

Real earnings management: an alternative to avoid reporting losses

Gerenciamento por decisões operacionais: alternativa para evitar reportar prejuízos

Gestión de resultados reales: una alternativa para evitar reportar pérdidas

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Abstract

The aim of this work was to verify whether Brazilian companies listed in Brazil, Bolsa and Balcão [B]³ used real earnings management to avoid report losses. The sample consists in 157 Brazilian publicly trading companies, totaling 1570 observations from 2008 to 2017. The Roychowdhury model (2006) was used to measure earnings management. For data analysis, multiple linear regression models were used. As for the results, evidence showed that earnings management based on operational decisions was confirmed in companies that presented a profit margin between 0 and 1%.

Keywords: Earnings management; Operational decisions; Report losses

Resumo

O objetivo desse trabalho foi verificar se as empresas brasileiras listadas na Brasil, Bolsa, Balcão [B]³ utilizaram-se do gerenciamento de resultados por atividades reais para evitar reportar prejuízos. A amostra é composta por 157 empresas brasileiras de capital aberto, somando 1570 observações no período de 2008 a 2017. Utilizou-se o modelo de Roychowdhury (2006) para mensurar o gerenciamento de resultados. Para a análise dos dados, utilizaram-se os modelos de regressão linear múltipla. Quanto aos resultados, evidenciou-se que o gerenciamento de resultado baseado em decisões operacionais foi confirmado nas empresas que apresentaram margem de lucro entre 0 e 1%.

Palavras-chave: Gerenciamento de resultados; Decisões operacionais; Reportar prejuízos

Resumen

El objetivo de este trabajo fue verificar si las empresas brasileñas que cotizan en Brasil, Bolsa y Balcão [B]³ utilizaban la gestión de resultados reales para evitar pérdidas en el informe. La muestra de 157 empresas brasileñas que cotizan en bolsa, con un total de 1570 observaciones de 2008 a 2017. Para medir la gestión de resultados se utilizó el modelo de Roychowdhury (2006). Para el análisis de datos se utilizaron modelos de regresión lineal múltiple. En cuanto a los resultados, la evidencia mostró que la gestión de resultados basada en decisiones operativas se confirmó en empresas que presentaron un margen de utilidad entre 0 y 1%.

Palabras clave: Gestión de resultados; Decisiones operativas; Informar pérdidas

1 Introduction

Earnings management is one of the topics of interest in accounting research, and such interest is easily explained as a cause of concern among regulators, shareholders, and the media regarding the functioning of the capital market and the quality of the results disclosed by the entities (Barton, 2001).

As managers are concerned with improving current performance indicators, they have incentives to inflate their current profits (Kim & Sohn, 2013). Some of these incentives are meeting analysts' and investors' forecasts (Scott, 2012) as well as keeping stable and predictable profits (Martinez, 2013). However, the practice of earnings management may have other objectives, such as reducing the variability of profits due to external factors, such as economic instability. Therefore, profit can come from earnings management actions that distort this measure of performance.

Research involving earnings management commonly focuses on profits given the importance of this variable in the market (Rodrigues, Melo, & Paulo, 2019). Managers consider profit the central metric to be considered by outsiders (Graham, Harvey, & Rajgopal, 2005). In this sense, Dichev, Graham, Harvey and Rajgopal (2013) found that the main importance of profit, in the view of managers, refers to the possibility of investors evaluating the company, and the two most significant benchmarks are the profits quarterly, in relation to the same period of the previous year, and the profit estimates of the analysts. In addition, meeting or exceeding the benchmarks is relevant, as executives believe that achieving them generates credibility in the market (Graham et al., 2005). Following this reasoning, they are willing to practice earnings management and sacrifice the future performance of their companies in order to meet the financial reporting goals of the current period (Rodrigues et al., 2019).

In general, managers positively misrepresent the company's financial information in the hope of distorting the market valuation and signaling positive value, thus influencing the perception of external users about the financial and economic conditions of the company (Kothari, Mizik, & Roychowdhury, 2016). Therefore, the accounting reports of companies have information that may undergo adjustments by managers (Sincerre, Sampaio, Famá, & Santos, 2016).

Research that addresses earnings management indicates that managers have discretionary power over resources in addition to incentives to disclose profit, i.e., discretion and incentives are intertwined in the daily lives of companies (Han, Rezaee, & Tuo, 2019). Zang (2012) noted that earnings management is initially done by activities operating (real) and, subsequently, if necessary, for accruals.

According to Roychowdhury (2006), proxies used to verify the real earnings management are administrative and production levels. National studies (Reis, Cunha & Ribeiro, 2014; Reis, Lamounier, & Bressan, 2015; Rodrigues; Paulo & Melo, 2017) did not check the use of all these proxies for Brazilian companies in the practice of this type of management.

Cohen, Dey and Lys (2008) consider it likely that companies that manage profits up through operating activities will have an exceptionally low cash flow combination of operations, and/or low discretionary expenses and/or exceptionally high production costs.

Rodrigues et al. (2017) and Dal Magro, Lavarda and Klann (2019) highlight that studies have not emphasized the real earnings management, with the need to increase the number of research on this aspect. Therefore, this study aims to fill part of this gap. In this context, the problem question that guides this research is: when companies are prone to show negative results in the period, do they make use of results management by operational activities?

Thus, the objective is to verify whether the Brazilian companies listed in Brazil, Bolsa, Balção [B]³ avoided reporting losses based on real earnings management. Specifically, the purpose of the study is to verify whether companies employ the three proxies of real earnings management.

Then, the present work is justified since the practice of earnings management by operational decisions compromises the reliability of the financial statements and ends up interfering decision-making of the stakeholders (Man & Wong, 2013). This study brings a practical contribution by pointing out the behavior of organizations on the immense of possible losses and, therefore, to the decision-making of users of accounting information. Regarding the theoretical contribution, this work is essential when analyzing whether the forms of real earnings management were all employed.

2 Theoretical Framework

Accounting aims to support users' decision-making by seeking to provide reliable accounting information (Paredes & Wheatley, 2017). However, managers have discretion in the judgment of accounting facts, and may change the financial statements (Kothari et al., 2016). Dal Magro et al. (2019) highlight that the Agency Theory has been used to guide most studies on earnings management, presenting two explanations: the opportunistic behavior of managers which aim at not revealing relevant accounting information to stakeholders and the reporting of accounting information used in communication between the parties.

Figure 1 summarizes the main aspects of earnings management. According to Lo (2008), the following questions can be raised on the theme: who does, why they do, how they do, earnings management modalities and who the "victims" are.

Based on Figure 1, it can be stated that earnings management refers to the decisions that managers make to employ accounting methods or to direct operational activities, in order to affect profits with the intention of achieving specific objectives in terms of the results presented in the financial statements (Cupertino; Martinez, & Costa Jr., 2017). Empirical evidence suggests that managers tend to manage earnings for personal benefit targeting their external reputation (Graham et al., 2005).

Managers use discretion in financial reporting and transactions to mislead stakeholders in the company's underlying economic performance or influence contractual results that depend on reported accounting numbers (Healy & Wahlen, 1999). Seen in this way, managers are manipulating something that harms another user of the information, because it affects the quality of profit (Cupertino et al., 2017). In this logic, the financial statements are neither transparent nor reliable (Scott, 2012). Thus, reported profits that are relevant to investor decisions may not be helpful in predicting the company's future performance (Francis, Lafond, Olsson, & Schipper, 2005).

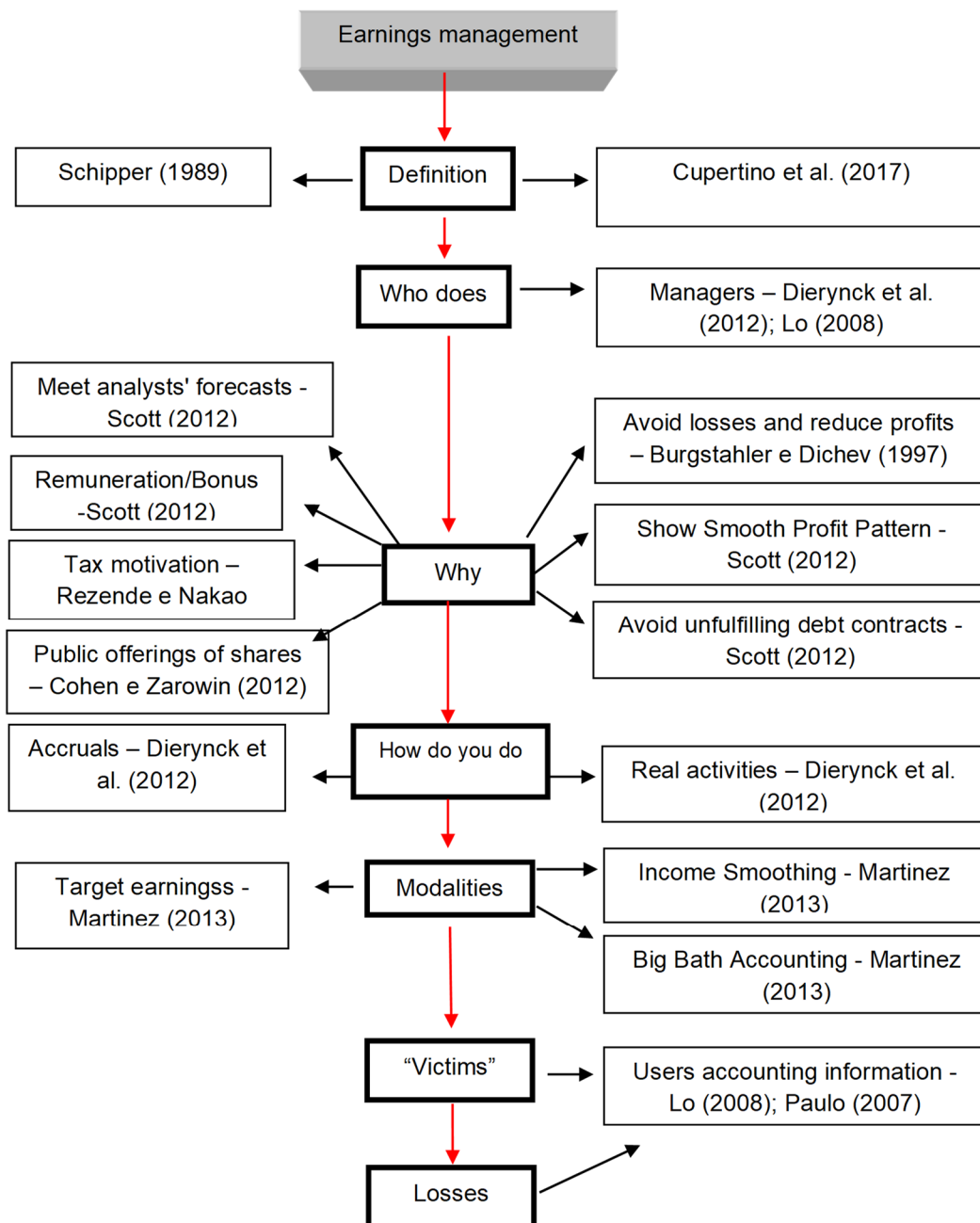


Figure 1: Main points related to earnings management

Source: Own authors.

This can lead to problems in the interpretation of financial reports, if the user does not know how to identify the effect of earnings management in the financial statements, because his analysis may be mistaken due to possible adjustments made by managers (Sincerre et al., 2016). Earnings management is attributed to managers, and may not be caused only by opportunistic management practices, and it is relevant to consider common practices in relation to organizational resources (Dierynck, Landsman, & Renders, 2012; Lo, 2008).

Evidence shows that companies manage results to avoid reporting losses or reduce profit (Burgstahler & Dichev, 1997), show a mild pattern of earnings, meet analysts' profit forecasts, or to avoid defaulting on debt contracts (Scott, 2012). For Healy and Wahlen (1999) the motivations for managing relate to capital markets, contractual relations or regulations and political costs. Martinez (2013) cites the possibilities of softening the reported results, meeting the expectations of analysts, maintaining the trend or dodging disclosing losses

incurred in the period. Cohen and Zarowin (2010) found evidence that earnings management occurs by U.S. companies, close to the period of public offerings of shares.

Managers' interest in earnings management stems in part from the fact that the result is used for a variety of purposes (contractual obligations, asset valuation, bonus plans and executive compensation) and as the financial statements summarize the relevant information of the company's performance, the profit presented is of paramount importance (Dani, Dal Magro & Klann, 2017).

The literature identifies two main strategies to manage the reported gains: (1) based on accruals (AEM), which have no direct effect on operational activities and cash flows and (2) real activities, which affect cash flows (Dierynck et al., 2012).

In earnings management based on accruals, managers intervene in the financial reporting process, exercising discretion and judgment in relation to estimates and accounting standards (Kothari et al., 2016). This earnings management typically occurs at the end of an accounting period, after the completion of most actual operating activities (Kim & Sohn, 2013; Zang, 2012).

The possibilities for selecting alternatives to measure assets according to the standards generate accruals (Silva & Fonseca, 2015). Defond and Jiambalvo (1994) define them as the difference between net income and operating cash flow. Therefore, accruals are the income accounts that entered the calculation of profit, but that did not result in changes in cash flow (Martinez, 2008). The use of judgments allows managers to have accounting choices, called discretionary, which do not adequately reflect the economic and financial reality of the company (Healy & Wahlen, 1999). It is noteworthy that non-discretion are the natural accounting entries of the business (Martinez, 2008).

The manipulation of real activities, on the other hand, entails deviations from normal operations with the intention of presenting the financial performance reported as resulting from the normal course of operations (Roychowdhury, 2006). Similar to accruals, real operations can be used to hide bad news about performance and prospects (Francis, Hasan & Li, 2016).

Regarding through real earnings management, there are different possibilities that can be used for companies to avoid announcing losses of the period: (1) sales manipulation, increasing sales through price discounts and/or more favorable credit conditions; (2) reduction of discretionary expenses (sales and administrative expenses, advertising, research and development); (3) choice of times to make investments and the opportune period of recognizing values arising from disposal of assets; (4) overproduction, when the company produces more than necessary, reducing the cost of sales, in order to obtain better operating margins (Gunny, 2010; Reis et al., 2014; Roychowdhury, 2006).

Empirical evidence holds that while normal expected levels of actual activity are associated with rational operational decisions, abnormal levels are associated with suboptimal decisions based on managerial opportunism to increase profits (Kim; Sohn, 2013). Considering real earnings management, there is concern that companies that move from normal business practices may have a negative impact on cash flows and future performance (Paredes & Wheatley, 2017).

Studies on earnings management have been mainly targeted at accruals models, but there is a tendency to apply the real activity model (Vladu & Cuzdriorean, 2014). Cohen, Dey and Lys (2008) examined the impact of the passage of the Law Sarbanes Oxley (SOX) in the preference of managers for earnings management of accruals or real activities. The authors document that companies were heavily involved in AEM in the pre-SOX period, but that this involvement decreased significantly after moving to SOX. Zang (2012) argues that changes in the accuracy of accounting standards due to SOX do not necessarily imply a reduction in earnings management, but only a change in the method used.

Dal Magro et al. (2019) found that most studies are focused on the earnings management by accruals and that the use of real activities as a form of earnings management is incipient. In turn, Cupertino et al. (2017) noted that the level of manipulation by accruals decreased after the adoption of international accounting standards (IFRS) in Brazil, whereas real activities have increased. They also highlight that, in the Brazilian scenario little is known about each of these two strategies of manipulation.

At first, there is a trade-off between earnings management by accruals and real activities (Cohen & Zarowin, 2010; Paulo & Mota, 2019). Zang (2012) showed that managers use real activity handling and earnings management based on accruals as substitutes. This can be explained in part because the cost of earnings management differs between these methods, and real earnings management is considered more costly because it destroys cash flow (Roychowdhury, 2006).

However, empirical evidence seems inconsistent with the higher cost of real earnings management, as managers are more willing to engage in this management category than in the earnings management of accruals (Graham et al., 2005). In particular, the results of the research by Graham et al. (2005) show that managers are willing to spend the cash resources and make economic sacrifices to achieve profit goals. Possible explanations refer to the fact that relying only on manipulation by accruals is risky and the ability to detect management through activities normally is more difficult (Cohen & Zarowin, 2010; Kothari et al., 2016), in addition to being less subject to external monitoring and auditing (Cohen et al., 2008; Kim & Sohn, 2013). This is due to the fact that accruals are subject to verification by the auditors who have accounting standards as a reference (Cohen & Zarowin, 2010). Cupertino et al. (2017) consider it reasonable to assume that a combination of accruals and real earnings management will be used to manipulate the results. Zang (2012)

noted that the profit adjustment is made initially by operational activities and, subsequently, if necessary, for example accruals.

Based on earnings management by accruals and/or real activities, managers can manage profit according to your goals. The earnings management modalities, results as the manager's interest are highlighted by Martinez (2001): Target Earnings, Income Smoothing and Big Bath Accounting. The mode Target Earnings has the objective of increasing (used in the remuneration of directors, covenants indebtedness) or decreasing (to reduce the tax burden) the accounting results in order to achieve specific goals. In the modality Income Smoothing management takes place to reduce the variability of accounting profits in certain periods for the purpose of ensuring that they remain stable and do not have excessive oscillation, i.e. the smoothing. It aims at showing less risk to the investor. As for the mode Big Bath Accounting, this is intended to reduce current profit to increase the probability of good future profits when modifying the administrative summit, that is, companies seek to worsen their current results to achieve better results in the future.

Paulo (2007) highlights losses from earnings management to some actors interested in financial statements, such as: (i) Investors: do not have reliable information to assist them in the investment decision, and may have a portion of their wealth expropriated by managers; (ii) Financial analysts: present investment recommendations to their clients inefficiently due to incorrect estimation of results; (iii) Credit institutions: do not have the true perception of the risks inserted in their negotiations; (iv) market regulators: they see such a practice impairing the proper functioning of the market; (v) Entities: may be harmed by such behavior since it would be used as a form of tax evasion; (vi) Trade unions: information about the economic and financial situation of the company is not reliable, making labor negotiations difficult.

Kothari et al. (2016) suggest that investors' ability to detect earnings management and assess its consequences for future performance is impaired when actual activities are based on earnings management. Outsiders have limited capacity to distinguish opportunistic operational decisions from legitimate decisions made in good faith, and this informational asymmetry provides managers with opportunities to hide negative news (Francis et al., 2016).

Given this scenario, studies have been conducted on the subject. Roychowdhury (2006) investigated the use of real earnings management and found evidence of the use of the strategy to avoid reporting incurred losses. The results indicated lower levels of operating cash flow and discretionary expenses, and higher levels of production cost.

Gunny (2010) found that managers made use of real earnings management and that the manipulation of these activities affects subsequent performance. In this sense, Cohen and Zarowin (2010) examined ways of earnings management (accruals and real activities) close to secondary stock offerings. The authors concluded that managers use both strategies, and that the decline in performance subsequently takes place through operational decisions. Added to this is the finding that Cupertino, Martinez and Costa Jr. (2016) that there is a negative relationship between the management of results by operational decisions and the future profitability of Brazilian companies.

Zang (2012) demonstrated that companies use both forms of earnings management as substitutes, according to the costs attributed to each. In this logic, Cupertino et al. (2017) found that in Brazilian companies the adoption of strategies depends on the relative cost of each of them and that real earnings management precedes that of accruals, and has increased after the adoption of international accounting standards.

Reis, Cunha and Ribeiro (2014) verified whether the companies that make up the Brazil Index (IBrX) manage results based on operational decisions. The authors pointed out that companies did not use sales volume and production levels to increase or reduce accounting results. On the other hand, the study of Reis et al. (2015) showed that Brazilian companies listed in [B]³ used sales, general and administrative expenses to avoid reporting losses. Rodrigues et al. (2017) also found that Brazilian companies with above average market values, have higher levels of sales manipulation and decrease in sales, general and administrative expenses.

Roychowdhury (2006), Gunny (2010) and Reis et al. (2015) show that companies with a positive but close to zero profit margin incur in earnings management through operational decisions. Thus, the following hypothesis is inferred:

H₁: The companies that presented profit margins between 0 and 1% used earnings management through operational activities.

To verify the hypothesis presented, the information obtained from the financial statements served as proxies as described in the methodological procedures.

3 Methodological Procedures

The population corresponded to all the active companies listed in [B]³ from 2008 to 2017. The choice of this period is due to the fact that information related to operating cash flow was required in the Cash Flow Statement, which was instated by law from 2008 on. (Reis et al., 2015). The year 2017 refers to the latest data available at Economática® at the time of collection. The information collected was consolidated, adjusted by

the inflation index of the database itself - Broad Consumer Price Index (IPCA) and measured in millions of reais, with annual data referring to December of each year.

Companies belonging to the Finance and Insurance sector were excluded from the Economática® classification because they operate in highly regulated sectors with specific accounting rules that differ from other sectors, leading to differences in the interpretation of financial reports (Cupertino et al., 2017; Gunny, 2010; Johnson, 2016; Zang, 2012).

To alleviate the problem of missing data, companies that did not have revenue information in at least five periods were excluded, for example, companies with recent stock market trading. As information regarding the variation of net revenue in $t-2$ in the real earnings management model is necessary, the companies needed to make the data available, at least, in three consecutive years. Thus, companies that had missing data, in one or two periods only, had these values obtained via data imputation, through the average of the three subsequent periods.

According to Banker, Byzalov and Plehn-Dujowich (2014), companies that had a net revenue variation of 50% or more between the period of one fiscal year and the subsequent one were excluded from the sample, since they can mean productive restructurings or even mergers, acquisitions and other special operations. Also excluded were two companies that presented missing data for revenues. Finally, the sample comprised 157 companies, totaling 1570 observations.

Initially, to define the companies suspected of real earnings management, the frequency distribution methodology according to Gunny (2010) and Zang (2012) was used. In order to do so, we used the profit margin (net profit for the period divided by total assets for the period), dividing it into percentile, being considered suspicious of managing the accounting result the companies that presented positive profit margin between 0 and 1% in each period, since companies can manage the results in one year and in another not (Reis et al., 2015). Moreover, according to Burgstahler and Dichev (1997), firms avoid announcing small losses, as these may represent a sign of poor performance and prefer to report small profits.

According to Reis et al. (2015) companies with a positive profit margin but close to zero may have managed their profits because zero refers to the benchmark. Graham et al. (2005) point out that managers are willing to meet this benchmark since the disclosure of losses may indicate poor management, generating doubts about the future prospects of the company. Thus, a conservative attitude is adopted in the use of the term REM (real earnings management) throughout this work: it refers only to suspicious firms that report positive profits that are close to zero, that is, avoid disclosing losses incurred in the period (Francis et al., 2016).

The real earnings management model used to detect manipulation was implemented by Roychowdhury (2006) and applied in the studies of Cohen et al. (2008), Cohen and Zarowin (2010), Cupertino et al. (2017) and Zang (2012). This model is based on three metrics: operations cash flow (FCO), production level (PROD) and discretionary expenditures (DD), according to equations 1, 2 and 3, respectively.

$$\frac{FCO_{it}}{A_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{RL_{it}}{A_{i,t-1}} + \beta_3 \frac{\Delta RL_{it}}{A_{i,t-1}} + \varepsilon_{i,t}, \quad (1)$$

$$\frac{PROD_{it}}{A_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{RL_{it}}{A_{i,t-1}} + \beta_3 \frac{\Delta RL_{it}}{A_{i,t-1}} + \beta_4 \frac{\Delta RL_{it-1}}{A_{i,t-1}} + \varepsilon_{i,t}, \quad (2)$$

$$\frac{DD_{it}}{A_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{RL_{it-1}}{A_{i,t-1}} + \varepsilon_{i,t}, \quad (3)$$

In which:

FCO_{it} : Operational cash flow of company i in period t ; $PROD_{it}$: Cost of goods sold + change in inventories of company i in period t ; DD_{it} : Sales, general and administrative expenses of company i in period t ; $A_{i,t-1}$: Total assets of company i in period $t-1$; RL_{it} : Net revenue of company i in period t ; ΔRL_{it} : Variation in net revenue of company i in period t relative to $t-1$; ΔRL_{it-1} : Variation in net revenue of company i in period $t-1$ relative to $t-2$; ε_{it} : Represents the error.

The variables of models 1, 2 and 3 are standardized by total assets as a way to alleviate heteroscedasticity problems inherent in the estimation with panel data, and the inclusion of the standardized intercept allows the independent variable to be distinguished from zero even when there are no sales for period t or $t-1$ (Roychowdhury, 2006). These models estimate the "normal" level of real activities and, as a result, the regression residues represent the "abnormal" level, i.e., proxies for variables to real earnings management (Francis et al., 2016).

The normal FCO level (equation 1) is a linear function of sales revenues and the variation in sales revenues. This model detects sales manipulation through price discounts or offering more favorable credit conditions, temporarily generating higher cash flows that are diminished when normal operations activity is re-established (Francis et al., 2016). Thus, it is expected that β_2 and β_3 have positive values, because the more the company increases its revenue, its FCO should increase, however, if the β_3 is significant and negative this will indicate suspicions of earnings management through sales manipulation.

The second proxy used to identify real earnings management is the production level (equation 2), which can be applied to any sector (Martinez & Cardoso, 2009). It is expected that all the coefficients of this model will be positive, since it is assumed that sales and production levels will increase proportionally (Almeida-Santos, Verhagem & Bezerra, 2011). The analysis by production costs instead of costs of products sold avoids the influence of accruals management (Cupertino et al., 2017; Gunny, 2010). Paredes and Wheatley (2017) show that overproduction associated with a reduction in sales is an indication of earnings management.

The proxy for the earnings management of discretionary expenditures (equation 3) for the current fiscal year is a function of the current level of sales, and the residue of the regression reflects the magnitude of the manipulation obtained, cutting sales, general and administrative expenses. Therefore, it is expected that the coefficient β_2 have a positive sign, because the more the company sells its products, the greater are the values of the expenses with sales.

According to Ge and Kim (2014), Reis et al. (2015) and Rodrigues et al. (2017), the residues from equations 1, 2 and 3 were used as dependent variables in models 4, 5 and 6 that estimate the abnormal levels called AFCO, APROD and ADD.

$$AFCO_{it} = y_0 + y_1 D_{it} + y_2 TAM_{it} + y_3 MTB_{it} + y_4 ROA_{it} + \varepsilon_{i,t} \quad (4)$$

$$APROD_{it} = y_0 + y_1 D_{it} + y_2 TAM_{it} + y_3 MTB_{it} + y_4 ROA_{it} + \varepsilon_{i,t} \quad (5)$$

$$ADD_{it} = y_0 + y_1 D_{it} + y_2 TAM_{it} + y_3 MTB_{it} + y_4 ROA_{it} + \varepsilon_{i,t} \quad (6)$$

$$REM_{it} = y_0 + y_1 D_{it} + y_2 TAM_{it} + y_3 MTB_{it} + y_4 ROA_{it} + \varepsilon_{i,t} \quad (7)$$

In which:

$AFCO_{it}$: Abnormal FCO level of company i in period t ; $APROD_{it}$: Abnormal PROD level of company i in period t ; ADD_{it} : Abnormal DD level of company i in period t ; REM_{it} : Aggregate measure (equation 9) of company i in period t ; D_{it} : Dummy variable that assumes value 1 for companies that presented profit margin between zero and 1% and 0, otherwise, of company i in period t ; TAM_{it} : Natural logarithm of the total assets of company i in period t ; MTB_{it} : The market value of the capital divided by the net worth of company i in period t ; ROA_{it} : Net profit divided by the total assets of company i in period t ; ε_{it} : Represents the error.

According to Gunny (2010) and Zang (2012), for suspect companies a low cash flow is expected due to discounts on the prices of products sold. The coefficient y_1 of equation 4 verifies if the companies increased the sales volume, presenting lower cash flow. If the coefficient y_1 is significant and negative, the suspicion is confirmed and companies use earnings management in sales through discounts on prices.

Gunny (2010) points out that abnormally high production costs for a certain sales level are indicative of sales manipulation. To check whether suspicious companies have increased the production level in order to manage the result, it is expected that the coefficient y_1 of equation 5 be significant and positive.

For Gunny (2010) and Zang (2012), companies that use earnings management to increase their reporting numbers are likely to use low discretionary spending. When checked for suspect companies, the coefficient is expected to y_1 . Equation 6 is significant and negative, that is, that these companies present, in an abnormal way, lower sales, general and administrative expenses.

Given sales levels, companies managing profits are likely to have: exceptionally low cash flow from operations and/or low discretionary spending and/or exceptionally high production costs (Cohen et al., 2008). According to Ge and Kim (2014), to capture the effects of managing the results of these three activities in a comprehensive measure, a global earnings management (REM) proxy was built adding the three abnormal proxies (AFCO, APROD and ADD) according to equation 8 (Cohen & Zarowin, 2010; Cupertino et al., 2017; Ge & Kim, 2014; Zang, 2012). As the total assets standardize all these measures for the previous financial period, they can be added together and the result compared between companies of different sizes (Cupertino et al., 2017).

$$REM_{it} = (APROD) + ((AFCO + ADD) * (-1)) \quad (8)$$

In which:

REM_{it} : Management of results by real activities of company i in period t ; $APROD_{it}$: Abnormal level of PROD of company i in period t ; $AFCO_{it}$: Abnormal level of FCO of company i in period t ; ADD_{it} : Abnormal level of DD of company i in period t .

The results of equations 4 and 6 have been multiplied by -1, so that higher values indicate a greater possibility of making real decisions to increase gains (Cohen & Zarowin, 2010; Zang, 2012). Equation 5 was not multiplied by -1, as higher production costs are indicative of overproduction and a high degree of earnings management (Cupertino et al., 2016; Zang, 2012). Thus, it's expected that the coefficient y_1 equation 7 is

significant and negative, that is, companies suspected of managing the accounting result incurred in the real earnings management in an abnormal way.

The control variables are shown in Table 1. Larger companies have a number of corporate characteristics that differentiate them from smaller ones, for example, a more diversified range of products, extensive use of capital markets for financing and greater visibility. These last two aspects are of particular importance for the quantity and quality of the information disclosed due to the interaction with different stakeholders. In this sense, large companies have a high scale of operation, which provides opportunities and incentives for managers to deviate from the objectives of the main one, i.e. large companies may have greater agency conflicts (Scott, 2012).

Table 1:
Control variables

Variable	Description	Formula	Authors
TAM _{it} – size	Proxy of company size <i>i</i> in period <i>t</i> .	Total Active LN.	Cupertino et al. (2017), Gunny (2010), Reis et al. (2015), Roychowdhury (2006), Sincerre et al. (2016).
ROA _{it} - Return on Assets	Proxy on company return investment <i>i</i> in period <i>t</i> .	Net Profit/Total Assets.	Cupertino et al. (2017), Gunny (2010), Reis et al. (2015), Sincerre et al. (2016), Zang (2012).
MTB _{it} – Market to Book	Proxy of company growth rate <i>i</i> in period <i>t</i> .	Value of Shares/ Net Worth per share.	Cupertino et al. (2017), Reis et al. (2015), Roychowdhury (2006), Zang (2012).

Source: Elaborated by the authors.

The proxy used to record the effect of company performance was the return on assets (ROA), because through earnings management it is possible to increase or decrease accounting profit and a low ROA indicates poor performance and agency problems (Paulo & Mota, 2019). The market-to-book variable is linked to the capital market and the perspectives that the shareholders have in relation to the company. Skinner and Sloan (2002) document that companies with growth opportunities are more penalized by the stock market when they lose profit limits. Thus, companies with growth are also likely to experience pressure to earnings management (Roychowdhury, 2006). In this sense, Rodrigues et al. (2017) found that companies with above average market value, measured by the market-to-book index, have higher levels of sales manipulation.

Since panel data is used to estimate management proxies, it is necessary to determine the best specification of constant (pooled), fixed and random effects models. Bressan, Braga, Bressan and Resende-Filho (2012) highlight the procedures: first estimate the constant (pooled) and fixed effects models to test, via Chow test (F test), the null hypothesis that the constant model is preferable to fixed effects.

In the second step, the model with random effects is estimated, and by using the Breusch-Pagan test (Lagrange multiplier test), the null hypothesis is tested to assess which pooled model is preferable to the model with random effects.

The third step consists in testing, by Hausman's test, for which the null hypothesis, the random effects estimator, once it is consistent and efficient, is preferable to the model estimator with fixed effects that is only consistent.

After choosing the most suitable model, the fourth step is performed, which consists in testing the autocorrelation of errors via Wooldridge test and testing heteroscedasticity by Wald and Breusch-Pagan test. In the case of evidence of autocorrelation and heteroscedasticity, the regression is estimated by robust means for the correction.

4 Results and Discussion

Table 2 summarizes the models used and the autocorrelation, heteroscedasticity and multicollinearity tests for each equation. It is noticeable that there was no heteroscedasticity only in equation 4. In all other models there was autocorrelation and heteroscedasticity, being employed the correction by robust means. Multicollinearity occurs when explanatory variables measure the same thing and values of the statistic variance inflation factor (VIF) above 10 indicate perfect multicollinearity (Gujarati & Porter, 2011). None of the equations in Table 2 presented substantial multicollinearity (VIF between 1.01 and 2.24).

For the normal levels of real earnings management (equations 1, 2 and 3) the Chow test (p-value less than 0.05) indicated preference of the fixed model over the pooled, while the Hausmann test (p-value greater than 0.05) demonstrated that the random model is more appropriate than the fixed one for FCO only. For PROD and DD, the Hausmann test (p-value less than 0.05) indicated that the fixed method is more adequate than the random one (Table 2). For the abnormal levels (equations 4, 5 and 6) and REM (equations 7) the results

of the Chow test (p-value greater than 0.05) indicated that the pooled model is preferable to the fixed one and the Lagrange test (p-value greater than 0.05) confirmed that the pooled method is preferable to the random one (Table 2). Thus, the abnormal and REM models were calculated through pooled regression.

Table 2:
Tests of model selection, autocorrelation, heteroscedasticity and multicollinearity

Equation/Model used	Tests applied to define the model	Autocorrelation ¹	Heteroscedasticity ²	Multicollinearity ³
1 – FCO / random effects	Chow F(156, 1410) = 1,29 and p-value= 0,0120; Hausmann $\chi^2(3)$ = 2,26 and p-value= 0,5200.	Yes. F(1,156) = 8,787 and p-value= 0,0035.	Sim. χ^2 (157) = 6,1e+09 and p-value= 0,0000.	1,71
2– PROD / fixed effects	Chow F(156, 1409) = 1,38 and p-value= 0,0020; Hausmann χ^2 (4) = 11,77 and p-value= 0,0191.	Yes. F(1,156) = 272,320 and p-value= 0,0000.	Yes. χ^2 (157) = 1,1e+12 and p-value= 0,0000.	2,24
3– DD / fixed effects	Chow F(156, 1411) = 1,28 and p-value= 0,0144; Hausmann χ^2 (2) = 6,67 and p-value= 0,0356.	Yes. F(1,156) = 238753,980 and p-value= 0,0000.	Yes. χ^2 (157) = 1,2e+11 and p-value= 0,0000.	1,05
4 – AFCO / Pooled	Chow F(156, 1409) = 1,09 and p-value= 0,2126; Lagrange χ^2 (1) = 0,02 and p-value= 0,4386.	Yes. F(1,156) = 1,416e+06 and p-value= 0,0000.	No. χ^2 (1) = 3,95 and p-value= 0,0468.	1,01
5 – APROD / Pooled	Chow F(156, 1409) = 1,05 and p-value= 0,3155; Lagrange χ^2 (1) = 0,04 and p-value= 0,4221.	Yes. F(1,156) = 33805,889 and p-value= 0,0000.	Yes. χ^2 (1) = 157,66 and p-value= 0,0000.	1,01
6 – ADD / Pooled	Chow F(156, 1409) = 1,13 and p-value= 0,1408; Lagrange χ^2 (1) = 0,16 and p-value= 0,3432.	Yes. F(1,156) = 1,012e+06 and p-value= 0,0000.	Yes. χ^2 (1) = 27,41 and p-value= 0,0000.	1,01
7 – REM / Pooled	Chow F(156, 1409) = 1,01 and p-value= 0,4448; Lagrange χ^2 (1) = 0,00 and p-value= 1,000.	Yes. F(1,156) = 19630,498 and p-value= 0,0000.	Yes. $\chi^2(1)$ = 247,08 and p-value= 0,0000.	1,01

Source: Research results.

Notes: ¹ – Wooldridge test. ² – Wald test for fixed and random effects models; Breusch-Pagan test for pooled model. ³ – VIF (variance inflation factor) test.

Initially, the results referring to normal operating cash flow (FCO), production level (PROD) and discretionary expenditures (DD) are presented. Next, the results related to abnormal levels and the aggregate measure of real earnings management are presented.

The normal level of the operating cash flow dependent variable (FCO) was estimated by equation 1 (Table 3), originating the abnormal operating cash flow levels (AFCO). The only significant variable for the FCO model was the net revenue variable that presented a positive value of 0.1539 at a 1% level. This is a consistent result with Reis et al. (2015), Rodrigues et al. (2017) and Roychowdury (2006), indicating that an increase in net revenue reflects an increase in operating cash flow.

The variation in net revenue had a negative coefficient, which would indicate signs of earnings management by operating decisions, but it was not significant, corroborating Reis et al. (2015) and Roychowdury (2006) who found similar results. Therefore, a positive change in sales does not imply a negative change in operating cash flow for the current period. Should this variation in revenue be significant, a possible explanation is given by Rodrigues et al. (2017, p. 96), which “consists in the hypothesis that the variation in revenue is due to a credit relaxation, which will not directly reflect in cash flow”. For Cohen et al. (2008), this would reinforce the idea that granting discounts on prices or easier credit conditions result in lower FCO in the current period despite a positive change in sales.

Table 3:
Operating cash flow model coefficients (FCO)

Variables	Coefficients	Robust standard deviations from errors	z	p-value
$1/A_{it-1}$	8,0865	12,7228	0,64	0,525
RL_{it} / A_{it-1}	0,1539	0,3740	4,11	0,000*
$\Delta RL_{it} / A_{it-1}$	-0,2693	0,1874	-1,44	0,151
Intercept	0,1524	0,0346	0,44	0,660
R^2	0,6648			
Prob > χ^2	0,0000*			
Robust standard errors	Yes			
Effects	Random			
Number of observations	1570			

Source: Research results.

Notes: * Signifying 1%; ** Signifying 5%; *** Signifying 10%.

 A_{it-1} : Total assets of company i from period $t-1$; RL_{it} : Net revenue of company i from period t ; ΔRL_{it} : Variation in net revenue of company i from period t relative to $t-1$.

Table 4 specifies the normal levels of operational activities related to the production level (PROD). The variables RL_{it}/A_{it-1} , $\Delta RL_{it}/A_{it-1}$ and $\Delta RL_{it-1}/A_{it-1}$ were all significant at 1%. RL_{it}/A_{it-1} and $\Delta RL_{it}/A_{it-1}$ have a positive relationship to the production level, indicating that increases in revenue imply an increase in the production levels, in line with Reis et al. (2014), Rodrigues et al. (2017) and Roychowdhury (2006). This result is as expected, since when sales increase production grows.

Table 4:
Production level model coefficients (PROD)

Variables	Coefficients	Robust standard deviations from errors	z	p-value
$1/A_{it-1}$	22,0980	21,7842	1,01	0,312
RL_{it} / A_{it-1}	0,6824	0,0695	9,82	0,000*
$\Delta RL_{it} / A_{it-1}$	1,6712	0,2944	5,68	0,000*
$\Delta RL_{it-1} / A_{it-1}$	-0,9649	0,3216	-	0,003*
Intercept	-0,0521	0,0943	3,00	0,581
R^2	0,9740		0,55	
Prob > F	0,0000*			
Robust standard errors	Yes			
Effects	Fixed			
Number of observations	1570			

Source: Research results.

Notes: * Signifying 1%; ** Signifying 5%; *** Signifying 10%.

 A_{it-1} : Total assets of company i from period $t-1$; RL_{it} : Net revenue of company i from period t ; ΔRL_{it} : Variation in net revenue of company i from period t relative to $t-1$; ΔRL_{it-1} : Variation in net revenue of company i from period $t-1$ in relation to $t-2$.

Gunny (2010) and Zang (2012) advocate that companies are likely to use low discretionary spending figures for real earnings management. Table 5 shows the results of normal discretionary spending (DD) levels and, according to Roychowdhury (2006), the more the company sells its products, the higher the sales and administrative expenses are expected to be. In relation to the regression of discretionary expenditures, the positive and significant coefficient of 1% for the parameter involving revenue is consistent with Reis et al. (2015), Rodrigues et al. (2017), Roychowdhury (2006) and Zang (2012). Thus, an increase of one unit in revenue will positively impact discretionary expenditures by 0.2025. This means that discretionary expenditures will follow the sales volume.

Table 5:
Coefficients of the discretionary spending model (DD)

Variables	Coefficients	Robust standard deviations from errors	z	p-value
$1/A_{it-1}$	21,60	18,6047	1,16	0,247
RL_{it-1} / A_{it-1}	0,2025	0,0562	3,60	0,000*
Intercept	-0,0820	0,0967	-	0,398
R^2	0,7867		0,85	
Prob > F	0,0019*			
Robust standard errors	Yes			
Effects	Fixed			
Number of observations	1570			

Source: Research results.

Notes: * Signifying 1%; ** Signifying 5%; *** Signifying 10%.

 A_{it-1} : Total assets of company i from period $t-1$; RL_{it-1} : Net revenue of company i from period $t-1$.

Based on Table 6, it can be seen that the abnormal levels of operating cash flow (AFCO) are not related to the size of the company and the return on assets, the same result found by Reis et al. (2015).

Contrary to Reis et al. (2015), the market-to-book variable was not significant. When analyzing the coefficient of the dummy variable, it is noticeable that it was significant, converging with Reis et al. (2015), and the negative sign as expected, based on Roychowdhury (2006). This shows that companies have manipulated sales in such a way as to have an abnormal behavior of cash flow.

Therefore, the companies that disclosed a profit margin between 0 and 1% are with abnormal levels of cash flow, lower than the other companies in the sample, i.e., these companies may have granted discounts or more favorable credit conditions. This has an adverse effect on future profitability because, according to Gunny (2010), it may lead to lower profit margins in subsequent periods.

Table 6 shows that for the abnormal levels of discretionary expenditures (ADD), the variables size, market-to-book and return on assets were not significant, different from those presented in Gunny (2010), Roychowdhury (2006) and Zang (2012), when all variables were significant. A possible explanation refers to the sample used in these studies, which consists of American companies. In comparison to the work of Reis et al. (2015), the market-to-book index is congruent, that is, it was not significant. The variables size and return on assets are opposite, being significant in the cited study. When the value of the dummy variable is verified, it is noted that it is negative and significant, converging with the studies of Gunny (2010), Reis et al. (2015), Roychowdhury (2006) and Zang (2012). Thus, statistical evidence indicates that suspicious companies, which disclosed a profit margin between 0 and 1%, reduced their discretionary expenditures in an abnormal way in order to real earnings management.

Table 6:
Coefficients of the AFCO, ADD, APROD and REM equations

Variables	AFCO	ADD	APROD	REM
Intercept	0,2323*	0,3656**	0,2267	-0,3721
D_{it}	-0,0932*	-0,1439**	-0,5671*	-0,3300*
TAM_{it}	-0,0014	-0,0157	0,0978	0,1149**
MTB_{it}	0,0007	0,0018	0,0030	0,0005
ROA_{it}	0,0127	0,0136	0,0715	0,0453
p-value	0,0679***	0,0510***	0,0376**	0,0307**
R^2	0,0001	0,0004	0,0009	0,0033
Number of observations	1570	1570	1570	1570

Source: Research results.

Notes: * Signifying 1%; ** Signifying 5%; *** Signifying 10%.

AFCO_{it}: Abnormal FCO level of company *i* in period *t* (equation 5); APROD_{it}: Abnormal PROD level of company *i* in period *t* (equation 6); ADD_{it}: Abnormal DD level of company *i* in period *t* (equation 7); REM_{it}: Aggregate measure (equation 9) of company *i* in period *t*; D_{it} : Dummy that assumes value 1 for the suspect companies and 0, otherwise, of company *i* in period *t*; TAM_{it} : Natural logarithm of the total assets of company *i* in period *t*; MTB_{it} : The market value of the capital divided by the net worth of company *i* in period *t*; ROA_{it} : Return on the assets of company *i* in period *t*.

Still in relation to Table 6, it can be seen that among the coefficients related to abnormal production levels (APROD), the control variables size, market-to-book and return on assets were not significant, being in accordance with Reis et al. On the other hand, the variable of interest (dummy) proved to be significant. This result indicates the earnings management through accounting reports, using the strategy of increasing production levels, and is aligned with Gunny (2010), Roychowdhury (2006) and Zang (2012).

Thus, in order to manage real earnings, there must be the possibility to produce more, taking advantage of the gains of scale and, later, adjusting the stock. This result converges to Scott's (2012) argument that large companies have greater agency conflicts because they have a high scale of operation, which provides opportunities and incentives for managers to deviate from the objectives of the main one according to the Agency Theory.

These results indicate that the three proxies of earnings management by operational decisions are employed by Brazilian companies to avoid reporting losses, extending the findings of national studies (Reis et al., 2014; Reis et al., 2015; Rodrigues et al., 2017).

As far as the REM aggregating measure (Table 6) is concerned, one can conclude that the companies that presented a profit margin between 0 and 1% incurred in the management of operating activities in an abnormal way, since the dummy variable was negative and significant, that is, hypothesis 1 is not rejected. This result is in line with those found by Cupertino et al. (2016), Gunny (2010), Reis et al. (2015) and Roychowdhury (2006). It is noteworthy that the real earnings management practice of the sample companies is concentrated on low abnormal levels of cash flow, discretionary expenditures and high production costs, i.e., in line with what Cohen et al. (2008) predicts: it is likely that companies that manage profits upwards will have a combination of exceptionally low cash flow from operations, and/or low discretionary expenditures and/or exceptionally high production costs.

Finally, based on Table 6, it is highlighted that the real earnings management is directly associated with the size of the company according to Cupertino et al. (2017) and Gunny (2010). Two possible explanations are the capacity of large companies to produce more, at some point, to increase the stock (Reis et al., 2015) and the political cost that can lead companies to earnings management, since they are under greater public

and regulatory scrutiny (Scott, 2012; Silva, Zonatto, Dal Magro, & Klann, 2019). The other control variables (MTB and ROA) were not significant according to the results found by Reis et al. (2015). Cupertino et al. (2016) found a negative and significant relationship between REM and ROA.

The conclusion is that possible mechanisms for mitigating agency problems are not sufficient to avoid earnings management. Therefore, managers have incentives to earnings management, not presenting losses in their accounting reports, since the users of the accounting information could react negatively to this information. In this sense, Silva et al. (2019, p. 192) point out “earnings management occurs according to the objectives of managers, who are provided with opportunistic behavior, both personal and linked to organizational objectives”.

5 Concluding Remarks

Research suggests that earnings management is determined by management choices for specific benefits. Thus, this study aimed at verifying whether Brazilian companies listed in Brazil, Bolsa, Balcão [B]³ avoided reporting losses based on real earnings management.

The results certified that companies that had a positive profit margin between 0 and 1% used real earnings management to avoid incurring losses disclosure in the reports. The results have implications for external stakeholders, including investors, financial analysts and the government, which should take management incentives into account when evaluating companies' performance.

The research differs from the works of Reis et al. (2014) and Reis et al. (2015), since these studies provide evidence that companies use only sales, general and administrative expenses to avoid reporting losses, while the results of this research indicate that operating cash flow, discretionary expenses and production level are employed by companies for this purpose. This result is in line with the findings of Roychowdhury (2006) and therefore with international literature.

However, the findings are subject to certain caveats. Statistical associations do not necessarily represent causality and alternative explanations cannot be ruled out, although the research proxies previously established have been adopted. In this sense, the results should be interpreted with caution, since revenue is influenced by changes in prices, as well as by other factors and not only by managers' decisions. Moreover, the results are not necessarily generalizable for any type of company, since the findings relate to publicly traded companies. That said, samples of distinct size and characteristics may present divergent results.

It is suggested, as future surveys, that this analysis be carried out based on quarterly reports, since quarterly results are also relevant to the market and investors.

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Discussion of the results: N. A. Pereira; Mr. Tavares.

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