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Earnings management and payment methods in M&A: an analysis of strategic choices in the Brazilian market

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Abstract

Objective: To analyze the relationship between earnings management strategies of publicly traded acquirers and the payment methods in mergers and acquisitions (M&A) in Brazil, focusing on the reversal of these strategies in the post-M&A period.

Methodology: A sample of 103 M&A transactions between 2010 and 2024, involving companies listed on B3, was analyzed using data from Refinitiv® and linear regression models.

Results: Acquirers engaged in real earnings management (REM) to increase reported earnings and influence the price paid in M&A transactions, without resorting to accrual-based earnings management (AEM). After the M&A, REM reversed in firms that used shares to finance the transaction, while AEM remained stable regardless of the payment method.

Contributions: From an academic perspective, the use of earnings management proxies before and after M&A transactions allows analyses more closely aligned with the event, without necessarily relying on event study methodology. In practice, the results have implications for shareholder valuations, as the potential use of earnings management may affect firms' profits. Regulators, auditors, and M&A managers should carefully assess firms' operational indicators—such as inventory levels, sales practices, and fluctuations in overhead expenses—to determine whether these activities are consistent with normal operations or indicative of earnings management.

Keywords: Mergers and acquisitions; Earnings management; Accruals reversal.

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1 Introduction

Given the competitive nature of the business environment, firms are compelled to develop strategies to maintain their foothold, improve performance, survive in the market, and achieve their objectives—including generating profits to create the greatest possible wealth for their shareholders (Edi & Irayanti, 2019). One way to pursue this goal is through Mergers & Acquisitions (M&A), which can enable firms to expand their market position, achieve economies of scale, acquire strategic assets, adopt new technologies, and broaden their customer base and product portfolio—often proving more beneficial than competing alone (Renneboog & Vansteenkiste, 2019; Edi & Irayanti, 2019).

In M&A, there are two main parties: acquirers that seek to acquire or merge with another firm, and targets, which are the firms being acquired or merged. To complete the transaction, acquirers can pay in cash, using their own shares, or in a combination of cash and shares (Hansen, 1987; Shleifer & Vishny, 2003). The choice of payment method is related to the degree of informational asymmetry between acquirers and targets, which is usually high (Luypaert & Caneghem, 2017). If the target has superior information relative to the acquirer, the private information held by the target's managers can create a problem for the acquirer, namely the risk of misvaluing the target. Thus, the acquirer is more likely to make a purchase offer using its shares, in whole or in part, due to the sharing of risk with the target's shareholders (Sudarsanam & Mahate, 2003).

When M&A involve share-based payments by acquirers, in whole or in part, the consideration received by target shareholders consists of the acquirer's shares. The total number of shares issued by the acquirer to gain control of the target is calculated based on the acquirer's share price on or around the acquisition announcement date. Since this exchange ratio is inversely related to the acquirer's share price, the acquirer may have incentives to increase pre-M&A reported earnings through earnings management practices in the periods preceding the M&A to influence stock market participants and increase the market price of its shares, thereby reducing the cost of acquiring the target (Erickson & Wang, 1999; Botsari & Meeks, 2008).

Therefore, it is possible that managers, when considering an acquisition or merger with another firm, regardless of the payment method, may engage in earnings management practices in the periods preceding the M&A. Given that these practices are opportunistic in nature and driven by specific objectives, it is expected that such practices will be reversed in the period following the M&A. Thus, the research question addressed in this article is: **What is the relationship between the earnings management strategies of publicly traded acquirers and mergers and acquisitions in Brazil?**

This study aims to analyze the relationship between the earnings management strategies of publicly traded acquirers and payment methods used in M&A in Brazil, with a focus on the potential reversal of these strategies in the period following M&A. International evidence, such as Erickson and Wang (1999), Louis (2004), Botsari and Meeks (2008), and Higgins (2013), documents the presence of earnings management practices among acquirers in the periods preceding M&A. Similarly, evidence from Brazil indicates the presence of earnings management practices in firms involved in M&A (Mendes et al., 2018; Antonio et al., 2023; Miranda Filho et al., 2024). However, given that earnings management practices in M&A contexts may be opportunistic, it is expected that these practices will be reversed in period following M&A, as shown by Dantas et al. (2013), focusing on financial firms; Sincerre et al. (2016), examining firms issuing debentures; and Melilo et al. (2018), analyzing the reversal of accruals in share buyback processes. In this context, this study extends prior research by not only examining the occurrence of earnings management practices in the periods preceding M&A among firms that use shares or cash as payment, but also by evaluating whether these practices are reversed in the period following M&A in Brazil.

2 Theoretical Framework

2.1 Signaling Theory

Signaling Theory was developed in the context of the labor market (Spence, 1973), but it describes a general phenomenon that applies to any market characterized by asymmetric information (Morris, 1987). In capital markets, information asymmetry arises when firm managers possess information that investors do not (Myers & Majluf, 1984). More broadly, it occurs whenever one party to a transaction holds superior information relative to another. This framework can be applied to the context of M&A, as acquirer and target managers may not share the same level of information about the transaction.

In this context, information asymmetry arises from the acquirer's difficulty in accurately assessing the true value of the target, as target managers theoretically possess more information about the firm's value than acquirer managers. Balakrishnan and Koza (1993) argue that it is reasonable to expect that the target will not accept a purchase offer if the offered value is lower than the net present value of its assets. Although accounting rules do not allow the recognition of internally generated assets by the target, managers may recognize that their assets are more valuable than assessed by the acquirer.

If we consider that the target will only sell its assets for a value equal to or greater than their true value, that only the target knows the true value of its assets, and that the acquirer offers payment in cash, an adverse selection problem arises (Hansen, 1987). Furthermore, if the target's assets are specific and there are no markets where identical assets are traded, obtaining information about their prices will be expensive or unavailable (Balakrishnan & Koza, 1993). Thus, the target, based on its private information, may reject the offer, and the deal may not go through, even if the negotiation is mutually beneficial (Hansen, 1987).

One solution to this adverse selection problem is for the acquirer to offer a percentage β of the shares of the new firm that will emerge after the merger as payment for the target, instead of cash (Hansen, 1987). The adverse selection problem is reduced because the value paid at the time of acquisition depends on the future profitability of the combined entity after the merger, and therefore the target's shareholders bear part of the valuation risk (Sudarsanam & Mahate, 2003).

Hansen (1987) argues that if the acquirer offers a percentage β of the shares of the new entity, the transaction will be attractive to the target if the value received by the target's shareholders in the merger is at least equal to the value that would be obtained through a cash offer. From the acquirer's perspective, determining the optimal value of β is essential to maximize its gains from the merger, given that it retains a share $(1 - \beta)$ of the new entity, whose value must exceed that of the pre-merger firm. Conversely, if the acquirer possesses superior private information about the value of its assets, the target may also face an adverse selection problem, as the acquirer's assets may be overvalued. In such cases, the acquirer may exploit this overvaluation by exchanging its shares for real assets. Anticipating this, target shareholders may interpret cash offers as a signal that the acquirer believes its shares are undervalued (Sudarsanam & Mahate, 2003).

An equilibrium arises in which the acquirer offers its shares when they are overvalued and offers cash when they are undervalued (Hansen, 1987). Given this condition, and considering that share prices are determined in capital markets, acquirer managers may have incentives to increase share value, even if artificially and temporarily, in order to influence market participants and raise share prices, thereby reducing the cost of acquiring the target (Erickson & Wang, 1999).

This evidence supports the study's hypotheses, as it indicates the possibility of acquirers engaging in earnings management practices in the periods preceding merger announcements. However, considering that these practices are artificial and temporary, they are expected to reverse in the post-M&A period.

2.2 Earnings management in M&A and study hypotheses

Earnings management can be defined as managers' judgment in financial reporting and in structuring transactions to mislead stakeholders about a firm's economic performance (Healy & Wahlen, 1999). Such practices may involve accrual-based earnings management (AEM), which includes delays in asset write-offs, discretionary recognition of gains or losses, changes in recognition and measurement methods, and estimates related to provisions, and/or real earnings management (REM), which includes overproduction to reduce the cost of goods sold, offering discounts to temporarily increase sales volume, or aggressive reductions in discretionary expenditures (Roychowdhury, 2006; Dechow et al., 2010; Zang, 2012).

Acquirers can use these practices to increase reported earnings. As the market may not fully understand or anticipate such practices, they may influence share prices, thereby enabling the acquirer to purchase the target using fewer shares (Erickson & Wang, 1999). Among these practices, managers may prefer REM, given that AEM is easier for the market, auditing firms, and regulatory bodies to detect (Graham et al., 2005; Cohen & Zarowin, 2010; Zang, 2012). However, some authors argue that firms may use both AEM and REM as substitutes or complements, depending on their relative costs and the extent to which one constrains the other (Abernathy et al., 2014; Black et al., 2017).

Building on this literature, international and Brazilian research, including Erickson and Wang (1999), Louis (2004), Botsari and Meeks (2008), Higgins (2013), Farooqi et al. (2017), Chang and Pan (2020), Antonio et al. (2023), and Miranda Filho et al. (2024), has documented earnings management practices in M&A contexts, showing that firms have an incentive to use these strategies prior to a merger to increase reported earnings and reduce the cost of acquiring the target. Although Brazilian studies have examined the reversal of accruals, such as Dantas et al. (2013), Sincerre et al. (2016), and Melilo et al. (2018), few studies have focused specifically on the reversal of these practices in M&A events.

Erickson and Wang (1999), using a sample of 55 acquirers that completed share-financed M&A transactions during the 1985–1990 period, reported evidence of accrual-based earnings management to increase reported earnings in the quarter preceding the M&A announcement. These findings suggest that acquirers use earnings management to increase share prices before M&A when shares are used as payment (Erickson & Wang, 1999). However, their results indicated that there was no reversal of accruals in the quarter following the M&A.

Similarly, Louis (2004), analyzing U.S. M&A transactions between January 1992 and December 2000, showed that acquirers using shares as a payment method inflate reported earnings in the quarter prior to the M&A announcement. The median of abnormal accruals was significantly positive for share-based acquisitions, whereas it was statistically insignificant for cash-financed acquisitions. However, these results indicate that there was no reversal of accruals in the quarter following the M&A.

Botsari and Meeks (2008) showed that acquirers in the United Kingdom between 1997 and 2001 engaged in pre-M&A earnings management in share-financed transactions. Based on a sample of 42 publicly traded firms, the results indicate that acquirers engaged in accrual-based earnings management in the year immediately preceding the M&A announcement. In contrast to Erickson and Wang (1999) and Louis (2004), this study found evidence of a reversal of accruals in the year following the M&A. Studies by Higgins (2013), Kassamany et al. (2017), Antonio et al. (2023), and Miranda Filho et al. (2024) also report accrual-based earnings management in the year prior to M&A but do not find evidence of a reversal in the post–M&A period. Conversely, Santos and Bezerra (2023) found that acquirers had negative accruals both before and after M&A, indicating no reversal.

Thus, using different methodologies and quarterly or annual periods, the authors cited above provide consistent evidence that acquirers engage in accrual-based earnings management prior to M&A, particularly when shares are used to complete such transactions. This suggests that pre-M&A earnings management can lead to share overvaluation, thereby reducing the cost of acquisition. However, the reversal of accruals following M&A remains inconclusive in the literature. These mixed findings may be associated with changes in International Financial Reporting Standards (IFRS), as suggested by Pelucio-Grecco et al. (2014).

As Dechow et al. (2012) point out, however, accrual-based earnings management should reverse in subsequent periods. This reversal may occur within a year (Dechow et al., 2012) or over a longer horizon (Allen et al., 2013). Thus, although prior evidence is not conclusive, earnings management prior to M&A is expected to reverse following the transaction, as such practices are typically temporary. Therefore, the following hypothesis is proposed:

H1. Following M&A announcements, acquirers engaging in share-financed transactions exhibit a significant reversal in accruals compared to those using only cash.

Focusing on real earnings management (REM), particularly those affecting firms' cash flows (Roychowdhury, 2006), some studies have examined these practices in the context of M&A. Zhang (2015) analyzed a sample of Chinese firms between 2008 and 2010 that used shares as a payment method in M&A transactions and found that these firms engaged in REM related to cash flows, discretionary expenses, and production costs during the M&A period. Furthermore, although not the primary focus of the study, the results suggest a reversal of these practices in the year following the M&A. Farooqi et al. (2017), using a sample of 5,857 U.S. firms between 1980 and 2011, found that acquirers increased their use of REM in the quarters preceding merger announcements but reduced or reversed these practices in the subsequent quarters.

Chang and Pan (2020) and Fasipe and Sun (2020), using a sample of U.S. firms, found that, compared to cash acquirers, acquirers that used shares as a payment method engaged in REM prior to M&A to increase reported earnings. However, they do not find evidence of a reversal of these practices in the post–M&A period.

In Brazil, Antonio et al. (2023), based on a sample of non-financial firms listed on the B3 between 2009 and 2017, found that firms undergoing M&A engaged in real earnings management. Miranda Filho et al. (2024), analyzing firms listed on the B3 between 2010 and 2020, found similar evidence in the year preceding the M&A announcement.

Empirical evidence shows a reversal in REM practices in Zhang (2015) and Farooqi et al. (2017), a pattern not observed in Chang and Pan (2020), Fasipe and Sun (2020), Antonio et al. (2023), and Miranda Filho et al. (2024), despite providing evidence of these practices prior to M&A.

REM differs from AEM. Typically, accrual-based earnings management concerns accounting estimates and provisions made by managers, which may be confirmed or reversed depending on the circumstances. In contrast, real earnings management practices, such as reducing administrative expenses or offering price discounts to increase revenue, may not be readily reversible after M&A. For example, a customer who purchases goods with discounts or favorable credit terms in a given quarter may seek to maintain these conditions in subsequent periods. This may hinder the post-M&A reversal of REM practices. However, if managers use these strategies opportunistically, their reversal may still be expected. Therefore, the following research hypothesis is proposed:

H2. Following M&A announcements, acquirers engaging in share-financed transactions exhibit a significant reversal in REM practices compared to those using only cash.

3 Methodology

Information on M&A transactions was reconciled with available accounting data to meet the study's objectives. Therefore, given the availability of accounting data, particularly firms' operating cash flows, M&A transactions completed between January 1, 2010, and December 31, 2023, were included. Accounting data were collected on a quarterly basis from 2008 to the third quarter of 2024 from the Refinitiv® database. The initial year of 2008 reflects the need for pre-2010 data in statistical models and to construct proxies for earnings management (gross revenue). The analysis period begins in 2010 due to the availability of accounting data following the full adoption of IFRS in Brazil, as the Statement of Cash Flows (SCF) was not mandatory prior to that date. Hribar and Collins (2002) argue that M&A can induce a positive trend in accruals estimated using the balance sheet approach, since net current assets tend to increase when a firm acquires another firm due to the consolidation of financial statements. Thus, according to the authors, it is preferable to obtain accrual measures directly from the cash flow statement rather than relying on balance sheet-based approximations.

Stata® software was used for data analysis, validation testing, and estimation of regression coefficients. Continuous quantitative variables were winsorized at the 1% and 99% levels to mitigate the effect of outliers.

Based on Botsari and Meeks (2008), Higgins (2013), Farooqi et al. (2017), Chang and Pan (2020), Fasipe and Sun (2020), and Antonio et al. (2023), the following criteria were adopted for sample selection: i) acquirers must be listed on the B3; ii) acquirers must acquire at least 50% of the target's shares; iii) firms in the financial sector (banks, insurance companies, and investment funds) were excluded, as they are subject to specific regulations and accounting standards, which may affect accrual calculations and introduce bias; iv) the M&A must be completed within the study period; and v) the transaction must be financed with shares, cash, or both.

Figure 1 summarizes the inclusion and exclusion criteria, as well as the number of M&A transactions included in this study.

Figure 1
Sample selection (acquirers listed on the B3)

Description	Number (N)
Initial sample (number of M&A transactions between Jan 1, 2010 and Dec 31, 2023)	1.385
Exclusions	
Incomplete transactions	479
Ownership stake below 50% after M&A	35
Transactions in the financial sector	162
Transactions with missing deal value	288
Transactions with payment method classified as other or unknown	25
Transactions with unavailable accounting information for the acquirer	123
Final sample of transactions	**273**
Cash-and-stock payment (combination)	22
Stock payment	15
Cash payment	236
Total transactions (by payment type)	**273**
Private targets	256
Public targets	17
Number of acquirers (largest M&A transactions)	**103**
Cash-and-stock payment (combination)	15
Stock payment	10
Cash payment	78
Total transactions (by payment type)	103
Private targets	92
Public targets	11

Source: Prepared by the authors based on data from Refinitiv®.

Figure 1 indicates that, from January 1, 2010, to December 31, 2023, 1,385 M&A transactions were completed in Brazil, involving publicly traded acquirers and both public and private targets. After applying the sample selection criteria, 103 acquiring firms remained in the sample, based on the highest-value M&A transactions. Most acquirers used cash to pay for these transactions (approximately 75%), whereas 25% involved stock, either fully or partially. This pattern is consistent with prior evidence that cash-financed M&A transactions predominate (Meng & Vijh, 2021; Dokas et al., 2025).

This study adopted the highest-value M&A transactions, following the criteria employed by Camargos and Barbosa (2010). Such transactions may create stronger incentives for earnings management due to their economic significance. However, results are similar when the full sample of M&A transactions is considered.

3.2 Econometric models for earnings management analysis

The performance matching model, developed by Kothari et al. (2005), was used to obtain a proxy for earnings management through accruals. Kothari et al. (2005) suggest that accrual measures should be estimated considering the recent performance of firms, in this case, Return on Assets (ROA). The dependent variable of this model (Equation 1), Total Accruals (ACT), was calculated as the difference between Net Income (LL) and operating cash flow (FCO), based on the guidelines of Hribar and Collins (2002). These authors suggest that it is preferable to obtain accrual measures directly from the Statement of Cash Flows (SCF) rather than from the balance sheet, especially when studying mergers and acquisitions (M&A) events.

$$\frac{ACT_{it}}{A_{it-1}} = \beta_0 + \beta_1\left(\frac{1}{A_{it-1}}\right) + \beta_2\left(\frac{\Delta REC_{it} - \Delta CREC_{it}}{A_{it-1}}\right) + \beta_3\left(\frac{PPE_{it}}{A_{it-1}}\right) + \beta_4\frac{LL_{it}}{A_{it-1}} + c_i + \varepsilon_{it} \quad (1)$$

Where: ΔREC_{it} = change in revenue; $\Delta CREC_{it}$ = change in accounts receivable; PPE_{it} = Fixed Assets; LL_{it} = net income; A_{it-1} = total assets; β's = estimated model coefficients; $c_i + \varepsilon_{it}$ are the error terms; i = each unit (firm) and t = time (quarter). The independent variables in Equation 1 explain the normal levels of accruals, and any unexplained variation (i.e., accrual-based earnings management) is captured by the residuals (Pimenta, 2024).

To detect real earnings management, this study used statistical models developed by Roychowdhury (2006), which examine patterns in firms' operating activities, including operating cash flow (FCO), selling, general, and administrative expenses (hereafter DVGA), and production costs (PROD). Equations 2, 3, and 4 estimate the normal levels of firms' operating activities, and the residuals represent abnormal levels, serving as proxies for REM, namely AFCO, ADVGA, and APROD.

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

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

$$\frac{PROD_{it}}{A_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{RL_{it}}{A_{i,t-1}} + \beta_3 \frac{\Delta RL_{it}}{A_{i,t-1}} + \beta_4 \frac{\Delta RL_{it-1}}{A_{i,t-1}} + c_i + \varepsilon_{it} \quad (4)$$

Where: FCO = operating cash flow; DVGA = selling, general, and administrative expenses; PROD = production costs (cost of goods sold + change in inventories); A = total assets; RL = net revenue; ΔRL = change in net revenue; β's = estimated model coefficients; $c_i + \varepsilon_{it}$ are the error terms; i = each unit (firm) and t = time (quarter).

If earnings management is present in the context of M&A, negative AFCO and ADVGA and positive APROD are expected as mechanisms used to increase reported earnings. Negative AFCO indicates that increases in sales may be driven by price discounts or more favorable credit terms, resulting in lower operating cash flow. Negative ADVGA suggests that these expenses are reduced relative to sales levels to inflate reported earnings. Similarly, positive APROD may indicate overproduction, whereby firms increase production to reduce the cost of goods sold and improve reported earnings.

The various REM practices may be interrelated. A firm offering price discounts to increase sales volume and reported earnings, but with a proportionally smaller impact on FCO, may incur higher sales commissions, which also affect DVGA. Furthermore, when firms reduce administrative expenses, including personnel costs and severance payments, this may also affect FCO. Similarly, if firms increase production or purchases for resale to abnormally high levels, they may need to use additional financial resources to acquire raw materials or goods for resale, thereby affecting operating cash flow.

Thus, following Zang (2012), Reis et al. (2015), Fasipe and Sun (2020), Pimenta (2024), an aggregate measure of the three proxies for real earnings management—AFCO, ADVGA, and APROD—is constructed and denoted as GRR, which represents real earnings management (REM), as defined in Equation 5.

$$GRR_{it} = [(-1) * (AFCO_{it})] + [(-1) * ADVGA_{it}] + (APROD_{it}) \quad (5)$$

AFCO and ADVGA are multiplied by -1 such that higher values indicate that reductions in DVGA and sales-related activities affecting FCO were used to inflate earnings. In contrast, APROD does not need to be multiplied by -1, as higher residual values already indicate higher levels of production or purchases by the firm. Thus, GRR serves as the aggregate measure of real earnings management (REM), allowing the assessment of earnings management through real activities while also mitigating potential measurement errors associated with individual REM proxies, as discussed by Pimenta (2024).

The estimation of Equations 1 to 4 is performed using all 103 acquirers in the sample, resulting in a panel dataset in which firms are observed over time. This allows the estimation of earnings management proxies, defined as the residuals of these equations, at the firm–quarter level.

This dataset enabled the identification of earnings management proxies during the M&A period. For example, if the merger occurred in the second quarter of 2015, it was possible to identify earnings management proxies in the first and third quarters of 2015, which constitute the pre- and post-M&A periods, respectively. Considering the context in which earnings management practices are analyzed, positive values of AEM and REM are expected. However, these practices are expected to reverse following the M&A, with the sign of these proxies becoming negative.

3.3 Econometric model for hypotheses testing

The econometric model used to test the research hypotheses considers both quarterly and annual measures. Specifically, it includes the quarter prior to the M&A (t-1), the sum of quarterly earnings management proxies (hereafter represented by GR) from t-4 to t-1, representing one year before the M&A, the quarter following the M&A (t+1), and the sum of quarterly GR measures from t+1 to t+4, representing one year after the M&A. Thus, both quarterly and annual perspectives are considered when defining pre- and post-M&A periods.

The statistical model was adapted from Campa and Hajbaba (2016) and Fasipe and Sun (2020). For the purposes of the econometric analysis, accrual-based earnings management (AEM) and real earnings management (REM) are operationalized through the variables GRAP and GRR, respectively. To examine reversals of these measures in the period following M&A, the dependent variable in Equation 6 corresponds to the post-M&A earnings management measure (GRAP or GRR), at t+1 (quarterly and annual measures).

$$GR_{it+1} = \beta_0 + \beta_1 DStock_i + \beta_2 GR_{it-1} + \beta_3 GR_{it-1} x\ DStock_i + \beta_4 MTB_i + \beta_4 ENDIV_i + \beta_5 PIB_i + \varepsilon_i \quad (6)$$

Where: GR = generic notation referring to the earnings management measures used in the model (GRAP for AEM and GRR for REM) observed for acquirers in the pre- and post-M&A periods; Dstock = dummy variable equal to 1 if the acquirer fully or partially financed the transaction with shares, and 0 otherwise; MTB = market value of equity divided by book value of equity; ENDIV = indebtedness measured as the ratio of interest-bearing liabilities to total assets; PIB = percentage change in quarterly GDP relative to the same quarter of the previous year; β's = estimated model coefficients; is the error term; i = each firm; t-1 = pre-M&A period and t+1 = post-M&A period.

For the research hypotheses to be supported, the β3 coefficient must be negative and statistically significant. This would indicate that acquirers using shares to finance the transaction, fully or partially, exhibit a significant reversal of earnings management practices, whether through accrual-based or real activities, in the period following the M&A announcement compared to acquirers using only cash.

In Equation 6, following prior studies examining the relationship between earnings management and M&A, including Campa and Hajbaba (2016), Fasipe and Sun (2020), and Antonio et al. (2023), the control variables MTB and ENDIV are included to capture growth opportunities and leverage—factors widely discussed in the literature as influencing earnings management practices. In addition, PIB (gross domestic product, GDP) is included as a control variable to represent economic conditions, as firms tend to maintain or expand their operations during periods of economic growth, which may affect earnings management practices. Additional M&A-related control variables were tested, including deal value and whether the target is privately held or publicly traded (Farooqi et al., 2017). However, these variables did not improve model specification and were not statistically significant; therefore, they were excluded.

The statistical models were subjected to the VIF test for multicollinearity, the Ramsey RESET test for model specification, and the Breusch–Pagan test for heteroscedasticity. When the models were estimated using panel data (Equations 1 to 4), the Chow test, the Breusch–Pagan test, and the Hausman test were performed to determine the appropriate estimation method for the econometric equations. In addition, t-tests were used to assess the statistical significance of the estimated coefficients in all models.

4 Results and Discussion

4.1 Descriptive statistics

Table 1 presents the summary descriptive statistics of the earnings management proxies used in the analysis.

Table 1
Descriptive statistics of earnings management proxies

Variables	N	Pre-M&A quarter (A)		Wilcoxon test (A) = 0	N	Post-M&A quarter (P)		Wilcoxon test (P) = 0	t-test (A) – (P)	Wilcoxon test (A) – (P)
		Mean	Median			Mean	Median			
AFCO	90	0.013	0.013	6.15***	99	0.013	0.014	6.34***	0.26	-0.31
ADVGA	90	0.032	0.025	8.23***	96	0.031	0.024	8.50***	1.65*	2.35**
APROD	93	0.132	0.108	8.23***	96	0.126	0.097	8.50***	0.73	-0.10
REM	90	0.086	0.067	7.76***	96	0.081	0.067	7.82***	0.66	-0.09
AEM	90	-0.004	-0.003	-1.63	97	-0.009	-0.008	-4.27***	2.22**	3.01***
REM-A	76	0.358	0.297	7.29***	96	0.320	0.258	9.26***	2.40**	2.31**
AEM-A	77	-0.023	-0.014	-2.29**	77	-0.031	-0.034	-4.58***	1.47*	2.38**

Notes: AFCO = abnormal operating cash flow levels, as defined in Equation 2; ADVGA = abnormal selling, general, and administrative expense levels, as defined in Equation 3; APROD = abnormal production levels, as defined in Equation 4; REM = proxy for real earnings management, as defined in Equation 5; AEM = discretionary accruals, as defined in Equation 1; REM-A = proxy for real earnings management aggregated from t-4 to t-1 (pre-M&A period) and t+1 to t+4 (post-M&A period); and AEM-A = discretionary accruals aggregated from t-4 to t-1 (pre–M&A period) and from t+1 to t+4 (post–M&A period). *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level

Source: Prepared by the authors based on research data.

Table 1 shows that abnormal levels of operating cash flow (AFCO) are positive and statistically significant mean and median values of 0.013 and 0.013, respectively, in the quarter prior to the M&A. Similarly, ADVGA, representing abnormal selling, general, and administrative expenses, exhibits positive and statistically significant mean and median values of 0.032 and 0.025, respectively, in the quarter prior to the M&A. APROD, which captures abnormal production levels, presents positive and statistically significant mean and median values of 0.132 and 0.108, respectively, in the quarter prior to the M&A. The aggregate measure of real earnings management (REM) also shows positive and statistically significant mean and median values of 0.086 and 0.067, respectively, in the pre-M&A quarter. These results suggest that acquirers involved in M&A transactions between 2010 and 2023, listed on B3, engaged in REM to increase reported earnings, consistent with prior evidence on earnings management in M&A contexts (Fasipe and Sun, 2020; Chang and Pan, 2020).

Regarding AEM, the mean and median values of this variable in the quarter prior to the M&A were -0.004 and -0.003, respectively. When considering the sum of the four quarters prior to the M&A, AEM remains negative, with values of -0.023 and -0.014, respectively. Thus, on average, the acquirers did not engage in accrual-based earnings management practices in either the quarter or the year prior to the M&A to increase reported earnings.

These results contrast with expectations in M&A contexts and are not consistent with those reported by Erickson and Wang (1999) and Louis (2004). However, the methodological differences between this study and those with which the results are compared should be noted. Furthermore, Pelucio-Grecco et al. (2014) observed that the transition to IFRS had a restrictive effect on accrual-based earnings management in Brazil following its full implementation. Given that AEM practices are easier to detect than REM practices (Graham et al., 2005; Cohen & Zarowin, 2010; Zang, 2012), together with this restrictive effect of IFRS, Brazilian firms undergoing M&A processes may prefer REM practices.

When comparing earnings management proxies across pre- and post-M&A periods (quarterly and annual), the signs remain unchanged. This suggests the persistence of earnings management practices both before and after M&A, corroborating the findings of Santos and Bezerra (2023). A decrease in the intensity of REM is observed in the annual data though, which, although positive in both periods, is lower in the post-M&A period. This suggests a partial reversal of these practices.

The analyses presented so far are exploratory, describing the behavior of REM and AEM in the pre- and post-M&A periods. The next subsection presents the results of the econometric model used to test the research hypotheses.

4.2 Analysis of research hypotheses

Table 2 presents the estimated coefficients of Equation 6 and the model validation tests. The VIF test and the RESET test indicate no significant multicollinearity or specification issues in the models. The Breusch–Pagan test indicates heteroscedasticity in some models; to address this issue, the equation was estimated using robust standard errors.

Table 2
Coefficients of Equation 6 – Hypothesis Testing – Dummy

Variables	Expected sign	AEM	AEM-A	REM	REM-A
Dstock	-	-0.003	-0.010	-0.012	0.022
AEM	-	0.160			
AEM x *Dstock*	-	0.797***			
AEM-A	-		0.506***		
AEM-A x *Dstock*	-		0.421***		
REM	-			0.841***	
REM x *Dstock*	-			-0.010	
REM-A	-				0.950***
REM-A x *Dstock*	-				-0.231**
MTB	+/-	0.000	0.000	-0.000	-0.001
ENDIV	+/-	-0.014	-0.016	0.039	-0.000
PIB	+/-	-0.000	-0.000	-0.001	-0.000
Intercept	+/-	-0.001	-0.010	0.003	0.009
VIF test		1.32	1.37	1.55	1.57
RESET test		0.82	0.99	3.97**	2.75*
Breusch–Pagan test		1.16	2.37	97.74***	16.48***
Adjusted R^2		0.32	0.61	0.74	0.93
Observations		89	77	86	73

Equation 6: $GR_{it+1} = \beta_0 + \beta_1 DStock_i + \beta_2 GR_{it-1} + \beta_3 GR_{it-1} x\ DStock_i + \beta_4 ENDIV_i + \beta_5 MTB_i + \beta_6 PIB_i + \varepsilon_i$
Notes: AEM = discretionary accruals in period t+1; AEM-A = cumulative discretionary accruals from period t+1 to t+4; REM = real earnings management in period t+1; REM-A = proxy for cumulative real earnings management from period t+1 to t+4; Dstock = dummy variable equal to 1 if the acquirer financed the M&A with shares, fully or partially, and 0 otherwise; MTB = market-to-book ratio; ENDIV = leverage, measured as the ratio of interest-bearing liabilities to total assets; PIB = percentage change in quarterly GDP relative to the same quarter of the previous year.
The remaining variables are presented in Table 1.
*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level

Source: Prepared by the authors based on research data.

In the analysis of the estimated coefficients, the variable Dstock, which captures the firms that used shares to finance M&A transactions, fully or partially, was not statistically significant. This result holds for both quarterly and annual measures, indicating that acquirers using shares in M&A transactions do not exhibit a reduction in earnings management in the post-M&A period.

Lagged AEM does not significantly influence AEM in the quarter following the M&A. However, when considering the sum of the four quarters before and the four after the M&A, the coefficient was positive and statistically significant (0.506). A reversal of these practices would be expected in M&A contexts, implying a negative relationship between pre- and post-M&A AEM. Nonetheless, this pattern is not observed, indicating that AEM does not reverse in the post-M&A period, regardless of the payment method.

Furthermore, when analyzing the interaction between the variables (AEM *x Dstock*) and their impact on AEM in the post-M&A period, both quarterly and annually, the coefficients are positive and statistically significant (0.797 and 0.421, respectively). Thus, acquirers involved in M&A transactions between 2010 and 2023, listed on B3, that use shares to fully or partially finance M&A transactions do not exhibit a significant reversal of accruals in the post-M&A period, relative to acquirers using only cash. Accordingly, Hypothesis 1 is rejected, as the coefficients associated with the interaction term (AEM *x Dstock*) were expected to be negative and statistically significant.

These results are consistent with international studies that investigate AEM during M&A periods, particularly Erickson and Wang (1999) and Louis (2004), which document AEM prior to M&A but do not find a reversal of accruals following M&A. In similar contexts, such as share buybacks (Melilo et al., 2018) and debenture issuances (Sincerre et al., 2016), studies conducted in Brazil have documented a reversal of accruals. Thus, the results of this study suggest that the accruals of acquirers may reflect firms' operational conditions rather than intentional AEM. Alternatively, the nature of M&A transactions—which involve at least two parties and multiple actors from acquiring and target firms—may constrain AEM.

Regarding the analysis of REM practices, the coefficients estimated by Equation 6 reveal that REM, whether measured at the quarterly or annual level prior to M&A, positively and significantly impact REM in the post-M&A period. This suggests that, in general, REM practices do not reverse following M&A; that is, given the M&A context and the opportunistic nature of REM, REM in the prior period would be expected to negatively affect REM in the post-M&A period.

Based on the analysis of annual data, however, when considering the interaction between the variables (REM-A *x Dstock*), the coefficient is negative and statistically significant. This result suggests that acquirers involved in M&A transactions between 2010 and 2023, listed on the B3, when using shares to fully or partially finance M&A transactions, exhibit a significant reversal of REM in the period following the M&A announcement, relative to acquirers using only cash. This evidence corroborates Signaling Theory by suggesting a significant incentive for earnings management when acquirers use shares to acquire the target firm. Thus, Hypothesis 2 is not rejected, which corroborates the results of Zhang (2015) and Farooqi et al. (2017).

REM practices affect firms' cash flows, and the repeated use of REM can lead to costs exceeding the benefits, both for firms and managers. Therefore, a reversal would be expected. The reversal occurs only one year after the M&A though, highlighting an important temporal dimension in managers' decisions regarding these practices.

These results show that firms exhibit similar accruals before and after M&A transactions, suggesting a lack of intention to engage in earnings management through accrual-based mechanisms. On the other hand, firms use real earnings management to improve their reported earnings before M&A transactions, and these practices are reversed in subsequent periods. It is important to note that these results may affect acquirers' future earnings, with implications for shareholders' returns.

The results remain unchanged when the Dstock variable, which represents the firms that use shares to fully or partially finance M&A transactions, is replaced by a variable capturing the percentage of shares used by acquirers to finance these transactions.

5 Final Considerations

This study aimed to examine the relationship between the earnings management (AEM and REM) strategies of publicly traded acquirers listed on B3 and involved in M&A transactions in Brazil from 2010 to 2023. To this end, data from 103 acquiring firms were used.

The results indicated that acquirers involved in M&A during the analyzed period used REM practices, particularly through production costs, to influence the market and reduce the price paid for target firms, but did not use AEM. This suggests that REM is preferred over AEM.

Furthermore, firms that used shares to finance M&A transactions do not exhibit a significant reversal of accruals in the period following the M&A compared to firms that used only cash, whether the analysis was quarterly or annual. This indicates that, regardless of the type of payment (cash or shares), these practices remain similar. This finding contrasts the Signaling Theory discussed here. On the other hand, these firms show a significant reversal of REM in the period following M&A transactions, relative to firms that used only cash, which is consistent with the predictions of Signaling Theory. However, this only occurs in the year following the M&A and not in the quarter following the M&A, possibly due to managers' difficulty in reversing these practices quickly.

Such reversal suggests that REM practices in the prior period were used to manage earnings around M&A events and, when reversed, may affect the expected synergies from M&A transactions, potentially influencing the perception of capital market participants of acquirers. With this reversal, economic and financial synergy indicators may decline, and investors who chose to hold their shares, even knowing that an M&A event would occur, may experience reduced gains.

The contributions of this study suggest that accruals reflect firm-specific conditions, while REM practices may be preferred in the Brazilian M&A context. Furthermore, the study contributes by employing earnings management proxies and control variables from periods before and after M&A, enabling analyses more closely aligned with the M&A event than those based on dummy variables to identify earnings management practices in samples including both acquiring and non-acquiring firms.

From a practical standpoint, the results have implications for shareholders of acquiring firms, who can incorporate them into their valuation analyses by considering the potential use of earnings management that may affect firms' profits. Regulators or other actors, such as auditors and M&A managers, should carefully assess firms' operational indicators, such as inventory levels, sales practices, and fluctuations in overhead expenses, to determine whether these activities are consistent with normal operations or indicative of earnings management.

It is important to acknowledge the limitations of this research regarding data availability. A substantial number of M&A transactions were classified as incomplete, without reported transaction values, and accounting information was unavailable. This limited the ability to obtain a more robust sample than that used in this study, thereby limiting the examination of the reversal of earnings management practices.

Given the contributions and limitations, future research should expand the sample used in this study, focusing on acquirers that use shares to finance M&A transactions. By expanding the sample, it may be possible to analyze earnings management proxies over a longer time horizon to examine the reversal of these practices, as earnings management may begin and reverse over a longer period than that analyzed in this study. Furthermore, similar analyses could be conducted in other specific contexts, such as IPOs or periods of performance pressure, to assess whether these practices are effective or remain similar after the event.

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