REVERSAL OF IMPAIRMENT LOSSES AND EARNINGS MANAGEMENT: A STUDY WITH BRAZILIAN COMPANIES LISTED ON B3

VINÍCIUS JESUS SOUZA[1]
Universidade Federal da Bahia

https://orcid.org/0009-0009-9780-3785
viniciusjsouza1@hotmail.com

SHEIZI CALHEIRA DE FREITAS
Universidade Federal da Bahia

https://orcid.org/0000-0002-1148-4296
shecal@ufba.br

JORGE DE SOUZA BISPO
Universidade Federal da Bahia

https://orcid.org/0000-0002-1845-2473
jorge.bispo@ufba.br

ABSTRACT

Although the impairment test is relevant to the quality of accounting information, it requires subjective estimates that allow discretion to manage companies and give rise to earnings management, especially when losses can be reversed. In this context, this research aimed to investigate whether there is a relationship between the reversals of impairment losses evidenced by Brazilian companies listed on B3 and the practice of earnings management between 2010 and 2019. For this, descriptive and quantitative research was conducted, which tested three hypotheses initially developed in the work of Duh et al. (2009) to analyze whether the companies that most recognize impairment losses reverse these losses in the future to avoid the decrease in accounting earnings and whether this behavior is more pronounced in higher levels of indebtedness or when their managers are paid for performance. The findings revealed that, although companies that recognize more losses conduct more significant reversals in the future, these reversals did not occur in the context of declining earnings and were not significantly influenced by indebtedness and the managers' pay-performance sensitivity. Considering the scarcity of empirical evidence on this topic in Brazil and the need to observe this phenomenon in different institutional and regulatory environments, it is expected that this study will contribute to stimulating the conducting of other similar studies, as well as to foster discussions on how the possibility of reversing impairment losses affects the quality of accounting information.

Keywords: Impairment test. Reversal. Earnings management. Brazilian companies.

1 INTRODUCTION

The impairment test can be defined as an accounting procedure that allows companies to periodically estimate the recoverable value of their assets to verify whether there has been a reduction in the potential to generate future economic benefits (França, 2017). Due to its relevance for the valuation of assets and, consequently, for the quality of accounting information, the impairment test has been the subject of recurring discussions, which resulted in several studies published (Vogt et al., 2016).

At the international level, studies have been dedicated to investigating aspects related to the disclosure of information on the impairment test, such as Devalle and Rizzato (2012), Vanza et al. (2018), and Chen et al. (2019), as well as the reaction of the markets to the disclosed impairments, such as the works of Alciatore et al. (2000), Lapointe-Antunes et al. (2009), and Abughazaleh et al. (2013). Moreover, other studies, such as Hilton and O'Brien (2009), Rennekamp et al. (2015), and Sorros et al. (2015), investigated accounting choices related to the recoverability test.

However, a discussion that has been highlighted on the subject concerns the use of this procedure as a strategy to practice earnings management due to the high level of discretion allowed to companies, which stems mainly from the subjectivity inherent in the estimation of recoverable value (Laskaridou & Athanasios, 2013).

Given its intrinsically subjective nature, the impairment test can enable different types of earnings management. Among the possible techniques, internationally published research has emphasized the cookie jar reserves, which, as explained by Mckee (2005), aims to create reserves from the recognition of provisions or estimated losses in the present that will not materialize to reverse them in the future to increase earnings artificially.

The use of the recoverability test as a tool to form cookie jar reserves is possible because standards applied in different jurisdictions, especially those that adopt the IFRS (International Financial Reporting Standards) standard, allow the reversal of losses due to the devaluation of assets recognized in previous periods, such as Brazil, which has adopted this logic since the advent of CPC 01 (Brazilian Accounting Pronouncements Committee, 2018) and NBC TG 01.

Reversals of impairment losses have motivated research because, among other factors, this permission constitutes the main difference between the two most notable standards addressing the subject worldwide: IAS 36, which allows reversals, and ASC 360, which prohibits this possibility (Rennekamp et al., 2015). The discussion about whether or not to allow reversals of this nature, in addition to emphasizing the antagonism between the two aforementioned standards, reinforces the existing trade-off between relevance and reliability, inserting in this discussion a fundamental aspect: the risk of earnings management.

Cao et al. (2018) explain there is no universal agreement on the best way to address depreciated assets estimated to have recovered part or all of their value. On the one hand, allowing reversals of impairment losses can incentivize companies to express values that are more consistent with reality for their assets, generating improvements in accounting reports (Cao et al., 2018; Reinstein & Lander, 2004). On the other hand, the possibility of making reversals also allows managers to use their judgment and the high subjectivity associated with the estimate of recoverable value to artificially increase the accounting earnings, which undermines the reliability of this same information (Jordan & Clark, 2004; Riedl, 2004).

Damasceno and Funchal (2015) emphasize that a major problem can arise from the reversibility of impairment losses since adjustments of this nature can be used to artificially change the accounting earnings, guaranteeing managers a tool to practice earnings management. Also, Deming et al. (2007) state that the recognition of impairment losses may be motivated by the opportunity for these losses to be reversed in the future when managers consider it appropriate when faced with incentives to report higher earnings.

When considering this problem, studies at the international level analyzed the relationship between reversals of losses due to devaluation and earnings management, such as the studies by Chen et al. (2009), Zhang et al. (2010), Duh et al. (2009), and Cao et al. (2018). Although adjustments of this nature are allowed in Brazil, no studies specifically investigated this relationship. Given this context and to contribute to filling this gap, this research investigated the following problem:

What is the relationship between the reversal of impairment losses and earnings management in publicly listed companies in Brazil? Therefore, this study aimed to analyze a possible association between the reversals of impairment losses evidenced by Brazilian companies and the practice of earnings management.

This research is justified because its results may constitute further empirical evidence regarding the possible association between reversals of impairment losses and earnings management in a scenario in which little research has been conducted on the subject, requiring studies with companies from other countries (Duh et al., 2009; Cao et al., 2018).

Chen et al. (2009) reinforce the need for more research on this subject, noting that, although reversals of this nature are allowed and practiced in many jurisdictions, especially those adopting the IFRS standard, empirical evidence on opportunistic behavior associated with these reversals is rare. Furthermore, the authors argue that recognizing impairment losses does not differ much between these jurisdictions. Still, the practice of reversals varies significantly and can have important implications, making research on this topic relevant in other countries.

Silva et al. (2017) argue that most research on the impairment test was conducted in developed countries, and few studies have observed this practice in emerging countries, which have more fragile monitoring and control structures. The authors conclude that few studies have investigated the application of the impairment test in Brazil, which characterizes the need for more research on the subject in the country. Given the incipience of this subject in Brazil, it is believed that this study may motivate other similar research, which will contribute to forming a consistent group of empirical evidence that can more robustly explain the phenomenon in question and, in turn, favor the production of solid knowledge about how the possibility of reversing impairment losses influences the level of quality of accounting information reported by companies.

Therefore, considering that institutional characteristics can influence the disclosure behavior of companies (Hong et al., 2018) and that the characteristics of a regulatory environment have a stronger influence on the information disclosed by companies than high-quality accounting standards determined exogenously (Ball et al., 2003; Burgstahler et al., 2006), this study with data from Brazilian companies, in addition to adding new evidence to academic discussions, may contribute to a better understanding of the practical effects generated by the possibility of reversal in Brazil. Finally, the literature has shown that the possibility of reversal increases the probability of managers recognizing impairment losses (Trottier, 2013; Tan & Trotman, 2018), which in turn can trigger the practice of earnings management (Dudycz & Praźników, 2020). Therefore, knowing the potential consequences of allowing the reversal of impairment losses in force in Brazil may also shed light on the need to monitor the practice or review the normative standard, aiming to improve the quality and reliability of the accounting information disclosed by Brazilian companies.

2 LITERATURE REVIEW AND HYPOTHESES

This section reviews the underlying literature and addresses the main arguments supporting the possible association between impairment testing and earnings management. The evidence and concepts offered theoretical support for the research hypotheses, also presented in this section.

2.1 Impairment test and Earnings management

In Accounting, both for academia and for market professionals, the term impairment refers to the loss of value suffered by assets due to economic or operational factors, and the impairment test is the accounting procedure or technique that periodically verifies the existence of the aforementioned loss. (Giannini, 2007; Uliano et al., 2014).

In this context, the relevance of the impairment test for the periodic control of the value that can be obtained through the use or sale of assets and, consequently, for the quality of accounting information is noted. On the other hand, several studies have emphasized that this procedure, due to the subjectivity intrinsic to its nature, allows managers a significant margin of discretion, which can be harmful, as it gives rise to opportunistic actions (Gox & Wagenhofer, 2009; Laskaridou & Athanasios, 2013).

Andrews (2012) argues that companies' measurement and valuation methods in determining an impairment loss are central issues for discretionary choice. The author explains that this is because managers can use the discretion that asset valuation allows to act opportunistically to maximize its own utility.

Research such as those by Avallone and Quagli (2015), Vogt *et al*. (2016), and Hong et al. (2018) indicated the high complexity of the process of estimating the recoverable value because it often requires subjective judgments about the cash flows that can be generated by the assets, highlighting that this level of subjectivity gives rise for the impairment test to be used as an alternative for earnings management.

As Schipper (1989) explains, earnings management corresponds to an intervention in financial reporting to obtain some private gain, compromising the neutral functioning of the accounting disclosure process. Authors such as Healy and Whalen (1999) and Leuz et al. (2003) classify this practice as a change in the economic performance disclosed by the management of companies to influence contractual earnings and obtain advantages that result from them, using discretionary elements that allow subjective judgments to be made about economic and operational events that affected the entity.

Martinez (2001) classifies earnings management as a harmful action, insofar as the changes made through this practice can compromise the quality of accounting information reported by companies and, as a consequence, cause serious economic implications, especially allocative inefficiencies and unjustified wealth distributions. Dias et al. (2004) reinforce the harmfulness of this practice by indicating that earnings management can compromise the clarity and transparency of financial statements, leading users of this information to construct a distorted view of the underlying economic reality of companies.

Laskaridou and Athanasios (2013) point out that earnings management is possible through the impairment test because both the net fair value of selling expenses and the value in use, from which the recoverable amount is determined, can be determined from subjective estimates of the economic potential of the assets and this makes it possible to make intentional and artificial changes in the accounting earnings. Giannini (2007) and Laili and Khairi (2014) argue that different criteria used to define recoverable value involve subjectivity, such as cash flow estimates, the calculation of present value, the selection of discount rates, and the determination of fair value, especially at level 3 hierarchy.

Another factor that can facilitate earnings management through the impairment test concerns the possibility of reversing previously recognized losses, mainly because there is no consensus on the subject, both in academia and the regulatory environment (Cao et al., 2018).

The possibility of reversal makes room for earnings management because the recognition of the impairment loss favors creating a reserve that, in the future, when reversed, positively impacts the accounting earnings for the period, an action compatible with the management technique called cookie jar reserves (Duh et al., 2009). Zhang et al. (2010) state that the permission

to perform reversals in the future when managers are faced with certain incentives to report higher earnings may motivate the previous recognition of the loss.

Some studies aimed to investigate earnings management based on the reversal of impairment losses. Their results reported different evidence in this regard, contributing to the discussion about the benefits and consequences resulting from the permission or prohibition of these reversals.

Chen et al. (2009) took advantage of the Chinese capital market characteristics to analyze the determinants and consequences associated with the reversals of impairment losses between 2003 and 2006. More specifically, the authors investigated whether the existence of performance-based listing requirements influenced the reversal of these losses. The results indicated that the companies that comprised the research sample reversed the losses due to devaluation to avoid the chances of suspension of negotiations or delisting. Also, the authors concluded that companies motivated by regulatory incentives employed the reversal of impairment losses as the main tool to manage earnings, compared to other non-recurring accruals.

Duh et al. (2009) analyzed whether Taiwanese companies used reversals of impairment losses to manage earnings. The analysis included 110 observations from 2005 to 2007. The results showed that the firms that recognized more impairment losses were more likely to reverse them to avoid declining earnings, which is consistent with the cookie jar reserve. The results also indicated that earnings management behavior was more pronounced in companies with higher indebtedness and that effective corporate governance mechanisms could mitigate it.

Zhang et al. (2010) took advantage of the ban on reversals of losses due to asset devaluation in China from 2007 onwards to investigate how companies in the country reacted to such a ban, especially in the two years leading up to it. The authors argued that Chinese regulators believed that prohibiting companies from reversing previously recognized asset devaluations would reduce the extent to which they used those reductions to alternate their earnings between accounting periods, which would result in higher-quality information. As a result of the study, the evidence indicated that companies started to recognize fewer losses due to the impossibility of reversal. Also, companies took the opportunity to make more reversals in the period before the implementation of the new rule to achieve earnings goals, an action also consistent with the jar reserve cookie.

Wu's (2011) research also examined whether reversals of impairments were used to manage earnings. The analysis included a sample of 132 reversal cases reported by 53 companies in European countries (Belgium, France, the Netherlands, and Portugal) from 2005 to 2009. Among the findings, the author reported that the companies used the reversals of impairment losses to meet or exceed the analysts' earnings forecasts and to avoid a decline in the accounting earnings compared to the previous period. On the other hand, the findings also indicated that the proportion of previously recognized losses was negatively related to reversals, and the level of indebtedness did not have a significant influence. Due to the conflicting evidence, the author concludes that the practice of earnings management could not be fully confirmed or discarded.

In turn, Cao et al. (2018) analyzed a set of Malaysian companies, whose sample consisted of 182 observations related to companies that reversed impairment losses plus another 182 companies that did not perform reversals as a control group. The results indicate that most Malaysian companies reversed their losses impartially, which rules out the earnings management hypothesis. However, the findings also demonstrate that some companies artificially used reversals to increase their earnings. Thus, the evidence produced by the study supports hypotheses associated with the idea of improving accounting information from reversals and using this practice for opportunistic actions.

2.2 Hypotheses

The earnings management technique called cookie jar reserves assumes that in periods of good profitability, managers can harm the profit calculated by recognizing losses that in the future may be reversed to improve earnings identified as below expectations (McKee, 2005; Martinez, 2006).

In the years after the recognition of the impairment loss, managers may opt for reversal when faced with incentives to report higher accounting earnings than actually achieved. This is possible because they may have access to information about this outcome before it is published. For example, Duh et al. (2009) report in their study that Taiwanese companies must submit their financial reports within four months of the end of the year so that managers can access information regarding the earnings achieved even before these reports are audited. The same occurs in Brazil, which means that managers may also know the earnings before the statements are ready for publication.

Prior knowledge about the performance achieved by the company in the period allows managers to resort to alternatives to manage the accounting earnings if it is not in line with their expectations. For example, if managers previously accessed the earnings of the period and identified that they were below their target, accounting practices could be used to increase these earnings. As a better proxy for this goal, studies such as those by Duh et al. (2009) and Cao et al. (2018) consider the earnings obtained in the previous year, especially because managers tend to avoid declines in earnings in relation to the previous period, taken as a benchmark.

Therefore, considering that the greater the loss due to the devaluation of assets recognized in previous periods, the greater the reserve that managers will have at their disposal in the future to conduct the reversal and stop a possible decline in earnings, it was defined as the first hypothesis of the research:

H1: *Ceteris paribus*, companies that recognize more impairment losses tend to reverse these losses in future periods to avoid declines in earnings.

Also, another factor that can influence the option to manage earnings is the level of indebtedness of companies. Watts and Zimmerman (1986) indicated that the most indebted companies tend to adopt accounting practices that cause an increase in profit because the higher this indebtedness, the more pressure companies will be under due to the restrictions imposed by their creditors, and the stricter these restrictions, the greater the probability of companies incurring technical insolvency costs.

In line with this idea, Sincerre et al. (2016) investigated the relationship between the level of indebtedness of Brazilian companies and current discretionary accruals, defined as a proxy for earnings management, whose evidence showed that the most indebted companies had higher earnings management rates. Costa et al. (2018) also found similar results, indicating that more indebted Brazilian companies chose to report profits with a more significant discretionary component.

Duh et al. (2009) explain that companies with debt covenants can face severe consequences if they do not reach a certain level of performance. Therefore, to avoid violating the restrictions imposed by creditors, the authors indicate managers can use the discretion allowed in accounting standards to manage the earnings obtained by companies, especially when they approach such restrictions.

Considering that the reversal of the impairment loss is an action with a strong discretionary component and allows to increase earnings, Duh et al. (2009) investigated whether the most indebted companies resort to this strategy to avoid a decline in earnings, having found evidence confirming this correlation. Therefore, the following was defined as the second hypothesis for this study:

H2: *Ceteris paribus*, companies with higher indebtedness indexes tend to reverse previously recognized impairment losses to avoid declines in future earnings.

Pay-performance contracts may also encourage the practice of earnings management. As explained by Watts and Zimmerman (1986), managers of companies that receive variable compensation or bonuses tend to use accounting methods that increase earnings for the period, thus maximizing their own return.

This is a characteristic problem of an agency conflict. According to Jensen and Meckling (1976), the agency relationship consists of a contract, implicit or explicit, involving the figure of two individuals who assume different roles: principal and agent. In this logic, the principal, which can be exemplified by a shareholder or investor, delegates to the agent, illustrated by the manager, the authority to make decisions on their behalf. However, since both parties maximize utility, there is a risk that their interests are not aligned.

From this perspective, with part of managers' compensation being pay-performance, there will be a tendency for them to resort to accounting practices that allow them to report higher earnings (Matsunaga & Park, 2001). Assuming that the reversal of impairment losses can be a mechanism to increase the accounting earnings, a third hypothesis for the study was outlined:

H3: *Ceteris paribus*, companies with pay-performance contracts are more likely to reverse previously recognized impairment losses to avoid declines in future earnings.

The methodological aspects that enabled the investigation of the relationships suggested in the hypotheses of this study will be presented below.

3 METHODOLOGY

Observing the scarcity of empirical evidence on the subject in Brazil, this research, with a descriptive character and a predominantly quantitative nature, sought to analyze the behavior of Brazilian companies listed on B3 regarding the reversal of impairment losses, especially if this practice is associated with a typical opportunistic action of earnings management.

For this, three hypotheses, initially raised in the study by Duh et al. (2009), were empirically tested. The authors themselves suggest that because their study was limited to only one country, there is a need for additional studies using data from companies in other countries.

3.1 Population and sample

The annual data on the reversals of impairment losses between 2010 and 2019 by the Brazilian companies listed on B3 were collected to compose the research sample. This time horizon is justified by the mandatory adoption of IFRS in Brazil, which occurred in 2010. Also, the analysis extends to 2019, considering that this was the last year before the COVID-19 pandemic, which may have affected the economic performance of the assets of companies operating in different segments and, consequently, have caused significant changes in the impairment assessments promoted by them.

Similar to the procedure adopted by Duh et al. (2009) and Cao et al. (2018), the data of companies that recognized impairment losses and made reversals were compared to the data of companies that also recognized impairment losses, but, during the same period, did not make reversals.

To select the control companies, the authors based their selection on the criteria of sector and size. In other words, for each company that reversed, a company from the same sector was selected and, based on total assets, of equivalent size. However, this criterion was not initially adopted in this research, as it would result in significant information loss, so 36.59% of reversal cases would be disregarded due to the absence of comparable companies.

Thus, all cases of reversal identified that refer to the period covered by the study were considered, plus all cases of companies that recognized losses, but did not perform reversals during the same period.

The data related to the impairment test were extracted from the financial statements published by the companies, especially the explanatory notes. The data collection process

identified 123 cases of reversal reported by 48 different companies. Of this total, 13 observations were excluded due to the lack of data, resulting in 110 observations of reversals. Regarding the control companies, 132 losses reported by 55 different companies were identified, which were not reversed during the analyzed period. Of these, 23 were disregarded due to the lack of data, which resulted in 109 observations. Therefore, the study sample consists of 219 year-company observations.

As in previous studies, data related to companies in the financial sector were not considered because they are highly regulated, a reality also present in Brazil, where this sector is regulated by specific rules issued by the Central Bank and has particularities in its operations, which makes it difficult to compare with companies in other sectors (Ponte et al., 2012).

3.2 Econometric model and research variables

Studies such as those by Duh et al. (2009) and Cao et al. (2018) used the total reversals of impairment losses divided by total assets as a dependent variable. Considering the nature of this variable, these studies promoted the regression analysis through the Tobit model, given its adequacy to censored data. Left censorship was considered because the dependent variable in question assumes positive values (when there are reversals) or zero (when there are no reversals) but does not assume negative values. However, in the same period, other companies recognized impairment losses.

However, the measurement system of the dependent variable makes the values assumed by it a continuously measured ratio and are restricted to the range between 0 and 1, including zero for cases in which the companies did not show reversal. For these cases, the Tobit model may not be the most appropriate since it is based on assumptions that may not be valid for data of this nature.

Kieschnick and McCullough (2003) point out that the Tobit model, when used to analyze data between 0 and 1, can be observationally equivalent to the linear normal regression model, being subject to the same criticisms. Pereira (2010) explains that regression analysis based on models with normal errors may not be appropriate for cases with limited dependent variables and whose values are between 0 and 1. Also, the author clarifies that, in general, the use of the Tobit model requires that the assumptions of normality and homoscedasticity be assumed and, in the case of data characterized as rates, ratios, or proportions, which generally assume asymmetry and heteroscedasticity, inferences based on normality can be erroneous.

The descriptive analysis of residuals and hypothesis tests such as Anderson-Darlin and Shapiro-Wilk identified non-normality, and the *LR* (likelihood ratio) test identified the presence of heteroscedasticity. In this case, we chose to use the zero-inflated beta regression model, which has wide applicability in modeling rates, ratios, and proportions and is capable of modeling the probability mass at 0 (Martínez, 2008).

For the regression analysis, the logit link function was used, and the estimation was performed through the "R" software using the *GAMLSS* package.

3.2.1 Dependent variable

The dependent variable of the research concerns the reversal of impairment losses proportional to total assets. Duh et al. (2009) recognized in their research that aggregate measures for earnings management, such as discretionary accruals, have advantages because they are more comprehensive. However, these measures cannot capture how managers take advantage of a specific accounting standard to manage earnings. For example, these authors cite the study by Moehrle (2002), who investigated whether the reversals of restructuring charges were associated with incentives to avoid declines in earnings compared to the previous year. To test the hypotheses, Moehrle (2002) used reversal by action as the dependent variable; a similar procedure was adopted

by Duh et al. (2009) and followed in this research when selecting reversal of impairment losses as the dependent variable.

3.2.2 Independent variables

Factors whose relationship with reversals of impairment losses may suggest evidence of earnings management or other possible influences were considered independent variables in this research. The independent variables are described in Table 1.

Table 1

Description of independent variables

Variable	Description	Measurement/Identification	Data source	References
ΔPRE	Pre-reversal accounting earnings variation	Accounting earnings of the current year are subtracted from the amount of the reversal minus the accounting earnings of the previous year. Earnings are divided by the total assets of the current year.	Economática®/ Accounting Statements	Moehrle (2002); Duh et al. (2009); Cao et al. (2018).
IMP	Impairment losses	Impairment loss recognized in the previous year divided by the total assets of the corresponding year.	Accounting statements/ Economática®	Chen et al. (2009); Duh et al. (2009); Cao et al. (2018).
DI	Degree of Indebtedness	Total liabilities are divided by total assets for the current year.	Economática®	Chen et al. (2009); Duh et al. (2009); Wu (2011); Costa et al. (2018).
DDI	Dummy variable for the degree of indebtedness	1 if the degree of indebtedness of the company is higher than the median of all companies in the sample and 0 otherwise.	Economática®	Duh et al. (2009).
DPPS	Dummy variable for the pay-performance sensitivity of managers	1 if the pay-performance sensitivity of managers is greater than the median of all companies in the sample, and 0 otherwise. Sensitivity is measured by the ratio between the variation in managers' compensation and the variation in accounting earnings in the same period.	Reference forms/ Economática	Lipper & Porter (1997); Duh et al. (2009).
CM	Change of manager	1 if the company changed manager in the last two years and 0 otherwise.	Reference forms	Chen et al. (2009); Riedl (2004); Cao et al (2018).
ΔREVE	Revenue variation	Percentage variation in sales for the current year compared to the previous year.	Economática®	Duh et al. (2009); Wu (2001).
MTB	*Market to book*	The ratio between market value and book net worth.	Economática®	Duh et al. (2009); Cao et al. 2018.

Source: Prepared by the authors.

In addition to the independent variables indicated in the previous table, interactions between some study variables were added to the regression analysis, considering that these interactions can more appropriately capture the effects assumed in the research hypotheses. Table

2 summarizes the set of variables used in the test of each hypothesis and identifies the interactions added to the analysis.

Table 2
Variables used in hypothesis testing

H1 Test		H2 Test		H3 Test	
Variable	Sign Expected	Variable	Sign Expected	Variable	Sign Expected
ΔPRE	-	ΔPRE	-	ΔPRE	-
IMP	+	IMP	+	IMP	+
ΔPRE*IMP	-	**ΔPRE*IMP*DDI**	-	**ΔPRE*IMP*DPPS**	-
DI	+	DPPS	+	DDI	+
CM	+	CM	+	CM	+
ΔREVE	+	ΔREVE	+	ΔREVE	+
MTB	+	MTB	+	MTB	+

Source: Prepared by the authors.

The interaction term ΔPRE*IMP was added because, although a possible positive correlation between *REV* and *IMP* indicates that companies that recognize more impairment losses report greater reversals, it is not able to capture whether companies that suffer declines in earnings opt for reversals as a means of avoiding this problem, a behavior compatible with earnings management. Therefore, including ΔPRE*IMP allows us to assess whether the companies that most recognize impairment losses choose to reverse these losses in the context of decreased accounting earnings compared to the previous year, which will be consistent with H1(Duh et al., 2009).

Likewise, to analyze a possible tendency for more indebted companies to resort to reversal of impairment losses to avoid declines in earnings (as H2 assumes), the interaction term ΔPRE*IMP*DPPS was added to the model (Duh et al., 2009).

Finally, for the H3 test, the interaction term ΔPRE*IMP*DPPS was added to the model, considering that its inclusion allows evaluating whether companies whose managers' pay is more sensitive to performance opt for reversal to avoid the decline of the accounting earnings.

4 ANALYSIS OF THE RESULTS

This section contains the description and analysis of the results obtained, including, in that order, descriptive statistics, correlation analysis from Pearson's coefficients, regression results, and additional tests.

4.1 Descriptive statistics

For the research variables, the central tendency, amplitude, and dispersion measures had their values calculated separately for each group that makes up the sample: the companies that reversed and those that did not. The measures were analyzed separately to verify possible differences between the groups. The data are shown in Table 3.

Table 3
Descriptive statistics

Variables	REV	ΔPRE	IMP	DI	ΔREVE	MTB
Group 1: companies with reversal (110 observations)						
Mean	0.014246	0.0424	0.035302	0.7573	0.0522	1.295
Minimum	0.000001	-2.6573	0.000002	0.1900	-0.8333	-7.030
Maximum	0.394076	4.7733	0.485272	3.9700	2.1641	12.160
Standard Deviation	0.0432	0.5605	0.0815	0.5818	0.289	2.284
Group 2: Companies without reversal (109 observations)						
Mean	0.0000	0.0585	0.026848	0.6972	0.0832	1.624
Minimum	0.0000	-0.1771	0.000001	0.1000	-0.8617	-6.320
Maximum	0.0000	1.5187	0.466303	4.2600	1.7573	9.960
Standard Deviation	0.0000	0.2356	0.0779	0.5464	0.3075	2.591

Source: Prepared by the authors.

The *REV* variable had a mean of 0.0142, which indicates that the reversals reported by the companies corresponded to 1.67% of the total assets reported at the end of the corresponding year. For the companies in the second group that did not make reversals, the mean and the other measures have a zero value.

In absolute terms, the variables ΔPRE, IMP, and DI had higher means for the group of companies that reversed than for those that did not reverse the impairment losses. However, a mean difference test was performed, and no statistical difference was found between the two groups. This result suggests that the variation in the pre-reversal accounting earnings, the amount of impairment losses, and the degree of indebtedness did not present significant differences between the two groups. The variables Δ*REVE* and *MTB,* in turn, presented numerically higher means for the group of companies that did not perform reversal. However, the difference of means test also did not report statistical significance.

The minimum and maximum values for non-binary variables suggest dispersion. Nonetheless, it was interpreted as an intrinsic characteristic of the data set, and because of this, it was decided not to remove any outliers from the sample. According to Draper and Smith (1998, as cited in Gujarati and Porter, 2011), rejecting discrepant data is not always an adequate procedure since this data can provide important information that other data cannot. Also, the authors point out that these data should only be rejected in circumstances such as errors in the records of observations.

4.2 Correlation analysis

To analyze the correlation between the research variables, Pearson's correlation coefficient was used, whose matrix is shown in Table 4.

Table 4
Correlation matrix

Variables	REV	ΔPRE	IMP	DI	ΔREVE	MTB
REV	1.000					
ΔPRE	0.366*	1.000				
IMP	0.478*	0.393*	1.000			
DI	0.234*	0.017	0.332*	1.000		
ΔREVE	-0.022	0.023	-0.039	0.038	1.000	
MTB	-0.247*	-0.097	-0.213*	-0.200*	0.077	1.000

Source: Prepared by the authors.

It is noted that the dependent variable *REV* showed a positive and significant correlation with the variable Δ *PRE*, which suggests that the more significant the pre-reversal earnings variation, the

greater the reversal. The *REV* variable also showed a significant correlation with the *IMP* and *DI* variables, indicating that the higher the impairment loss reported in the previous period and the level of indebtedness, the greater the reversal. The *REV* variable showed an inverse correlation with the *MTB* variable, suggesting that the higher the market to book, the lower the reversal. On the other hand, the variable Δ*REVE* did not express a significant correlation with the dependent variable. Regarding the interactions between independent variables, the correlation between *IMP* and DI stands out, which indicates a positive relationship between impairment loss and the degree of indebtedness.

In addition to demonstrating the linear relationships between the study variables, the correlation matrix can also be used to diagnose the presence of multicollinearity. Gujarati and Porter (2011) explain that if the correlation coefficient between two regressors is more significant than 0.8, multicollinearity will be a severe problem. The variables analyzed in the matrix shown in Table 4 did not present correlation coefficients higher than the reference value, suggesting the absence of multicollinearity between these regressors.

4.3 Regression results

This subsection comprises the tests of the hypotheses raised in this study, which were performed through regression analysis based on the zero-inflated beta model.

4.3.1 Hypothesis 1 test

The first hypothesis of the research assumes that, *ceteris paribus*, companies that recognize more impairment losses tend to reverse these losses in future periods to avoid declines in earnings. To test this hypothesis, it was necessary to add the interaction Δ*PRE*IMP* to the model because, in isolation, the results associated with these variables would not allow confirming or not the hypothesis in question.

However, adding Δ*PRE*IMP* can cause multicollinearity problems, considering that this interaction is formed from two variables already in the model. To verify the existence of multicollinearity, the Variance Inflation Factor (VIF) was used because, according to Gujarati and Porter (2011), if the VIF of a variable is greater than 10, this variable will be considered highly collinear.

The result of the VIF test indicated that the variable Δ*PRE* and the interaction Δ*PRE*IMP* are highly collinear (VIF = 155.65 and 177.87, respectively). Considering that this problem may compromise the estimates, it was decided to remove one of the regressors. In this case, as the Δ*PRE*IMP* interaction is fundamental for the H1 test, the Δ*PRE* variable was disregarded. After this procedure, the model for testing hypothesis 1 was estimated, according to Table 5.

Table 5
*Estimation of the model without the variable Δ*PRE* for the H1 test*

Variable	Expected sign	Coefficient	Standard error	t value	Pr (>|t|)	
Intercept	?	-4.70566	0.17662	-26.644	0.00000	***
IMP	+	7.85470	1.14683	6.849	0.00000	***
ΔPRE*IMP	-	0.30380	0.24856	1.223	0.22290	
DI	+	-0.15113	0.15344	-0.985	0.32580	
CM	+	-0.16209	0.19984	-0.811	0.41820	
ΔREVE	+	-0.39232	0.23348	-1.680	0.09440	*
MTB	+	-0.08711	0.04190	-2.079	0.03880	**

***Significance at 1% level / **Significance at 5% level / *Significance at 10% level
AIC: -625.86
SBC: -595.36

Source: Prepared by the authors.

As expected, the *IMP* variable showed a positive and significant relationship with the dependent variable *REV*, suggesting that the magnitude of impairment losses recognized by companies influenced the level of reversal they reported in subsequent periods. Chen et al. (2009), Duh et al. (2009), and Cao et al. (2018) found a similar result.

The DI variable presented a positive coefficient, as expected, but not significant, demonstrating that companies' level of indebtedness did not significantly influence the reversals of impairment losses. Chen et al. (2009) also found a positive and non-significant coefficient for this variable.

The *CM* variable presented a negative coefficient, but not significant, demonstrating that companies had changed managers previously did not significantly interfere with the reversals they conducted. Chen et al. (2009), Duh et al. (2009), and Cao et al. (2018) also found no significant relationships between this variable.

The estimated coefficient for the variable ΔREVE is negative and significant, suggesting that companies with higher revenue increases reported a lower proportion of reversals. This result differs from previous studies such as Duh et al. (2009), Chen et al. (2009), and Wu (2011). Unlike predicted, the MTB variable also presented a negative and significant coefficient. This result differs from the findings of Duh et al. (2009) and Cao et al. (2018), considering that this variable did not present significance in these studies.

A positive and significant coefficient for the variables Δ *REVE* and MTB would indicate that economic and financial factors influenced the reversals since companies with revenue growth and a higher market-to-book coefficient tend to have more valuable assets (Duh et al., 2009). As an opposite result was found, it is suggested that economic or financial factors did not influence the reversals. There is a suspicion that other factors, including those related to earnings management, may have influenced them. However, the findings related to the variables Δ REVE and *MTB* should be interpreted with caution since they only suggest that other factors may have influenced the reversals but do not provide sufficient evidence of earnings management.

As for the Δ*PRE*IMP* interaction, a negative and significant coefficient would indicate that companies that recognized higher impairment losses opted for reversals to avoid declining earnings, which would be consistent with earnings management. Still, a positive and non-significant relationship was found with *REV*, diverging from the assumption in the first hypothesis. Thus, H1 cannot be confirmed.

4.3.2 Hypothesis 2 test (H2)

The second hypothesis predicts that, *ceteris paribus*, companies with higher indebtedness indexes tend to reverse previously recognized impairment losses to avoid declines in future earnings. Following the same procedure applied to the test of the first hypothesis, the Δ*PRE*IMP*DDI* interaction was included in the model, making multicollinearity analysis necessary. The VIF test, again, showed that the variable Δ*PRE* and the interaction Δ*PRE*IMP*DDI* are highly collinear (VIF = 203.66 and 221.59, respectively), which led to the removal of the variable Δ*PRE* from the model. The estimated model for the H2 test is in Table 6.

Table 6

Estimation of the model without the variable ΔPRE for the H2 test

Variable	Expected sign	Coefficient	Standard error	t value	Pr (>|t|)	
Intercept	?	-4.85781	0.18102	-26.836	0.0000	***
IMP	+	7.11346	0.81140	8.767	0.0000	***
ΔPRE*IMP*DDI	-	0.25460	0.23405	1.088	0.2779	
DPPS	+	0.23856	0.18181	1.312	0.1909	
CM	+	-0.19867	0.19981	-0.994	0.3212	
ΔREVE	+	-0.38018	0.21564	-1.763	0.0794	*
MTB	+	-0.11481	0.04322	-2.657	0.0085	***

***Significance at 1% level / **Significance at 5% level / *Significance at 10% level
AIC: -626.61
SBC: -596.11

Source: Prepared by the authors.

The results again indicate that the *IMP* variable presented a positive and significant coefficient, as expected. However, the interaction Δ*PRE*IMP*DDI*, for which a negative and significant coefficient was expected, did not present statistical significance, which does not allow confirming H2 and differs from the result of Duh et al. (2009).

The *DPPS* variable, which measures the managers' pay-performance sensitivity, was included in the model. Although the coefficient presented the expected sign for this variable, no statistical significance was found. Therefore, it is impossible to state that the sensitivity of the compensation paid by companies to their managers for the performance they reported significantly influenced the reversals. Duh et al. (2009) also found no significance for this variable.

For the *CM, ΔREVE, and MTB* variables, results similar to those obtained in the test of the first hypothesis were found, with emphasis on the variables Δ*REVE and MTB*, which again presented results different from those expected.

Therefore, the analyses indicate that H2 also cannot be confirmed since it was impossible to verify from the results that most indebted companies reverse impairment losses to avoid declining earnings.

4.3.3 Hypothesis 3 test (H3)

The last hypothesis of the research postulated that, *ceteris paribus*, companies with pay-performance contracts are more likely to reverse previously recognized impairment losses to avoid declines in future earnings. In the previous analysis, the *DPPS* variable was included to evaluate the effect of the managers' pay-performance sensitivity on reversals, and the results indicated that this influence is not significant. However, as in previous tests, including the ΔPRE*IMP*DPPS interaction in the model is necessary to test hypothesis 3.

Thus, the VIF test was performed, and collinearity was also found between Δ*PRE* and Δ*PRE*IMP* DPPS* (VIF = 22.29 and 33.42, respectively), which is why Δ*PRE* was removed from the model. The results for the third hypothesis test are in Table 7.

Table 7

Estimation of the model without the variable ΔPRE for the H3 test

Variable	Expected sign	Coefficient	Standard error	t value	Pr (>|t|)	
Intercept	?	-4.729660	0.179648	-26.327	0.0000	***
IMP	+	6.876273	0.970633	7.084	0.0000	***
ΔPRE*IMP*DPPS	-	0.281745	0.316943	0.889	0.3750	
DDI	+	0.003456	0.190073	0.018	0.9855	
CM	+	-0.246367	0.212043	-1.162	0.2466	
ΔREVE	+	-0.347192	0.199291	-1.742	0.0829	*
MTB	+	-0.105161	0.043377	-2.424	0.0162	**

***Significance at 1% level / **Significance at 5% level / *Significance at 10% level

AIC: -623.24

SBC: -592.73

Source: Prepared by the authors.

According to the regression results, the *IMP* variable again showed an expected relationship with the dependent variable *REV*, confirming the previous results that previously recognized impairment losses positively and significantly influence reversals. The *DDI* variable, a dummy that identifies the companies with the highest indebtedness in the sample, was not significant, confirming the result obtained for the continuous variable indicating the degree of indebtedness (DI) when testing the first hypothesis. The CM, ΔREVE, and MTB variables showed results equivalent to the previous tests.

Regarding the *ΔPRE*IMP*DPPS* interaction, the results did not indicate a significant influence on the reversals, which is evidence that does not support H3. Thus, it is impossible to state that companies with managers paid per performance choose to reverse impairment losses to avoid declining earnings. The same result was found by Duh et al. (2009).

The beta regression model may generate estimates for the Sigma (Σ) and Ni (N) coefficients as additional outputs. The Sigma coefficients allow us to evaluate the influence of the explanatory variables on the homogeneity of the data related to the dependent variable. In contrast, the Ni coefficients, in the case of the zero-inflated beta model, allow us to evaluate the influence of the independent variables on the probability of occurring 0 in the dependent variable. However, in both cases, the research variables were not significant, so the estimates of these coefficients were not reported as test results.

From the above, it can be inferred that the results found corroborate the findings of previous studies conducted with international data (Trottier, 2013; Tan & Trotman, 2018) by identifying an association between the volume of reversals and the volume of recognized impairment losses, suggesting that the behavior of Brazilian companies does not differ from companies from other countries, for the researched sample. However, attention should be given to the fact that the decisions to recognize the aforementioned losses in Brazil may be potentially affected by the possibility of reversal.

4.4 Further analysis

As an additional analysis, the variable *ΔPRE*, removed from the model due to multicollinearity problems, was again included to test its influence on reversals. In this case, the interactions between the variables were removed from the models to solve the problem. In the tests of the three hypotheses, the variable was not statistically significant. The other results remained unchanged, indicating that the reversals of impairment losses were not conducted in the context of a decline in the accounting earnings.

Moreover, initially, the criterion based on the sector and size of the companies used in the studies by Duh et al. (2009) and Cao et al. (2018) was not adopted due to the restrictions that would be imposed on the sample. However, to assess whether the non-use of this criterion considerably influenced the results, it was decided to apply it, keeping in the sample only the observations of

companies that can be compared by sector and size. Thus, for each company observation that performed a reversal, a company observation belonging to the same sector and of equivalent size was added to the sample, which did not perform a reversal.

The classification provided on the B3 website was considered to define the economic sector. With regard to size, total assets were considered as a parameter, assuming a difference of up to 30% (Cao et al., 2018). Applying this criterion resulted in a subsample with 130 observations, 65 from companies with reversal and another 65 from companies that did not perform reversal.

The results, in turn, were not changed for most research variables. The *MTB* variable, which had a significant relationship, was not statistically significant at this time. On the other hand, the interaction $\Delta PRE*IMP*DDI$, which had not shown significance, started to show a significant relationship at the level of 10%, but with a positive coefficient (0.47167), unlike expected.

It is concluded, therefore, that adopting the criterion based on the sector and size of the companies did not change the results concerning the research hypotheses.

Finally, by verifying the existence of an association between the magnitude of impairment losses recognized by the companies in the sample and the level of reversal reported by them in subsequent periods, it contributes to the discussion about the quality of the accounting information of publicly-held companies since Brazilian accounting standards allow companies the possibility of reversing the recognized losses in the future, which, as evidenced in Trottier (2013), can influence the behavior of managers in recognizing the loss. It is essential to highlight that the normative standard in force in the United States does not allow future reversals of recorded impairment losses. This raises the discussion about potential informational benefits derived from the possibility of recomposing, even partially, the value of assets provided to countries adopting IFRS.

5 FINAL CONSIDERATIONS

This research aimed to investigate the possible association between reversals of impairment losses and the practice of earnings management in publicly-held companies in Brazil. The study was motivated by extensive literature addressing the subjectivity intrinsic to the estimate of the recoverable value of assets as a factor that makes this procedure conducive to earnings management, especially when the reversal of losses recognized in previous periods is allowed (Reinstein & Lander 2004; Deming et al., 2007; Chen et al., 2009; Zhang et al., 2010; Rennekamp et al., 2015; Damasceno & Funchal, 2015). Also, previous studies specifically investigating this topic in Brazil were not known.

To achieve the proposed objective, descriptive and quantitative research was conducted to test three hypotheses initially developed in the study of Duh et al. (2009). Hypothesis testing was performed using the zero-inflated beta regression to 0, which best suited the characteristics of the dependent variable.

The results, in turn, do not support the hypotheses raised, given that the companies that most recognized impairment losses reversed a more significant proportion of these losses in the future. Still, these reversals were not practiced in a context of declining accounting earnings and were not significantly influenced by the degree of indebtedness and the managers' pay-performance sensitivity.

On the other hand, the companies that most recognized reversals showed a decrease in revenue and a lower market-to-book index, suggesting that economic and financial factors linked to asset performance and market capitalization did not influence the reversals as expected.

As an additional analysis, the research hypotheses were also tested for a subsample generated from the criterion of sector and size of companies, following the same protocol defined by Duh et al. (2009) and Cao et al. (2018). However, the results indicated only changes in significance levels for some variables, so the inferences made regarding the research hypotheses remained unchanged.

Although the results of this research do not indicate the presence of earnings management through reversals of impairment losses, it is important to note that it is also not possible to rule out that this practice may have occurred due to limitations inherent to the research design. In this context, this study contributes to the literature by studying the behavior of publicly held Brazilian companies regarding the recognition of losses and reversals related to the recoverability of assets and by testing a possible explanation for the relationship between the volume of losses and reversals found.

Earnings management cannot be directly observed. Because of this, research often uses discretionary accruals as a proxy to identify this practice. Management measures based on discretionary accruals have an advantage because they are more comprehensive. However, they cannot capture how companies use a specific accrual to manage earnings (Duh et al., 2009). Thus, this research was not based on discretionary accruals because it investigated whether companies use reversals of impairment losses to manage their earnings. In other words, it was based on a specific accrual.

However, Duh et al. (2009) admit that the overall effect on the quality of financial reporting is a net consequence of applying many accounting standards and not just one. Martinez (2008) explains that management can use discretion and make choices based on other accruals, which compromises the generalization of results in studies based on specific accruals. This means, therefore, that the findings of this study do not allow us to rule out that other means were used to manage earnings, as they constitute evidence related to a specific accounting practice.

Added to this is the fact that companies that practice earnings management can resort to different strategies for this, either from different accruals or through operational decisions (Martinez & Cardoso, 2009; Huang, 2010; Wang et al., 2010).

Furthermore, the sample size can also be understood as a research limitation. Still, this restriction results from the frequency with which companies report reversals of impairment losses in Brazil, which is common in studies that address the impairment test in the country. For example, Silva et al. (2017) analyzed data from 464 companies belonging to 10 B3 sectors from 2010 to 2015 and found impairment data in 53. Amaral (2017), when collecting data for the same period (2010 to 2015), identified that of the 2005 observations of his study, 4.6% contained recognition of impairment losses.

Despite these limitations, it is expected that this research will contribute to other studies that address this theme in Brazil from different perspectives to produce a set of empirical evidence capable of explaining several aspects related to the phenomenon under study. Also, it is expected that this research will contribute to fostering discussions about how the possibility of reversing impairment losses affects the level of quality of accounting information. Countries such as the United States, whose normative accounting standard does not allow such reversal, can serve as a parameter for comparative analyses.

Notably, the scarcity of studies on this subject in Brazil prevents the results from being analyzed in light of previous evidence related to the behavior of Brazilian companies, which would allow a better understanding of the factors that potentially influence the reversals. Thus, it is understood that the results of this research should be interpreted with caution and as preliminary evidence, which is why the performance of other studies, in addition to trying to circumvent the aforementioned limitations, may produce results that dialogue with the findings of this research.

Therefore, it is suggested that future research investigate the relationship between reversals of impairment losses and discretionary accruals, considering that a possible association between these factors may provide an important indication of earnings management. Also, future research may investigate the determining factors for the reversal of impairment losses, which will allow us to understand whether these reversals are influenced by economic and financial variables or factors that may indicate incentives for the practice of earnings management.

Considering that the Covid-19 pandemic may have significantly impacted the economic performance of the assets of Brazilian companies, and this may have generated an additional need for adjustments resulting from impairment, as well as may have influenced other determinants for recognizing the loss or its reversal, it is also suggested that future research consider the data released from 2020.

REFERÊNCIAS

Abughazaleh, M. M., Al-hares, O. M., & Roberts, C. (2011). Accounting Discretion in Goodwill Impairments: UK Evidence. *Journal of International Management and Accounting*, *Dundee-Escócia, 22*(3), 165-204. https://doi.org/10.1111/j.1467-646X.2011.01049.x

Alciatore, M., Easton, P., & Spear, N. (2000). Accounting for the impairment of long-lived assets: Evidence from the petroleum industry. *Journal of Accounting and Economics, 29*, 151-172. https://doi.org/10.1016/S0165-4101(00)00018-5

Amaral, A. C. F. do. (2017). *Impairment test: um estudo sobre o reconhecimento da perda sob a influência do gerenciamento de resultados e mudança das firmas de auditoria*. [Dissertação de Mestrado, Fundação Instituto Capixaba de Pesquisas em Contabilidade, Economia e Finanças].

Andrews, R. (2012). Fair Value, earnings management and asset impairment: The impact of achange in the regulatory environment. *Procedia Economics and Finance, 2*, 16-25. https://doi.org/10.1016/S2212-5671(12)00060-3

Avallone, F., & Quagli, A. (2015). Insight into the variables used to manage the goodwill impairment test under IAS 36. *Advances in Accounting, incorporating Advances in International Accounting, 31*(1), 107-114. https://doi.org/10.1016/j.adiac.2015.03.011

Ball, R., Robin, A., & Wu, J. S. (2003). Incentives versus standards: properties of accounting income in four East Asian countries. *Journal of Accounting and Economics, 36*, 235-270. https://doi.org/10.1016/j.jacceco.2003.10.003

Burgstahler, D. C., Hail, L., & Leuz, C. (2006). The importance of reporting incentives: Earnings management in European private and public firms. *The Accounting Review, 81*(5) 983-1016. https://doi.org/10.2308/accr.2006.81.5.983

Cao, T., Shaari, H., & Donnelly, R. (2018). Impairment Reversals: unbiased reporting or earnings management? *International Journal of Accounting & Information Management, 26*(2), 245-271. https://doi.org/10.1108/IJAIM-08-2016-0084

Chen, S., Wang, Y., & Zhao, Z. (2009). Regulatory Incentives for Earnings Management through Asset Impairment reversal in China. *Journal of Accounting, Auditing and Finance, 24*(4), 589-620. https://doi.org/10.1177/0148558X0902400405

Chen, V. Y. S., Keung, E. C., & Lin, I. (2019). Disclosure of Fair Value Measurement in Goodwill Impairment Test and Audit Fees. *Journal of Contemporary Accounting & Economics, 15*(3), 100-160. https://doi.org/10.1016/j.jcae.2019.100160

Comitê de Pronunciamentos Contábeis. (2018). *CPC 01 (R1) – redução ao valor recuperável de ativos.* http://static.cpc.aatb.com.br/Documentos/27_CPC_01_R1_rev%2012.pdf

Costa, C. M., Matte, A. M., & Monte-Mor, D. S. (2018). Endividamento e decisões contábeis: a relação não linear entre dívida e qualidade dos lucros. *Revista de Contabilidade e Organizações, 12*, 1-15. http://dx.doi.org/10.11606/issn.1982-6486.rco.2018.137077

Damasceno, F. S., & Funchal, B. (2015). Valuing the Impairment Reverse Loss Effect on Firm's Debit Financing. *Anais do IX Congresso Anpcont*, Curitiba, PR, Brasil.

Deming, D., Xinshu, M., & Fan, D. (2007). A research on impairment of assets in listed firms with negative earnings in China. *Frontiers of Business Research in China, 1*(3), 351-364. https://doi.org/10.1007/s11782-007-0020-1

Devalle, A., & Rizzato, F. (2012). The quality of mandatory disclosure: the impairment of goodwill: an empirical analysis of European listed companies. *Procedia Economics and Finance, 2*, 101-108. https://doi.org/10.1016/S2212-5671(12)00069-X

Dias Filho, J. M., & Machado, L. H. B. (2004). Abordagens da pesquisa em contabilidade. In *Teoria avançada da contabilidade*. Atlas, 15-69.

Dudycz T., & Praźnikòw, J. (2020). Does the Mark-to-Model Fair Value Measure Make Assets Impairment Noisy?: A Literature Review. *Sustainability, 12*(4), 1504. https://doi.org/10.3390/su12041504

Duh, R., Lee, W., & Lin, C. (2009). Reversing an impairment loss and earnings management: The role of corporate governance. *The International Journal of Accounting, 44*(2), 113-137. https://doi.org/10.1016/j.intacc.2009.03.001

França, J. A. (2017). *Fundamentos da redução ao valor recuperável de ativos - teoria e prática*. Elevação.

Giannini, E. (2007). *Impairment of assets or impairment of financial information*. The Honors Program. Senior Capstone. Project. https://pdfs.semanticscholar.org/a236/1d47ad17879571fbfddb88fca9844c5ec591.pdf?_ga=2.20214776.1398391316.1595287556-930068665.1595287556

Gox, R. F., & Wagenhofer, A. (2009). Optimal impairment rules. *Journal of Accounting and Economics, 48*, 2-16. https://doi.org/10.1016/j.jacceco.2009.04.004

Gujarati, D., & Porter, D. C. (2011). *Econometria Básica* (5a ed.). AMGH Editora LTDA.

Healy, P. M., & Wahlen, J. M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting Horizons, 13*, 365-383. https://doi.org/10.2308/acch.1999.13.4.365

Hilton, A. S., & O'Brien, P. C. (2009). Inco Ltd.: Market Value, Fair Value, and Management Discretion. *Journal of Accounting Research, 47*(1), 179-211. https://doi.org/10.1111/j.1475-679X.2008.00314.x

Hong, P. K., Paik, D. G., & Smith, J. V. D. L. (2018). A study of long-lived asset impairment under U.S. GAAP and IFRS within the U.S. institutional environment. *Journal of*

International Accounting, Auditing and Taxation, 31, 74-89. https://doi.org/10.1016/j.intaccaudtax.2018.05.001

Huang, C. J. (2010). The joint decision to manage earnings through discretionary accruals and asset sales around insider trading: Taiwan evidence. *Journal of Economics and Finance*, *34* (3), 308-325. https://doi.org/10.1007/s12197-008-9034-6

International Accounting Standard. (2013). *IAS 36 – Impairment of assets.* http://www.iasplus.com/en/standards/ias/ias36.

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

Jordan, C., & Clark, S. J. (2004). Big Bath Earnings Management: The Case of Goodwill Impairment Under SFAS No. 142. *Journal Of Applied Business Research, 20*(2), 63-70. https://doi.org/10.19030/jabr.v20i2.2206

Kieschnick, R., & Mccullough, B. D. (2003). Regression analysis of variates observed on (0, 1): percentages, proportions and fractions. *Statistical Modelling, 3*, 193-213. https://doi.org/10.1191/1471082X03st053oa

Laili, N., & Khairi, K. F. (2014) Accounting for Assets Impairment: Creative Impairment Strategy on Discount Rate Disclosure. *Wulfenia, 21*(2), 136-159.

Lapointe-Antunes, P., Cormier, D., & Magnan, M. (2009). Value relevance and timeliness of transitional goodwill-impairment losses: Evidence from Canada. *The International Journal of Accounting, 44*(1), 56-78. https://doi.org/10.1016/j.intacc.2008.12.006

Laskaridou, E. C., & Athanasios, V. (2013). Detecting Asset Impairment Management: Some Evidence from Food and Beverage Listed Companies. *Procedia Technology, 8*, 493-497. https://doi.org/10.1016/j.protcy.2013.11.065

Leuz, C., Nanda, D., & Wysocki, P. D. (2003). Earnings management and investor protection: an international comparison. *Journal of Financial Economics, 69*(3), 505-527. https://doi.org/10.1016/S0304-405X(03)00121-1

Lipper, L., & Porter, G. (1997). Understanding CEO PayA Test of Two Pay-to-Performance Sensitivity Measures with Alternative Measures of Alignment and Influence. *Journal of Business Research, 40*, 127-138. https://doi.org/10.1016/S0148-2963(96)00283-4

Martinez, A. L. (2001). Gerenciamento dos resultados contábeis: estudo empírico das companhias abertas brasileiras. [Tese de Doutorado em Ciências Contábeis, Programa de Pós-Graduação em Ciências Contábeis, Departamento de Contabilidade e Atuaria Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo. São Paulo].

Martinez, A. L. (2006). Minimizando a variabilidade dos resultados contábeis: estudo empírico do income smoothing no Brasil. *Revista Universo Contábil, 2*(1), 09-25.

Martinez, A. L. (2008). Detectando earnings management no Brasil: estimando os accruals discricionários. *Revista de Contabilidade & Finanças, 19*(46), 7-17. https://doi.org/10.1590/S1519-70772008000100002

Martínez, R. O. (2008). Modelos de regressão beta inflacionados. [Tese de Doutorado em Estatística, Programa de pós-graduação em Estatística da Universidade de São Paulo, São Paulo].

Martinez, A. L.; Cardoso, R. L. (2009). Gerenciamento da informação contábil no brasil mediante decisões operacionais. *REAd - Revista Eletrônica de Administração*, *15*(3), 1-27.

Matsunaga, S. R., & Park, C.W. (2001). The Effect of Missing a Quarterly Earnings Benchmark on the CEO's Annual Bonus. *The Accounting Review, 76*(3), 313-332. https://doi.org/10.2308/accr.2001.76.3.313

Mckee, T. (2005). *Earnings management: an executive perspective*. Thomson.

Moehrle, S. R. (2002). Do firms use restructuring charge reversals to meet earnings targets? *The Accounting Review, 77*(2), 397-413.

Pereira, T. L. (2010). Regressão beta inflacionada: inferência e aplicações. [Tese de Doutorado em Estatística, Programa de pós-graduação em Estatística da Universidade de Pernambuco, Recife].

Ponte, V. M. R., De Luca, M. M. M., Sousa, H. V., & Cavalcante, D. S. (2012). Práticas de Divulgação do Teste de Redução ao Valor Recuperável de Ativos Pelas Companhias Abertas Listadas na BM&F Bovespa. *Revista Contabilidade Vista e Revista, 22*(4), 113-144.

Reinstein, A., & Lander, G. H. (2004). Implementing the impairment of assets requirements of SFAS No. 144: An empirical analysis. *Managerial Auditing Journal, 19*(3), 400-411. https://doi.org/10.1108/02686900410524409

Rennekamp, K. M., Rupar, K., & Seybert, N. (2015). Impaired Judgment: The Effects of Asset Impairment Reversibility and Cognitive Dissonance on Future Investment. *The Accounting Review, 90*(2), 739-759. https://doi.org/10.2308/accr-50879

Riedl, E. J. (2004). An examination of long-lived asset impairments. *The Accounting Review, 79*(3), 823-852.

Schipper, K. (1989). Commentary on earnings management. *Accounting Horizons, 3*, 91-102.

Silva, J. P., Bonfim, M. P., Niyama, J. K., & Silva, C. A. T. (2017). Impairment test e qualidade da informação contábil: a utilização do teste de recuperabilidade de ativos nas empresas brasileiras de capital aberto. *Anais do XVI Congresso Internacional de Contabilidade e Auditoria (CICA)*, Aveiro-Portugal.

Sincerre, B. P., Sampaio, J. O., Famá, R., & Santos, J. O. (2016). Emissão de Dívida e Gerenciamento de Resultados. *Revista de Contabilidade e Finanças, 27*(72), 1-15. https://doi.org/10.1590/1808-057x201601660

Sorros, J., Belesis, N., & Karagiorgos, A. (2015). The reliability of Impairment Tests: The case of Vessels. *Procedia Economics and Finance, 32*, 1787-1793. https://doi.org/10.1016/S2212-5671(15)01482-3

Tan, H. C., & Trotman, K. T. (2018). Information Processing Biases in Impairment Decisions: Effect of Reversibility of Impairment Losses and Disclosure Transparency. *Behavioral Research in Accounting, 30*(2), 77-94. https://doi.org/10.2308/bria-52042

Trottier, K. (2013). The Effect of Reversibility on a Manager's Decision to Record Asset Impairments. *Account Perspect*, 12, 1-22. https://doi.org/10.1111/1911-3838.12005

Uliano, A. L. P., Doná, A. L., & Gonçalves, M. N. (2014). Disclusore da perda por impairment aplicado ao ativo imobilizado: análise nas companhias do IBrX-50. *Enfoque: Reflexão Contábil*, *33*(1), 1-18. https://doi.org/10.4025/enfoque.v33i1.21557

Vanza, S., Wells, P., & Wright, A. (2018). Do asset impairments and the associated disclosures resolve uncertainty about future returns and reduce information asymmetry? *Journal of Contemporary Accounting & Economics, 14*(1), 22-40. https://doi.org/10.1016/j.jcae.2018.02.003

Vogt, M., Pletsch, C. S., Morás, V. R., & Klann, R. C. (2016). Determinantes do Reconhecimento das Perdas por Impairment do Goodwill. *Revista de Contabilidade e Finanças, 27*(72), 349-362. https://doi.org/10.1590/1808-057x201602010

Wang, C., Tung, S., Chen-Chang, L., Lan-Fen, W., & Ching-Hui, L. (2010). Earnings management using asset sales: Interesting issues for further study under unique institutional settings. *International Journal of Accounting & Information Management, 18*(3), 237-251. https://doi.org/10.1108/18347641011068983

Watts, R. L., & Zimmerman, J. L. (1986). *Positive accounting theory.* Prentice-Hall.

Wu, Y. (2011). Are asset impairment reversals under IAS 36 being used as an earnings management tool?. [Master thesis Department Accountancy, Faculty of Economics and Business Studies, Tilburg University].

Zhang, R., Lu, Z., & Ye, K. (2010). How do firms react to the prohibition of long-lived asset impairment reversals? Evidence from China. *Journal of Accounting and Public Policy, 29*(5), 424-438. https://doi.org/10.1016/j.jaccpubpol.2010.09.010

CONTRIBUIÇÕES DOS AUTORES

Roles	1st author	2nd author	3nd author
Conceptualization	♦	♦	♦
Data curation	♦		
Formal analysis	♦		
Funding acquisition	Does not have		
Investigation	♦		
Methodology	♦	♦	
Project administration	♦	♦	

Resources	♦		
Software	♦		
Supervision		♦	
Validation	♦	♦	♦
Visualization	♦		
Writing – original draft	♦	♦	
Writing – review & editing	♦	♦	♦

CONFLICT OF INTEREST

The authors assert that there is no conflict of interest related to this submitted work.