00.00-2 Level C Risk Operations 3.1.5.00.00-5 Level D Risk Operations 3.1.6.00.00-8 Level E Risk Operations 3.1.7.00.00-1 Level F Risk Operations 3.1.8.00.00-4 Risk Operations Level G 3.1.9.00.00-7 Level H Risk Operations PCLDd = PCLD discretionary = PCLD - PCLDnd PCLDnd = non-discretionary PCLD = Sum of the results of Level 'n' Risk Operations multiplied by the regulatory percentage. Source: BACEN (2023a).
LLAJ (Dantas et al., 2018; Silva et al., 2018)	Adjusted Net Income-measured by adding the discretionary portion of expenses with PCLD (measured by the difference of PCLD - PCLDd) to the difference between operating income and operating expenses of cooperative *i*, at time *t*, divided by total assets in period *t-1*. Accounts Involved 1.6.9.00.00-8 (-) Provisions for Credit Operations 7.1.0.00.00-8 Operating Income 8.1.0.00.00-5 (-) Operating Expenses 3.9.9.99.99-3 Grand Total Assets Source: BACEN (2023a).
ΔOpC (Bressan et al., 2017; Dantas et al., 2018; Silva et al., 2018)	Variation in the stock of credit operations of cooperative *i*, at time *t*, considering the difference between time *t* and the previous period, divided by total assets in period *t-1*. Accounts Involved 1.6.0.00.00-1 Credit Operations

	3.9.9.99.99-3 Grand Total Assets Source: BACEN (2023a).
INT (Silva et al., 2018)	Implicit interest rate on income from credit operations, based on the average amount of credit operations. In this case, we measure the implicit interest rate based on the variation in income from credit operations by the average of the loan portfolio, of bank *i*, in period *t*. Accounts Involved 1.6.0.00.00-1 Credit Operations 7.1.1.00.00-1 Income from Credit Operations Source: BACEN (2023a).
LA (Bressan et al., 2017)	Binary variable for "free admission" cooperatives, assuming a value of 1 for free admission and 0 for others. Source: BACEN (2023b).
*Δ*INAD	The historical series of credit defaults in financial institutions was reduced by the variation between the coefficient t and the coefficient in *t-1* Source: BACEN (2023c).
*Δ*SELIC	The Selic rate represents the basic interest rate of the economy, obtained by the variation between the coefficient t and the coefficient in *t-1*. Source: BACEN (2023d).
*Δ*GDP (Dantas et al., 2018; Silva et al., 2018)	Gross Domestic Product Variation, obtained by the variation between the coefficient *t* and the coefficient in *t-1*. To match the magnitude of the other variables, it was scaled by a factor of 10. Source: Institute of Applied Economic Research [IPEA] (2023).
*Δ*IPCA (Bressan et al., 2017)	Variation of the Autonomous Consumer Price Index, obtained by the variation between the coefficient t and the coefficient at *t-1*. To match the magnitude of the other variables, it was scaled by a factor of 100. Source: Brazilian Institute of Geography and Statistics [IBGE] (2023).

Source: *Research data.*

The adjusted earnings variable (LLAJ) is the one of main interest in earnings management analysis, which is assigned the responsibility for testing the research objective. The other variable tested of great interest in the research is default, which by its very nature directly interferes with losses and corresponding provisions, and whose behavior tends to demonstrate the oscillations arising from the nature of the PCLD.

The earnings management proxy given by the discretionary PCLD variation stems from its ability tomodify the result of the period, which for Martinez (2008), in a situation of normality, the allowance for doubtful accounts (PCLD) account should present a positive correlation with the results/profits of the entities.

To ensure the control of market effects, control variables were inserted, such as variation in credit operations (ΔOpC), implicit interest rate (INT), free admission cooperative condition (LA), and economic variables – GDP, IPCA and Selic. These variables may indirectly affect the constitution of PCLD, as they reflect the socioeconomic conditions of consumers and resource borrowers, and therefore, the importance of including them in the model. GDP measures economic output, which affects billing and the corresponding PCLD, however, greater economic capacity tends to generate lower PCLD. The IPCA reflects inflation, however its accelerated growth can generate a crisis and, consequently, non-payment (higher PCLD). The Selic reflects the interest rate that determines bank rates, and the

higher the interest premium, the greater the risk and, consequently, theconstitution of PCLD.

The expectation of functional behavior isthat the variation in the recognition of losses due to allowance for doubtful accounts acts negatively on the profit for the period, and, therefore, an inverse correlation (negative) with statistical significance would indicate the perspective of income smoothing, in which the cooperative's management credit card arbitrarily recognizes PCLD artificially.

4 Data Analysis

Preliminary data analysis allows verifying the characteristics of the sample (Fávero et al., 2014). The initial basic descriptive measures of central tendency and dispersion are shown in Table 2 and are (i) number of observations (Obs.), (ii) mean, (iii) standard deviation, (iv) minimum (Min.) and (v) maximum (Max.).

The sample is significant for the universe of credit cooperatives, reaching 938 (93.3%) individual cooperatives, including loan capital cooperatives, in order to demonstrate and imply the scope of the research, mainly the results, the integrality of the cooperatives with data available in the base data from the Central Bank, from a registered universe of 967 cooperatives, in addition to the 37 central cooperatives and the confederation, resulting in a quantitative data superior to 29 thousand observations. However, this representativeness implies absorbing observations with greater dispersion, represented by high standard deviation and extreme minimum and maximum.

Table 2
Descriptive Analysis

Variable	Obs.	Average	Standard deviation	Min.	Max.
ΔPCLDd	29,046	-0.0010	0.0404	-6.2801	0.7074
ΔOpC	29,046	0.3078	16.8503	-0.4568	520.8980
LLAJ	29,046	0.0191	0.6701	-0.6156	5.9123
INT	28,835	2.1203	344.8145	-183.8210	8,546.9500
LA	29,047	0.3949	0.4888	-	1.0000
ΔInad	29,047	-0.0161	0.1147	-0.3568	0.2977
ΔSelic	29,047	-0.0018	0.0628	-0.2461	0.0956
ΔIPCA	29,047	0.5744	0.3358	-	0.5540
ΔGDP	29,047	0.0449	0.2668	-0.5520	0.4700

Note: ΔPCLDd = Variation in the allowance for discretionary loan losses; ΔOpC = Variation in the volume of credit operations; LLAJ = Adjusted net income; INT = Implicit interest rate on income from credit operations; LA = Binary variable for "free admission" cooperatives; ΔInad = Change in default; ΔSelic = Variation of the Selic rate; ΔIPCA = Autonomous Consumer Price Index Variation; ΔGDP = Change in Gross Domestic Product.
Source: *Research data.*

Pearson's correlation matrix provides evidence of the relationship between the variables, as well as identifying the risks of multicollinearity. The correlation matrix allows evaluating possible multicollinearity due to the correlation between the independent variables, and in this sample (Table 3) signs of multicollinearity were not identified, since the degree of correlation between the independent variables did not exceed the score of 0.8 (Gujarati, 2006).

According to the descriptive statistics of the dependent variable (change in the allowance for discretionary loan losses– PCLDd), it is observed that, on average, the set of analyzed cooperatives presents low amounts of discretionary expenses with PCLD. However,

when analyzing the maximum, minimum and standard deviation measures, it is evident that, although this behavior is predominant, it is far from being uniform, with some entities reaching around 70% of the discretionary portion of PCLD. The ΔOpC variable, which indicates the variation in credit operations between quarters and t-1, presented an average of 0.3078, that is, on average, credit operations increased 30.7% per quarter.

Table 3
Correlation of Variables

	ΔPCLDd	ΔOpC	LLAJ	INT	LA	ΔInad	ΔSelic	ΔIPCA	ΔGDP
ΔPCLDd	1								
p-value									
ΔOpC	0.0003	1							
p-value	0.9577								
LLAJ	-0.0033	0.7897	1						
p-value	0.5772	0							
INT	0.0048	-0.0001	-0.0002	1					
p-value	0.4187	0.981	0.9697						
LA	0.0033	-0.0128	-0.0179	-0.0049	1				
p-value	0.5726	0.0289	0.0023	0.4071					
ΔInad	-0.0281	0.0029	0.0034	-0.0178	0	1			
p-value	0	0.6209	0.5638	0.0025	1				
ΔSelic	-0.0364	0.0015	0.0021	-0.0233	0	0.3520	1		
p-value	0	0.7944	0.7255	0.0001	1	0			
ΔIPCA	-0.0063	-0.0301	-0.0431	-0.0083	0	0.1912	0.0744	1	
p-value	0.2853	0	0	0.1584	1	0	0		
ΔGDP	-0.007	-0.0028	-0.004	0.0003	0	0.0521	0.0437	-0.4456	1
p-value	0.2319	0.6376	0.4968	0.9593	1	0	0	0	

Note: ΔPCLDd = Variation in the allowance for discretionary loan losses; ΔOpC = Variation in the volume of credit operations; LLAJ = Adjusted net income; INT = Implicit interest rate on income from credit operations; LA = Binary variable for "free admission" cooperatives; ΔInad = Change in default; ΔSelic = Variation of the Selic rate; ΔIPCA = Autonomous Consumer Price Index Variation; ΔGDP = Change in Gross Domestic Product.
Source: *Research data.*

The correlation matrix showed a positive relationship between the variation in the discretionary PCLD (ΔPCLDd) and the variation in the volume of credit operations (ΔOpC). However, adjusted net income (LLAJ) does not show a significant correlation with the variation in PCLD (ΔPCLDd).

The earnings management alternative by income smoothing would imply a reduction in earnings when positive, through greater artificial recognition of provisions, as a cushion so that in times of weak performance, management can reverse this cushion or recognize lower expenses with provisions, and thus improve the result, avoiding losses, and, consequently, calling on the cooperative member to bear the difference. This action of artificial provisioning would imply a break in the proportional relationship between the volume of credit operations – provisions – profits, statistically generating a break in statistical significance, that is, above the critical p-value. In the continuity of the result curve, it would be possible to smooth the oscillations, mitigating the risk to the members.

The implicit expectation is that the positive variation in the credit operations portfolio will increase the constitution of the discretionary PCLD, in the same way as the increase in the implicit interest rate. The condition of Free Admission (LA) indicates that a positive variation with the PCLD variation indicates the effort to be transparent in order to attract more members in the market. In terms of economic activity variables (GDP and IPCA), the premise

is that, in an income smoothing scenario, opportunities for the discretionary constitution of PCLDd occur mainly in times of higher economic growth (GDP) and lower inflation (IPCA), in which the rate of default tends to reduce.

To apply the theoretical model proposed in the research hypothesis, regression models were proposed on panel data, with the variation of PCLDd a behavior explained by the company's result and the variation of the stock of credit operations, and as control the variables indicative of the condition of free admission, the implicit rate of loans, and the macroeconomic GDP, IPCA, Selic and Default.

To define the appropriate panel regression model, the premises of the panel regression models were previously analyzed for the set of variables. The Breusch-Pagan test does not allow rejection of the null hypothesis that there is adequacy of the POLS model in relation to the random effects model, since $\chi 2 = 0.00$ (sig. $\chi 2 = 1.000$). Chow's F test on the fixed effects model showed a result that does not allow rejecting the null hypothesis that there is equality of intercepts and slopes for all cooperatives [F (937, 27888) = 0.23 Prob > F = 1.0000], signaling adequacy of the POLS model.

Multicollinearity was assessed by checking the VIF (variance inflation factor), for which coefficients up to 5 are required (Fávero et al., 2014), which was achieved after a stepwise procedure, due to the Average VIF of 1.53, with a maximum of 2.66 in adjusted net income and variation in credit operations. The Shapiro-Francia test indicated the non-normality of the residues (Prob>z 0.00001), and the Breusch-Pagan test indicated the presence of heteroscedasticity (Var 0.000279, $\chi 2 = 1.000$), reasons for which we chose to apply the model POLS with robust errors, which generated the outputs in Table 4. F calculated from 1970.82 with 8 and 937 degrees of freedom, returns a p-value of approximately zero. Thus, there is evidence that the model is valid.

Table 4
Estimation Results of the Model of Equation 1

$$\Delta PCLDd_{it} = \beta_0 + \beta_1 LLAJ_{it} + \beta_2 \Delta OpC_{it} + \beta_3 INT_{it} + \beta_4 LA_{it} + \beta_5 \Delta Inad_{it} + \beta_6 \Delta GDP_{it} + \beta_7 \Delta IPCA_{it} + \beta_8 Selic_{it} + \epsilon_{it}$$

Variables	Coef.	Standard Error	PT|
ΔOpC	0.000015	8.70e-06	0.084
LLAJ	-0.000452	0.000234	0.054
INT	1.16e-07	1.22e-08	0.000***
LA	-0.000083	0.000084	0.319
ΔInad	-0.006125	0.000995	0.000***
ΔSelic	-0.018806	0.002193	0.000***
ΔIPCA	0.000235	0.000230	0.308
ΔGDP	0.000032	0.000214	0.883
Constant	-0.001050	0.000178	0.000***

F(8, 937) = 1970.82 Prob > F 0.0000 R-squared = 0.0089

Note: ΔPCLDd = Variation in the allowance for discretionary loan losses; ΔOpC = Variation in the volume of credit operations; LLAJ = Adjusted net income; INT = Implicit interest rate on income from credit operations; LA = Binary variable for "free admission" cooperatives; ΔInad = Change in default; ΔSelic = Variation of the Selic rate; ΔIPCA = Autonomous Consumer Price Index Variation; ΔGDP = Change in Gross Domestic Product. ***Significance at the level of up to 0.001; ** Significance at the level of up to 0.01; *Significance at the level of up to 0.05.
Source: *Research data.*

The variable variation in the stock of credit operations (OpC) showed a positive coefficient, corroborating the studies by Bressan et al. (2017), Dantas et al. (2018) and Silva

et al. (2018), however, did not demonstrate statistical significance, reinforcing the findings of Bressan et al. (2017) and Silva et al. (2018), but diverging from Dantas et al. (2018). Therefore, it is not possible to affirm research hypothesis H_{1b} (Credit cooperatives use the ΔPCLD variation as a mechanism for earnings management with reference to the credit operation portfolio).

Adjusted net income (ALL) obtained a negative coefficient and was not statistically significant, which differs from the findings by Dantas et al. (2018) and Silva et al. (2018), who obtained positive and significant coefficients. This difference may have occurred because the research by Dantas et al. (2018) analyzed only singular credit unions, while the present study analyzed both singular and central credit unions. In the case of Silva et al. (2018), the thirty largest Brazilian and 31 Portuguese-Spanish financial institutions were analyzed, with no cooperatives in the sample. The findings refute H_{1a} (Credit unions use the PCLD variation as a mechanism for earnings management based on profit). However, looking at all the results,

Silva et al. (2018) obtained a statistical significance of $\alpha = 10\%$ in the interest rate of the income from credit operations (INT) with a coefficient of 0.02 for the thirty largest Brazilian financial institutions. This research obtained a very small coefficient, but with good statistical significance at the level of $\alpha = 1\%$, indicating that higher levels of remuneration for credit operations reflect a higher level of risk and more provisions.

The condition of free admission (AL) did not show statistical significance. This dummy variable indicates that cooperatives allow any individual to join, even if they do not belong to a specific group, as is the case with group cooperatives. This result differs fromBressan et al. (2017), butcorroboratesMaia et al. (2013) and partially Bressan et al. (2016). This variable may be being captured by default control, which Lima and Amaral (2011) identified as a relationship [a firm relationship indicates commitment to default, while in free choice, ties are weaker].

The variation of default (ΔInad) despite being a control variable, was the subject of interest in the present research to capture the singularities of the PCLD variation that simply depended on market variations regarding the payment of debts by customers, due to being the main object of the business. As expected, it showed significance, allowing to control the effects resulting from the macroeconomic conditions that interfere directly in the settlement of credits and, consequently, in the levels of PCLD. It also captured effects arising from the IPCA and GDP with greater precision, with regard to the explanatory capacity of PCLD.

The variation of default (ΔInad) showed significance in the model, with a negative coefficient, implying consistency with the earnings management hypothesis, since in a scenario of higher default (risk) the relationship is negative and, therefore, PCLD levels are lower, avoiding potential negative results. Therefore, there is evidence to accept H_2 (the variation in default is related to the variation in provisions for loan losses). Initially, the rational expectation was that in times of higher default, the PCLD variation would be leveraged and, therefore, would result in a positive ratio coefficient.

The Selic rate (Selic) is the economy's basic interest rate, which influences the interest rates of the various lenders and which the government pays to investors (BACEN, 2023e). The regression results indicate the significance of the variable for the earnings management model, with a negative coefficient. The perspective is that it captures the variations of the economy in a level of growth of the operations, since it is a minimum remuneration rate, in which it would be advantageous to keep the assets in an activity, rather than simply liquidating the operation and investing in the National Treasury, which has minimal risk. The

possibility of a negative coefficient is proposed due to taxation, which consumes a portion of the remuneration, in addition to being compatible with the magnitude of the coefficient. In the same way, as default,Δ

The Autonomous Consumer Price Index (IPCA) is a rate that reflects the variation resulting from inflation and that did not show significance in the model. The IPCA variable was significant in Bressan et al. (2017), according to which there was already an expectation ofΔpositive coefficient, since a possible increase in the variation of inflation generates an increase in the levels of provision for losses with credit operations, influencing a higher level of default (Santos, 2007).However, in the research by Bressan et al. (2017) the Selic and Default control variables were not present, which is why it is assumed that these variables capture, at least partially, the effects of inflation fluctuations. Maia et al. (2013) highlighted that theIPCA has a high correlation with GDP and Selic, and without the presence of the Default variable, which best explained the variations, GDP has a negative sign. In the presence of the control variables Delinquency and Selic, it is not statistically significant.

The Gross Domestic Product (GDP) demonstrates the economic activity, by the sum of production, having the ability to show how much variation in the model stems from the variation in the production of the national market. In the model under study, it was not statistically significant.ΔIn the research by Dantas et al. (2018) was significant in moments of positive result. In the research by Silva et al. (2018) it was not significant in the presence of other macroeconomic control variables. Dantas et al. (2018) point out that this variable usually corroborates the perspective of earnings management, as in periods of greater economic growth the provision 'reserve' is expanded to cushion periods of worse performance. However, nothe presence of the control variables Delinquency and Selic, it did not denote statistical significance.

5 Research Conclusions and Implications

This research expanded the analysis on earnings management in credit unions, with the objective of analyzing whether credit cooperatives manage their accounting results, in order to reduce variation in results and signal management consistency through the provision for settlement credits - management of the income smoothing type.

The results of the multiple regression cannot affirm the presence of management in the relation of the variation of the allowance for discretionary doubtful debts (PCLDd) with the adjusted net profit (LLAJ), however the present study included in its sample singular and central credit unions, unlike Dantas et al. (2018) who analyzed only the singular and obtained statistical significance.

The effects of the variation variable in the stock of credit operations (ΔOpC) corroborate previous results, however it is not possible to establish agreement with the research hypothesis, that credit cooperatives use PCLD as a mechanism for earnings management, due to the absence of statistical significance, contributing to the contextualization of the divergent results existing in the literature. It is observed that the present study included macroeconomic control variables Default (ΔInad), Selic (Selic), IPCA (IPCA) and GDP (GDP), which may have influenced the results.

The variation of Default (ΔInad) significant to PCLD revealedrelationship with the variation in provisions for loan losses. This relationship denotes that there is evidence in the

sample in question to accept that thevariation in default is related to the variation in provisions for loan losses (H₂). Default allowed controlling the results of other macroeconomic variations of IPCA and GDP, in order to better explain the variation of PCLD. In addition, the Selic variable also proved to be significant, possibly because it captures the temporal variations in the volume of business growth, at the usual financial market rate.

Therefore, this evidence contributes to the progress of the literature on earnings manipulation in financial institutions in general and fills a significant gap when addressing a specific type of entity, credit unions, for which there are few studies available. The main contribution of this study, therefore, lies in exploring the practice of earnings manipulation by a group of entities that play an important role in the functioning of the Brazilian capital market, especially by guaranteeing funding flows to economic sectors not served by institutions. traditional banking.

The results contribute to a greater perception of reliability in the cooperative credit market, a relevant segment for the country's economy and the inclusion of small economies, which may reflect a factor of attraction for cooperative members, monitoring policies and cost reduction. The results indicated a lack of management for adjusted net income (LLAJ) in the sample and period, contributing to the discussion of the relationships between earnings management variables. Still, it demonstrates the significance and relevance of default in a model that tries to explain the provision for losses, omitted in other studies on cooperatives. Thus, credit unions can reflect their governance structure with regard to manipulation of results.

As research limitations, the complete base of cooperatives is indicated, including outliers, a database with results that require treatment. For future research, it is suggested, under the same perspective, to analyze credit cooperatives, with data from the If.Data base, and other traditional financial institutions in order to verify the applicability and bring new discussions to the understanding.

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