

Earning Management in Brazilian Financial Institutions

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1. Introduction

Several authors who have studied earnings management in banking have found empirical support for the claim that banks use the loan loss provision for earnings management (ANANDARAJAN, 2003; EL SOOD, 2012; LOBO, 2001). The authors have also found evidence of earnings management when there is a positive relationship between financial institutions' expenditures on loan loss provisions and their outcomes. Thus, a better outcome motivates greater spending on loan loss provisions to mitigate gains (EL SOOD, 2012; LOBO AND YANG, 2005; AHMED, 1999).

There are several goals of earnings management. The main objective is typically income smoothing, which is used either when the previously established earnings are high, thus reducing the reported earnings, or when the earnings are considered low, to increase the reported earnings (ZENDERSKI, 2005). In this context, managers attempt to avoid presenting negative net income or a decrease in profit in relation to the previous period (BORNEMANN 2012). The main objectives of this behavior are to transmit an image of solidity and good performance to the market (GOULART, 2007) and to influence agents' risk perception (EL SOOD, 2012; BALBOA, 2013), in addition to other personal goals of managers such as maintaining dividends and contractual bonuses, which are generally at least partially tied to a financial institution's performance (EL SOOD, 2012; SHUTO, 2007). A manager can also choose to continue an earnings management position, even if it may compromise the quality of the presented accounting figures or if it entails future sacrifices by the organization (MARTINEZ, 2001). Financial institutions also seek to meet goals where they can be compared with an industry benchmark or the performance of a peer group (BORNEMANN, 2012).

In Brazil, CMN Resolution 2682/99 established the regulatory framework for loan loss provision accounts. The expenses associated with a loan loss provision account are based on the risk level of the loan portfolio, which is defined by specific criteria in relation to the debtor and the guarantees involved. Because the regulation only suggests guidelines and not objective criteria that determine risk ratings, the Central Bank has delegated to financial institutions the freedom to define credit models at each institution's discretion, resulting in possible inconsistencies related to loan loss provision accounts.

Bornemann (2012) carried out the following tests in the German banking market: (i) assessed whether banks avoid a decrease in net income (excluding loan loss provisions) in relation to the previous period, thus seeking to achieve lower outcome variability; and (iii) assessed whether banks seek to avoid a decrease in net income (excluding loan loss provisions) in relation to its peer group. Previous studies on the Brazilian banking market focused on evaluating whether firms practiced earnings management using a provision account. These studies tested the hypothesis of a positive relationship between a financial institution's expenses and earnings, which would constitute income smoothing (GOULART, 2007; ZENDERSKI, 2005).

The present study aims to investigate earnings management in Brazilian banking, and the study's main contribution is an unprecedented examination of the reasons for earnings management by Brazilian banks, following the framework established in the study by Bornemann (2012). The focus of this study is loan loss provision account management because it is a financial institution's main discretionary account. Second, banks have high leverage, which makes them vulnerable to volatility in asset prices and requires them to make constant adjustments to their loan loss provision

accounts to maintain adequate coverage of their loan portfolios (GONZALEZ, 2007). Thus, the credit provision account is closely associated with the earnings account and has an important effect on a bank's profitability.

The two-stage least squares (2SLS) method is used; this approach is unprecedented for Brazil and was not used by Bornemann (2012). Additionally, this study is the first in the Brazilian market to employ data from the financial crisis of 2007-2009; these data are used as control variables in the investigation of the reasons for earnings management by Brazilian banks.

The study is extremely important because financial statements are the main source of public information on banks, and they serve as a tool to determine banks' current economic and financial position, their potential for growth, and future trends (Assaf, 2007). Additionally, because banks also have systemic importance in a country's economy, it is essential to be able to discern whether and to what extent earnings management occurs in the Brazilian banking market.

2. Literature Review and Hypotheses

The regulation that controls the credit provisioning rules in Brazil is Resolution 2682 of the Central Bank of Brazil from December 21, 1999. As defined by the law, a credit rating must be based on some criteria set by the Central Bank and should include at least certain criteria defined by the Resolution. These criteria are the identified provisions in which there is a direct relationship between the credit provision and customers' credit risk.

Although Resolution 2682 results in the evaluation of credit risk by financial institutions, the regulation does not specify the characteristics for each risk category. Thus, each bank is responsible for evaluating each of the elements of the Resolution according to its own criteria and must define its own proprietary model for risk assessment (PARENTE, 2000). The Resolution introduced a framework for the evaluation of credit risk in financial institutions, but it allowed some freedom and room for discretion. The Resolution states that the credit provision has a discretionary criterion: *"the classification of the operation at the corresponding risk level is the responsibility of the institution holding the credit"*. That is, the loan loss provision (LLP) is defined according to the judgment of the manager regarding the risk of the granted loans.

Because the Central Bank only establishes the elements that should be considered in the rating process, it delegates to financial institutions the freedom to define the models at each institution's discretion.

Despite this discretion, financial institutions are often subject to supervision by the Central Bank regarding the classification of their credit operations. Therefore, they must retain documentation demonstrating their established risk levels. The classifications defined by each institution must also be disclosed in the explanatory notes to the financial statements, as well as the amount of renegotiated credit provisions, provisions against losses, and recovered amounts.

Discretion is allowed by the legislation for credit ratings between the AA and H levels; however, an investigation of whether such discretion creates regulatory arbitrage would require not only the individual analysis of each grant of credit but also comparative research to evaluate each specific customer of the different financial institutions. In this study, such an analysis is not performed, and this characteristic is not used to investigate the existence of earnings management.

The research that is performed in this study concerns regulatory arbitrage made possible by unidentified provisions or general provisions (FERNANDES et al, 2008), which allows an examination of whether there is earnings management in Brazilian banks. As defined by the International Monetary Fund, general provisions are intended to cover possible or potential losses that are not yet identified, while specific provisions reflect already-identified losses.

Financial institutions have the opportunity to make additional provisions beyond the levels provided by Resolution 2682 by working with a provision allowance in relation to delayed credits. Non-identified provisions are those that are not associated with loans classified as 'in liquidation' or as 'delayed'. This practice is known as a "provisioning buffer" (PARENTE, 2000). These

unidentified provisions may create a negative aspect as an auspicious environment arises for regulatory arbitrage and a consequent decrease in the transparency of financial data, which can cause a loss of efficiency in the allocation of resources and potential danger to the stability of the financial system. The establishment of provisions detached from risk ratings opens up the possibility of analyzing credit operations in a less rigorous manner, thereby improving customer risk ratings by using less conservative criteria. This practice may encourage behavior that constitutes a “provisioning buffer” in the search for comparative advantages in relation to a bank’s peers, not through improved efficiency in the management of credit risk but through a less conservative portfolio evaluation. This lack of transparency can lead to efficiency losses because it generates rates that are incompatible with the institution’s risk.

No Brazilian author has tested the hypotheses proposed in this study and, despite the fact that the credit provision account is a financial institution’s main accrual account, few significant studies have focused on this account (ZENDERSKI, 2005; GOULART, 2007). Goulart (2007) found that earnings management using the provision account provided more significant results with regard to derivatives and securities.

The main subjects of study in Brazil have used the securities account (ZENDERSKI, 2005; GOULART, 2007; CORRAR, 2010; GALDI et al., 2012), derivatives (GALDI and PEREIRA, 2007; GOULART, 2007; GALDI, 2012), and the practice of securitization (GALDI and CAMARA, 2012). The hypotheses tested in this study follow the framework used by Bornemann (2012) and seek to investigate whether there is earnings management in Brazil and how it is practiced.

However, Bornemann’s (2012) study used a particularity of the German financial system, i.e., the existence of a hidden reserve called the “340f Reserve”, which was enacted by German law in 1993. The 340f reserve is established by devaluing active accounts and, unlike the loan loss provision account, its creation does not need to be tied to the inherent risk of a certain category of accounts. From the standpoint of earnings management, the great advantage of setting up this type of reserve is that a justification for it is not required, and therefore discretion can be used. In Brazil, the absence of similar legislation to the 340f account, along with a lack of data, prevents the use of a similar methodology to that used by Bornemann (2012) and therefore requires that this study adjusts to the Brazilian reality.

The loan loss provision is used in the present study because according to Kanagaretnam (2001), it is the largest accrual for most of the largest banks and thus plays a significant role in earnings management.

There are various forms of earnings management, and in this study, we focus on the practice of income smoothing, which is used to reduce the dispersion of results and convey an image of solidity and good performance to the market (GOULART, 2007). Other purposes of earnings management, which are not addressed in this article, are the ‘bump up’, which seeks to improve a bank’s performance when the results are close to a given target; the ‘cookie jar’, when there is an incentive to reduce earnings for the current period to increase earnings in less favorable periods; and the ‘big bath’, which is used in periods where a bank knows that it will fall short of a certain goal and decides to further reduce profitability.

The hypotheses that we investigate in this study are cited as the main motivations in the capital market by Goulart (2007). He claimed that the intention to satisfy certain benchmark results can be cited as a reason to prevent the disclosure of losses, demonstrate rising profits, and meet the expectations of investment analysts regarding a firm’s results. Dechow and Skinner (2000) argued that there is evidence of the existence of a hierarchy: it is most important to prevent the disclosure of losses; it is secondarily important to show increasing returns; and finally, firms must meet expectations and analysts’ forecasts. The authors defined this hierarchy within the capital market; however, it can also be applied to financial institutions, which are seen by investors as a potential target for investment through financing or the purchase of securities.

The existing studies on the Brazilian market have investigated the existence of a positive correlation between a financial institution's provision expenses and net income (ZENDERSKI, 2005; GOULART, 2007)

The first and most intuitive form of earnings management aims to avoid losses (negative profits). By analyzing the profitability of a financial institution, analysts or investors primarily evaluate whether the net income is positive; this analysis does not require historical or comparative data (DEGEORGE, 1999). Such research yields a simple and straightforward answer on whether a financial institution is profitable. Showing net income below zero is avoided in financial statements because from a macroeconomic perspective, net losses in a given year raise questions regarding a bank's solidity and arouse more public interest in investigating the reasons for the poor performance.

From a microeconomic perspective, shareholders wish to increase their influence in a bank's management after the presentation of losses. In both cases, the administrative decisions by the bank's management are now restricted. Thus, managers have strong incentives to preserve the confidence of shareholders and avoid presenting any losses, or at least to present net income higher than zero. A bank that has a narrow loss in a period will therefore perform earnings management through increased revenue and/or expense reductions to reverse the losses and generate profits (GOULART, 2007).

Thus, we define the first hypothesis:

H₁: Banks seek to avoid negative net income pre-loan loss provisions and taxes

Previous studies that investigated loan loss provision accounts focused mainly on the positive relationship between expense accounts for bad debts and income (before provisions and tax expenses). Thus, the central hypothesis addressed by the existing literature already described earnings management as managers' incentive to reduce the variability of their reported earnings using the flexibility provided by discretionary accounts (ANANDARAJAN, 2003; EL SOOD, 2012; LOBO, 2001). Thus, within the accounting rules, managers may increase/decrease discretionary accruals when a bank reports significant/small profits (BALBOA, 2013). Ahmed (1999) stated that when profits are expected to be high, expenses for provisions are deliberately minimized to mitigate the adverse effects of other factors on profitability. This approach is known as income smoothing.

Galdi et al. (2012) found evidence that banks use the discretionary portion of their derivative accounts for income smoothing, which is a more commonly used practice in private institutions. However, the author's study did not mainly focus on provision accounts. In another study, Galdi et al. (2012) also found that securitization is used to smooth earnings.

An important benchmark for managers is the ratio of profits in period t in relation to period $t - 1$, and they are inclined to avoid a drop in profits from the previous period. Bornemann (2012) argued that investors in the German banking market interpret perennial increases in net income as the appearance of management's trust in the prospects of future profitability.

In publicly traded banks, share price and bank value tend to increase after an increase in dividend payments from periods of increased profitability, which strengthens the position of managers. Similarly, a drop in profits in comparison to the previous period induces investors to seek a more profitable alternative. For unlisted banks, the motivation to avoid a decrease in profitability results from a desire for a reduction in interference from shareholders, regulators, and other stakeholders. Goulart (2007) stated that although his research on the Brazilian market focused only on income smoothing, other earnings management practices are also considered to be of interest for financial institutions as actions to prevent the disclosure of losses and declining profits. These practices are examined in this study.

Bornemann (2012) also stated that managers wish to reduce the volatility of the net income of their banks because less income variability reduces the cost of capital and reflects a lower perceived probability of failure of their financial institution.

Thus, we formulate the second hypothesis:

H₂: Banks seek to avoid negative net income pre-loan loss provisions and taxes in relation to the previous period

Managers also seek to meet a profitability benchmark of banks' industry or peer group. They tend to avoid a decrease in net income compared with this peer group. This hypothesis was first tested by Bornemann (2012) in the international market and has not yet been tested in the Brazilian market. We can draw a parallel between the third hypothesis and the third level of the hierarchy suggested by Goulart (2007). After achieving the first two levels of the hierarchy suggested by Dechow and Skinner (2000), the third goal is to meet the projected results of analysts. Here, we test whether banks seek to meet an industry benchmark that is considered by most analysts and that therefore creates a certain level of expectation in the forecasts.

Bornemann (2012) stated that stakeholders value a bank's performance in relation to a peer group and not only in relation to the bank's past performance. In fact, managers themselves analyze a bank's performance against others in the same region and with a similar profile. This comparison creates incentives for managers to avoid decreases in profit compared with their peer group. Those outside a financial institution create a "threshold mindset", i.e., they create certain expectations regarding the bank's performance (DEGEORGE, 1999), and these expectations can also refer to the comparative performance of banks with similar profiles.

Analysts and investors frequently perform comparative financial analyses of financial institutions that have similar profiles. With this in mind, managers may seek to match or even stand out from their peers. Most analysts consider the outcomes of a group of banks with similar profiles, and these outcomes and comparisons are also taken into consideration by managers (DEGEORGE, 1999).

In general, banks with similar profiles and therefore similar risks should ideally have similar financial statements and outcomes. Any significant deviation from this pattern calls the attention of analysts, who then perform a more detailed investigation to understand the reasons for the negative deviation.

Thus, we propose the third hypothesis:

H₃: Banks seek to avoid negative net income pre-loan loss provisions and taxes in relation to the previous period of a given peer group

3. Methodology

3.1 Data

The data used in this study were extracted from information published by the Central Bank of Brazil (*Banco Central do Brasil - BCB*) under different forms: Balance Sheet Accounts (Sisbacen data), Financial Information Quarterly (*Informações Financeiras Trimestrais - IFT*), and Outcome Statement Accounts from the BCB.

The sample was derived from the consolidated bank data I and II, totaling 123 banks, with annual data for the period between 2001 and 2012. The initial period of the study was limited by a lack of data from Financial Information Quarterly and the BCB (Outcome Statement Accounts) prior to this period.

Banks were classified into five different categories according to their profiles and their main business segments: Retail Banks, Subsidiaries of Foreign Banks, Public Banks, Automaker Banks

(connected to a non-financial company active in the automobile/truck market), and Cooperative Banks. These categories were used for the investigation of Hypothesis 3.

The sample of banks represents a significant portion of the total assets of the Brazilian financial system. In December 2012, the sample of selected banks had total assets of R\$ 5.1 trillion, which amounts to approximately 90% of the Brazilian market.

Table 1 provides detailed information on the number of banks observed in the sample with the classifications into the different segments. The amount of data at the end of the analysis period is greater because the database was constructed retroactively, i.e., we selected banks in 2012, and data from previous years was extracted from the respective CNPJ (*Cadastro Nacional da Pessoa Jurídica* - VAT identification number) of each bank.

The sample data form an unbalanced panel because certain financial institutions did not exist in a given year or they had no available balance information; therefore, the number of observations is not the same for each year.

There is a predominance of retail banks in the sample and the cooperative banks and public banks categories have considerably small samples; however, these categories were retained in the sample due to the unique role that they both play in the economy.

Table 1 – Number of banks in the sample by different segments and by year from 2001 to 2012.

Period	<i>Cooperatives</i>		<i>Automaker</i>		<i>Public</i>		<i>Subsidiaries</i>		<i>Retail</i>		<i>Total</i>	
	No.	Row %	No.	Row %	No.	Row %	No.	Row %	No.	Row %	No.	Row %
2001	2	1.9%	13	12.0%	9	8.3%	29	26.9%	55	50.9%	108	7.9%
2002	2	1.8%	13	11.9%	9	8.3%	30	27.5%	55	50.5%	109	7.9%
2003	2	1.9%	13	12.0%	9	8.3%	29	26.9%	55	50.9%	108	7.9%
2004	2	1.9%	13	12.0%	9	8.3%	29	26.9%	55	50.9%	108	7.9%
2005	2	1.8%	14	12.7%	9	8.2%	29	26.4%	56	50.9%	110	8.0%
2006	2	1.8%	14	12.5%	9	8.0%	31	27.7%	56	50.0%	112	8.2%
2007	2	1.8%	14	12.3%	9	7.9%	31	27.2%	58	50.9%	114	8.3%
2008	2	1.7%	15	12.8%	9	7.7%	33	28.2%	58	49.6%	117	8.5%
2009	2	1.7%	16	13.4%	9	7.6%	35	29.4%	57	47.9%	119	8.7%
2010	2	1.6%	17	13.8%	9	7.3%	36	29.3%	59	48.0%	123	9.0%
2011	2	1.6%	17	13.9%	9	7.4%	36	29.5%	58	47.5%	122	8.9%
2012	2	1.6%	17	13.8%	9	7.3%	36	29.3%	59	48.0%	123	9.0%
	24	1.7%	176	12.8%	108	7.9%	384	28.0%	681	49.6%	1373	100.0%

Table 2 shows the number of banks that hold loan loss provision reserves above the minimum required by the Central Bank and how their use varies over time. Banks increasingly use discretion in the provision of credit operations, i.e., they increasingly retain a reserve supply of credit above the regulatory required minimum. In 2001, 28.7% of the sample banks retained provisions in excess of the regulatory minimum, and in 2012, this percentage increased to 54.1%.

Table 2 – Number of banks with loan loss reserves by year from 2001 to 2012.

Period	<i>Only minimal provision</i>		<i>Excess Provision</i>		<i>Total</i>	
	No.	%	No.	%	No.	%
2001	62	71.3%	25	28.7%	87	7.3%
2002	58	63.7%	33	36.3%	91	7.6%
2003	60	65.2%	32	34.8%	92	7.7%
2004	61	64.2%	34	35.8%	95	7.9%
2005	55	58.5%	39	41.5%	94	7.9%
2006	54	54.5%	45	45.5%	99	8.3%
2007	56	56.6%	43	43.4%	99	8.3%
2008	50	49.0%	52	51.0%	102	8.5%
2009	49	45.4%	59	54.6%	108	9.0%
2010	49	45.8%	58	54.2%	107	8.9%
2011	49	44.1%	62	55.9%	111	9.3%
2012	51	45.9%	60	54.1%	111	9.3%
	654	54.7%	542	45.3%	1196	100.0%

3.2 Variables

To analyze the practice of earnings management using loan loss provisions, we use llp as the dependent variable, which is the total spent on provision for year t as a percentage of total assets. The main explanatory variable in this study is Net Income Before Taxes and LLP as a percentage of total assets (ni_assets).

Variables that use balance sheet data were normalized by the total assets for the period. Following the method suggested by Brown et al. (1999), this procedure was used to avoid the problem of scale effect. Other authors followed a similar methodology (BORNEMANN, 2012; SHRIEVES, 2003; and BALBOA, 2013).

Hypotheses H1, H2, and H3 are tested using the following dummy variables: (i) $d_loss_{i,t}$, with 1 representing the situation where a bank has net income before provisions below zero, representing H1; (ii) $d_prev_year_{i,t}$, with 1 representing the situation where a bank shows a decrease in net income before the LLP that is lower than the previous year, representing H2; and (iii) $d_peer_{i,t}$, with 1 representing the situation where a bank shows a decrease in net income before provisions in relation to its peer group, representing H3.

To investigate the three hypotheses, we use the following control variables (a summary of all the variables is shown in Table 3):

(i) Organizational structure characteristics: publicly traded bank (dummy variable)

The literature showed conflicting perspectives on the impact a publicly traded bank would have on earnings management (Fonseca, 2008). On the one hand, a publicly traded bank has a greater incentive to manage earnings. Because these banks have more outsiders, the publication of their financial statements may have greater signaling effects. Anandarajan (2005) stated that a publicly traded bank has incentives to manage earnings because such banks are examined in detail by their stakeholders, board members, and potential investors. The author expected a positive relationship.

However, the opposite can also be argued. Smaller banks, which normally are not publicly traded, often have fewer opportunities for diversification. Thus, these banks have incentives to seek greater profitability through more risky activities, which would encourage these banks to deliver results that cover up these risky activities. Fonseca (2008) stated that regulators focus on supervision of the larger banks because the larger banks have greater systemic importance and are consequently at the center of any banking crisis. Balboa (2013) raised a question about the reputational issue because when managers perform earnings management, others can monitor their behavior, which results in the repression of this behavior.

(ii) Service earnings in relation to total assets

Higher service earnings may indicate that a bank depends less on traditional credit activities. According to Anandarajan (2005), it would therefore be plausible that these banks are more active in allocating the appropriate credit reserves to present the image of being a “safer” institution. The reverse can also be argued, in the sense that banks with higher revenue from services may practice more aggressive banking activities. These banks may then have higher credit risk and compensate for this increased risk through higher expenditures on provisions to manage an uncertain future. The author stated that it is not possible to predict the sign (positive or negative) of this relationship.

(iii) GDP growth

Some behaviors of managers can be explained by factors in a bank’s economic environment. The GDP growth variable is a natural indicator of the aggregate business cycle and captures the general conditions of the economy; thus, it is an external indicator of credit risk (BALBOA, 2013). It is expected that the cyclical component of expenses on provisions is negatively correlated with this variable.

The Risk Management Theory emphasizes the interests of supervisors in reducing the cyclical nature of capital and provision expenses. Following the subjective criteria of Resolution 2682 discussed above, banks define a protection level against expected losses (through the definition of their optimal coverage level) and increase their capital in accordance with the non-expected loss. In other words, loan loss reserves are established in periods of economic growth, and losses – and therefore the use of these reserves – occur in periods of recession. Thus, the establishment of a credit reserve has a cyclical nature (EL SOOD, 2012; FONSECA, 2008)

(iv) Unemployment

The unemployment variable was used by Anandarajan (2003) as an indicator of economic activity. An increase in unemployment could mean an economic depression that can increase the credit risk of banks, forcing the banks to increase expenditures on provisions.

(v) Provisions in excess (dummy variable)

Based on Resolution 2682 discussed above, Brazilian banks must have a minimum level of provisions they must hold according to the risk profile of their loan portfolios (the risk profile is determined by the credit rating categories AA to H). The Resolution determines the minimum provisions, and each bank has the discretion to hold provisions above what is defined in the regulation if it deems it necessary. This variable takes a value of one if the bank holds provisions above the minimum requirement, meaning that there is a discretionary portion associated with the provision account.

(vi) Amount of the provisions in excess

If a bank holds provisions above the minimum required by Resolution 2682, this variable determines the amount of the excess provisions in relation to total assets.

(vii) Years of the financial crisis

The years of the financial crisis are used as a control variable. To define which years are considered crisis years, we use the criterion suggested by El Sood (2012), which considers 2007-2009 as the years of crisis. There may be a change in the provisioning behavior of banks during periods of financial instability.

The use of the years 2001-2012 as control variables to control the time effect in the tested model was considered and evaluated. However, because there are few observations in some years, the use of these variables was discarded.

Table 3 – Summary of variables used in the model

Variable	Expected Sign	Definition	References
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% expense with credit provisions/total assets	---	Expense with credit provisions in the period	Fonseca e Gonzalez (2008), Anandarajan, Hasan e Vivas (2005), El Sood (2012), Bornemann <i>et al.</i> (2012)
% net income/total assets	(+)	Accounting net income in the period	Fonseca e Gonzales (2008), Anandarajan, Hasan e Vivas (2005), El Sood (2012), Bornemann <i>et al.</i> (2012)
1= publicly traded	(+) or (-)	May have different incentives for earnings management in publicly traded banks	Fonseca e Gonzales (2008), Anandarajan, Hasan e Vivas (2005), Balboa, Lopes-Espinosa e Rubia (2013)
% Services income/total assets	(?)	Indicates the dependence of the bank in relation to credit activities	Anandarajan, Hasan e Vivas (2005)
% GDP growth	(-)	Macroeconomic environment factors influence the behavior of the bank	Balboa, Lopes-Espinosa e Rubia (2013), El Sood (2012) Fonseca e Gonzalez (2008)
% Unemployment	(+)	Macroeconomic environment factors influence the behavior of the bank	Anandarajan, Hasan e Vivas (2003), Bornemann <i>et al.</i> (2012)
1= bank has provisions in excess regarding the regulatory minimum	(+)	Indicates banks that use discretion in credit provisioning	Resolução 2682, de 21 de Dezembro de 1999
% Value of the provisions excess/total assets	(?)	Provision excess regarding the required regulatory minimum	Resolução 2682, de 21 de Dezembro de 1999
1= years of crisis (2007-2009)	(?)	Aims to investigate behavior changes in periods of crisis	El Sood (2012)
1= net income below zero in the period	(-)	H1: Investigates if banks seek to avoid net income below zero	Bornemann <i>et al.</i> (2012)
1= net income below the net income in the previous period	(-)	H2: Investigates if banks seek to avoid decreases in net income in relation to the previous period	Bornemann <i>et al.</i> (2012)
1= net income below the net income in the previous period of the respective peer group	(-)	H3: Investigates if banks seek to avoid decreases in the net income with credit provisions and taxes in relation to the previous period of a determined peer group	Bornemann <i>et al.</i> (2012)

Note: net income refer to “net income excluding credit provisions and taxes”.

3.3 Econometric Model

Because “detailed regulations on building 340f reserves are lacking (...),” stated Bornemann (2012), “(...) banks can use this account at their own discretion”. Thus, data on the 340f account have the great advantage of not requiring a distinction between the discretionary and the non-discretionary portions. In the present study, this distinction is necessary because we use the loan loss provision account as a dependent variable. Zenderski (2005) also made this distinction and identified the discretionary and non-discretionary components of expenditures on loan loss provisions.

As discussed in Section 2, the loan loss provision account has discretionary and non-discretionary components. McNichols (2000) highlighted the importance of properly isolating these two components in studies on earnings management. Kanagaretnam (2010) used a two-stage approach where the first stage aimed to identify the normal, or non-discretionary, estimators of the provision expenditure account. In the first equation, Kanagaretnam (2010) used the variables “beginning loan loss allowance”, “write-offs”, “change in total loans outstanding”, “total loans outstanding”, “non-performing loans” and “loan categories”. The residuals from the first regression

were the abnormal, or discretionary, component of the provision. In the second stage, the author tested the relationship between the residuals of the first regression and the object of study.

De Boskey (2012) used a similar methodology. In the first equation, he sought to identify the non-discretionary portion using control variables that captured various attributes of the financial institution's loan portfolio and that may have explained the variation in the loan loss provision account. In the second step, the residuals of the first regression were used as the discretionary component of the loan loss provision account. Zenderski (2005) also followed this methodology of isolating the discretionary and the non-discretionary components of the provision accounts.

According to Kanagaretnam and Wolf (2004), a two-stage estimation is inconvenient because it underestimates the absolute value of the regression coefficients of the second stage. Additionally, to increase the reliability of the empirical results, Zanderski (2005) found that the use of one-stage estimations showed the same results as two-stage regressions. Likewise, El Sood (2012) used a one-stage regression, isolating the discretionary component of the loan loss provision through variable control elements that were considered non-discretionary. The author used three control variables as indicators of the non-discretionary component of the provision accounts.

In the present study, we have the great advantage of having a database with the credit balances classified by the categories AA - H and, from the rules found in Resolution 2682, it is possible to calculate the minimum mandatory provision for each financial institution. The difference between the effective provision and the minimum required provision is the discretionary provision made by the bank. So we can use a one-stage regression to solve the problem.

The investigation of hypotheses H₁, H₂, and H₃ is performed using the equation (1). The sample for this study combines annual observations from various banks over a period of time (2001-2012); therefore, to test hypotheses H₁ to H₃, we use panel data methodology, which combines time series and cross-sectional observations.

$$\begin{aligned}
 llp_{it} = & \beta_0 + \beta_1 ni_assets_{it} + \beta_2 pubtrad_dummy_{it} + \beta_3 serv_assets_{it} + \\
 & \beta_4 GDP_{it} + \beta_5 unempl_{it} + \beta_6 prov_excess_dummy_{it} + \beta_7 excess_prov_{it} + \\
 & \beta_8 d_loss_{it} + \beta_9 d_prev_year_{it} + \beta_{10} d_peer_{it} + a_i + \varepsilon_{it}
 \end{aligned} \tag{1}$$

where a_i is the unobserved effect and ε_{it} is the idiosyncratic error.

The variables that use balance data were normalized by the total assets for the period. This procedure was adopted following the methodology suggested by Brown et al. (1999) to avoid the problem of scale effect. Other authors followed a similar methodology (Bornemann, 2012; Shrieves, 2003; and Balboa, 2013).

We use a one-stage model to determine the discretionary portion of the loan loss provision account. This process aims to isolate the discretionary component of the loan loss provision through control variables of elements that are considered non-discretionary. The control variables included in the model for this purpose are *prov_excess_dummy* and *excess_prov*. We have the great advantage of having balance data for Brazil that allow us to identify the portion of the provision stock that is discretionary, or unidentified. These control variables aim to identify the discretionary portion of the provision expenditure account.

To examine hypotheses H₁ to H₃, we fit the panel data regression by two-stage least squares (2SLS) method to control for the potential endogeneity between the variables used in the model that originate from the same year balance sheet data. One concern in estimating the existence of earnings management in banks is the possible endogeneity existing between loan loss provision (*llp*) and the other control variables originating from the balance sheet or the earnings statement (*ni_assets*, *serv_assets*, and *excess_prov*). This could occur because the dependent variable and some of the independent variables use balance sheet data from the same fiscal year, there is these variables are simultaneously determined.

The idea of the 2SLS estimation method is to use a set of variables, called instruments that should be correlated with the endogenous variables and that are not correlated to the error term.

Studying earnings management, Fonseca (2008) expressed concern about endogeneity when using instruments based on lagged explanatory variables. Then we use as instruments the lagged variables for all endogenous explanatory variables from the balance sheet. These instrumental variables have a direct effect on the endogenous explanatory variable, it is partially correlated with the endogenous variable, and it has no direct effect on the dependent variable.

Greene (2000) suggests the use of Hausman test to choose between fixed effect (FE) or random effect (RE) panel data regression. This test compares the estimations from the FE and RA methods to verify whether there is a correlation between the unobserved factors and the explanatory variables (Wooldridge, 2011). Thus, based on the results of the Hausman test applied to the data, we use fixed effects panel model.

4 Results

In an initial analysis of the data, we checked the correlations between the explanatory variables in the model to indicate the level of multicollinearity. No correlation was large enough to cause problems for the model; the highest correlation value was between the percentage of expense with credit provisions and the percentage of net income (0.46) and there was a moderate correlation between GDP growth and unemployment (0.45).

Table 4 – Descriptive analysis of the numerical variables in the period.

	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
<i>llp</i>	1213	0.0180	0.0291	0.0000	0.3199
<i>ni_assets</i>	1361	0.0400	0.0625	-0.8730	0.4053
<i>serv_assets</i>	1263	0.0297	0.0681	0.0000	0.7480
<i>GDP</i>	1375	0.1175	0.0313	0.0626	0.1638
<i>unempl</i>	1500	0.0783	0.0218	0.0460	0.1090
<i>excess_prov</i>	1196	0.0017	0.0045	-0.0013	0.0538

For the analysis of the hypotheses H_1 to H_3 , we estimate five regression models that are used to predict the existence or non-existence of earnings management in financial institutions in Brazil between 2001 and 2012. The model 1 is the baseline model that contains only the control variables; models 2, 3 and 4 test each of the hypotheses H_1 , H_2 and H_3 , respectively; while model 5 is used to compare the hypotheses among themselves.

First, there is a positive relationship between the loan loss provision account and net income. This result corresponds to the expected sign and characterizes the practice of income smoothing.

The results show that there is a strong positive association between d_loss and llp , and the p-value of d_loss is statistically significant at the 1% level. This result means that managers seek to avoid a decrease in profits in relation to the previous period. The coefficient has the expected sign, meaning that net income excluding loan loss provisions and taxes is positively correlated with loan loss provision expenditures. The higher/lower the income, the higher/lower the incentive for management to increase/decrease the expenditures on provisions to reduce/increase the net income in the period.

This result is in line with that of Degeorge (1999), who also found evidence that banks use thresholds to show positive net income. In Brazil, this result is expected because the primary metric used for profitability analysis is the evaluation of net income above zero.

The results show that there is a strong positive association between d_prev_year and llp . The p-value of d_prev_year is statistically significant at the 1% level. This result shows that banks seek income smoothing and avoid showing net income below their net income in the previous period.

The coefficient has the expected sign (+). 'Net income excluding loan loss provisions and taxes' below the 'net income excluding loan loss provisions and taxes' of the previous period is positively correlated with 'expenses for loan loss provisions'.

Analysts estimate not only the profits during a period but also the evolution of the profitability of a financial institution. Thus, it is expected that a bank always seeks to obtain increasing profits so it does not show a deceleration in profitability, which could attract attention to the institution's financial situation.

The results show that there is a strong positive association between d_peer and llp . The p-value of d_peer is statistically significant at the 5% level. This result shows that managers seek to meet a profitability benchmark of the industry or its peer group of banks. They tend to avoid a decrease in net income compared with this peer group.

Analysts and investors frequently perform comparative financial analyses between financial institutions that have the same activity profiles. Knowing this, managers seek to match or even stand out from their peers. Ideally, banks with similar activity profiles and therefore similar risks should generally have similar results. Any significant deviation from this pattern negatively calls the attention of analysts.

The outsiders of a financial institution create a "threshold mindset", i.e., they create certain expectations regarding a bank's performance (DEGEORGE, 1999); therefore, it was expected that H_3 showed significant results. In the Brazilian market, banks with similar profiles tend to show similar results for profitability.

The joint analysis of the hypotheses using Equation (i) shows that H_1 has a coefficient that is nearly four times higher than H_2 and eleven times higher than H_3 . This result shows that the main objective of managers in relation to earnings management is to avoid showing negative net income. The second objective is to avoid showing decreases in net income compared with the previous period, and, finally, the third objective sought by managers is to prevent decreases in net income compared with a peer group.

This "hierarchy" of the goals sought by management is justifiable in the sense that the net income in the period is the primary metric for the profitability of a financial institution. Showing negative net income requires explanations to analysts and investors and, depending on the magnitude, can affect a bank's capitalization, thus calling the attention of regulators. This hierarchy is aligned with that presented by Degeorge (1999) and had not yet been tested in Brazil.

Showing a decrease in net income from the previous period does not necessarily mean that a bank reported a loss. A bank may show a decrease in profitability but still have positive net income. This situation most likely requires explanation, but it may have less relevance. However, it is virtually mandatory for analysts to perform a historical trend analysis of the profitability of a financial institution.

The situation tested in H_3 , in which a bank avoids a decrease in net income compared with a peer group, has less relevance in the hierarchy. Banks with similar activity profiles tend to have similar risk profiles, with costs and revenue that somehow converge.

However, it is not mandatory for managers to closely match their peer group because there are several factors that influence a bank's profitability, not only its activity profile; possibly for this reason, this third purpose is pursued to a lesser extent by managers. Moreover, belonging to a certain peer group can be a somewhat subjective determination that is made differently by different analysts.

The most significant control variable in all of the tested equations is GDP growth, which shows the importance of the economic cycle in a bank's credit provisioning.

Table 11 – Results – 2SLS Panel Data – Fixed Effects

<i>llp</i> Variable	Equation (i)			Equation (ii)			Equation (iii)			Equation (iv)			Equation (v)		
	Coefficient	Std. Dev.	p-value	Coefficient	Std. Dev.	p-value	Coefficient	Std. Dev.	p-value	Coefficient	Std. Dev.	p-value	Coefficient	Std. Dev.	p-value
<i>ni_assets</i>	0.42590	0.05257	0.00000 ***	0.41498	0.05650	0.00000 ***	0.47618	0.06565	0.00000 ***	0.36722	0.04418	0.00000 ***	0.41836	0.05717	0.00000 ***
<i>pubtrad_dummy</i>	0.00843	0.00442	0.05700 *	0.00717	0.00463	0.12200	0.00700	0.00457	0.12600	0.00846	0.00436	0.05200 *	0.00881	0.00468	0.05900 *
<i>serv_assets</i>	-0.00798	0.02542	0.75400	-0.03137	0.02728	0.25000	-0.01272	0.02658	0.63200	-0.01890	0.02537	0.45600	-0.03210	0.02730	0.24000
<i>GDP</i>	-0.07004	0.02376	0.00300 ***	-0.06771	0.02501	0.00700 ***	-0.05837	0.02481	0.01900 **	-0.07917	0.02365	0.00100 ***	-0.07059	0.02500	0.00500 ***
<i>unempl</i>	-0.04639	0.04445	0.29700	-0.06709	0.04900	0.17100	-0.09359	0.05062	0.06400 *	-0.01687	0.04284	0.69400	-0.05623	0.04798	0.24100
<i>prov_excess_dummy</i>	0.00110	0.00338	0.74600	-0.00067	0.00362	0.85200	-0.00029	0.00356	0.93400	0.00130	0.00336	0.69900	-0.00073	0.00362	0.83900
<i>excess_prov</i>	0.28045	0.64497	0.66400	1.16115	0.69871	0.09700 *	0.63499	0.67427	0.34600	0.53103	0.64314	0.40900	1.14211	0.69584	0.10100
<i>crisis</i>	-0.00194	0.00164	0.23600	-0.00281	0.00173	0.10400	-0.00213	0.00171	0.21200	-0.00233	0.00163	0.15300	-0.00285	0.00173	0.09900 *
<i>d_loss (H₁)</i>	0.02365	0.00462	0.00000 ***	---	---	---	0.03125	0.00602	0.00000 ***	---	---	---	---	---	---
<i>d_prev_year (H₂)</i>	0.00605	0.00194	0.00200 ***	---	---	---	---	---	---	0.00798	0.00207	0.00000 ***	---	---	---
<i>d_peer (H₃)</i>	0.00213	0.00537	0.52800	---	---	---	---	---	---	---	---	---	0.00864	0.00392	0.02700 **
<i>c</i>	0.00565	0.00516	0.27300	0.01367	0.00417	0.00100 ***	0.00934	0.00426	0.02800 **	0.00990	0.00412	0.01600 **	0.00603	0.00545	0.26900
<i>R² within</i>	0.0937			-			0.0090			0.0960			-		
<i>R² between</i>	0.3326			0.3449			0.3522			0.3163			0.3531		
<i>R² overall</i>	0.2766			0.2582			0.2820			0.2540			0.2612		

* Significant at 10%; ** Significant at 5%; *** Significant at 1%;