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Relationship between earnings management and abnormal book-tax differences in Brazil*

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ABSTRACT

The aim of this study was to verify whether the discretionary actions of managers to manage earnings can be captured by abnormal book-tax differences (ABTD). In Brazil, there are no studies with the disaggregated use of earnings management (EM) through operational choices as a proxy for discretionary decisions to be captured by ABTD. Moreover, the previous studies focus on the period before the International Financial Reporting Standards (IFRS) were required in Brazil or when they were still being implemented, which may change the context of earnings management in the country and, consequently, the relationship with ABTD. This study is relevant for accounting information users, such as investors, creditors, the tax authorities, and regulatory bodies, as the findings may help them to identify manager opportunism through earnings management. The identification that tax management can be affected by EM through accounting and operational decisions reveals that investors, creditors, the tax authorities, regulators, and auditors should remain vigilant against deteriorations in accounting information quality and, consequently, in the utility of that information. An analysis of 201 non-financial companies was carried out, covering 2012 to 2016, thus totaling 1,005 observations. Five panel data regression models were used: three to capture EM, one to identify ABTD, and one to relate these variables. A significant and positive relationship was revealed between accounting and operational EM and ABTD, indicating that companies that manage earnings upward have positive ABTD, and companies that manage earnings downward have negative ABTD. This research therefore contributes to identifying that ABTD captures the discretionary actions of managers related to EM through accounting and operational decisions.

Keywords: accounting earnings management, operational earnings management, abnormal book-tax differences.

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1. INTRODUCTION

A contract agreement in which one or more people (principal) delegate some service to another (agent) and the agent is responsible for deciding in name of the principal defines the agency relationship (Jensen & Meckling, 1976). In this case, the principal is the shareholder and the agent is the manager.

However, it cannot be ensured that the manager will always act to serve the shareholders' interests, as the manager could have different objectives from the owners, so the former may use earnings management (EM) mechanisms to achieve their personal goals to the detriment of the real results that would be achieved by the company. This conflict of interest is the agency conflict, explained by Agency Theory.

As a result of this conflict of interest between managers and shareholders, EM occurs with greater intensity (Ferreira et al., 2012). Martinez and Cardoso (2009) explain that there are two ways to manage earnings: EM through accounting decisions (AEM) and EM through operational decisions (OEM). According to the authors, AEM covers the accounting practices adopted by companies and OEM involves the operational choices inherent to sales, to the level of production, and to sales, general, and administrative expenses.

These practices can have undesirable effects. Martinez (2008) states that EM compromises accounting information quality and can cause damage to the capital market. Sunder (2014) highlighted that the more companies manage earnings, the lower the quality is of that information.

Moreover, Tang and Firth (2011) explain that the discretionary actions of managers generate differences between accounting profit and taxable income, called book-tax differences (BTD). BTD basically emerge in two ways: the first is through divergences between the accounting criteria and the tax criteria for measuring profit, considered the normal part of BTD and classified as normal BTD (NBTD); the second is the reflection of managers' discretionary actions, carried out with the aim of managing earnings, which is the abnormal part of BTD, known as abnormal BTD (ABTD) (Cappellesso & Rodrigues, 2019; Ferreira et al., 2012).

Tang and Firth (2011) treat ABTD as a proxy for capturing manager opportunism in relation to EM of accounting and taxable profit. These authors identified significant relationships between variables that represent proxies for (accounting and tax) EM and ABTD.

Dridi and Boubaker (2015) and Tang and Firth (2011) carried out a study regarding ABTD and EM and identified a significant relationship between the variables, determining that the companies studied manage their earnings to reduce taxes.

In the Brazilian literature, Formigoni et al. (2009) and Piqueras (2010) sought to identify whether ABTD captures these discretionary actions of managers. In contrast to what was argued and revealed by Tang and Firth (2011), Formigoni et al. (2009) did not find evidence that accounting EM and tax planning explain ABTD. Piqueras (2010) found a significant correlation between accounting EM and ABTD; however, he concluded that this correlation was very small.

On the other hand, Ferreira et al. (2012) found a positive relationship between accounting EM and BTD, which indicates that the greater companies' EM is, the greater the difference will be between accounting and taxable profit. However, Ferreira et al. (2012) related EM with total BTD, and not with ABTD; that is, the authors did not isolate the effects of managers' opportunistic behaviors reflected in ABTD.

Due to the different results revealed by the previous studies, this study aims to draw closer with more robustness to the research developed by Dridi and Boubaker (2015) and Tang and Firth (2011) and, thus, highlight the possible causes of the differences between the results.

According to the arguments indicated in the contextualization, this study is based on the following research question: how does ABTD capture the discretionary actions of managers related to accounting EM and/or operational EM?

Thus, the aim of this study is to verify how ABTD captures the discretionary actions of managers through AEM and OEM.

According to Ramos et al. (2019), the Brazilian tax burden is one of the highest in the world. Studies of the Brazilian Institute of Tax Planning (IBPT, 2015) show that Brazil occupies 14th place in the world ranking among the 29 countries of the Organisation for Economic Co-operation and Development (OECD), it has one of the greatest tax burdens in Latin America [around 35% of gross domestic product (GDP)], and it leads the ranking with the greatest tax burden among developing countries.

According to Martinez and Silva (2017), there are various taxes in Brazil, but in the 1960s there were only

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two types and, at that time, less attention was paid to tax planning. However, according to Pilati and Theiss (2016), the Constitutional Tax System has evolved over time into something more complex, with approximately 60 taxes and constantly altering tax legislation.

Lopes et al. (2018) highlight that the complexity of the tax system in Brazil can also be expressed by the frequency and infinity of accounting and tax rules approved. According to studies of the Brazilian Institute of Tax Planning (IBPT, 2015), from 1988 to 2008, more than one tax rule was created every two hours.

According to Marquezini (2005), the high tax burden and complexity significantly affect the financial results of companies, leading many organizations to close, as this is one of the greatest difficulties for institutions to survive (Ramos et al., 2019). According to Lopes et al. (2018), this complex environment with high costs incentivizes EM aimed at reducing taxes. For Tang and Firth (2011), companies with heavily taxed profits tend to manage their accounting and taxable income more.

In Brazil, according to Formigoni et al. (2009) and Machado and Nakao (2012), it was observed that for a long time the tax legislation strongly influenced the accounting rules; that is, there was no tax neutrality. But with the enactment of Laws 11,638/2007, 11,941/2009, and 12,973/2014, the accounting came to be less influenced by the tax effects (greater neutrality).

Thus, also according to Formigoni et al. (2009), it is important to investigate the impact of the taxation on the accounting figures, particularly on earnings management. This is because, according to Tang and Firth (2011), high tax burdens imply low performance and a reduction in company cash flow. So, managers are incentivized to seek ways to minimize that tax burden within the legal limits, through tax aggressiveness.

According to Martinez (2017), when tax aggressiveness tools are used, there is the risk that, through the deliberate reduction of the tax obligations, the legal substance contradicts the legal form, generating potential questions from the tax authorities. This issue is particularly problematic in Brazil, given the dubiousness concerning the possibility of applying an economic interpretation to the taxation facts.

This study contributes to improving the identification of managers' discretionary practices, as, until now, most of the research that studies ABTD to capture manager opportunism only focuses on verifying AEM and tax planning, only capturing OEM indirectly. This research directly includes OEM in the model, which can also have effects on ABTD.

According to Martinez (2017), in Brazil, the research on tax aggressiveness has only just started to be developed, and many unclear points remain to be investigated, in particular given the specificities of the Brazilian reality (highlighted in the previous paragraphs). Thus, the inclusion of discussions based on OEM may represent an advancement in this topic.

Rocha and Zanoteli (2017) highlight that research on ABTD represents the evolution of the studies of BTD using proxies for EM. Also along these lines, Martinez (2017) highlights that BTD can be seen as a biased proxy for tax aggressiveness, as its behavior can also be defined by the propensity for EM. This is because financial reporting decisions are associated with tax strategies and accounting choices influence tax results. Thus, tax aggressiveness is associated with EM. In that environment, this study could deepen those carried out in Brazil, by including OEM.

However, one important question that limits the results of all the ABTD studies in Brazil is the fact that taxes on earnings represent only a faction (around 10%) of taxation in the country. With this, BTD represents only one facet of tax aggressiveness activities (Santa & Rezende, 2016).

It is also highlighted that this study was conducted using company information after the full adoption of the International Financial Reporting Standards (IFRS) (2010 to 2016), while previous studies have been carried out in pre-IFRS periods or during their partial adoption (2008 and 2009). Therefore, this study also contributes to providing evidence about EM and ABTD in a different period from previous studies.

This paper is relevant for accounting information users, such as investors, creditors, the tax authorities, and regulatory bodies, as the findings may help them to identify manager opportunism via earnings management through ABTD. ABTD could be a proxy for identifying the quality of financial reports.

2. THEORETICAL FRAMEWORK

2.1 Accounting EM

EM arises from the possibility of the manager acting discretionarily to increase or reduce accruals to manage the entity's earnings. Accounting accruals are divided into discretionary accruals (DA) and non-discretionary accruals (NDA) (Healy, 1985). Part of DA is generated by managers' interventions aimed at managing accounting

profit, and NDA are inherent to the company; that is, they show the reality of the business (Dechow et al., 1995; Healy, 1985; Paulo et al., 2007).

For Healy and Wahlen (1999), accounting EM occurs when managers use their judgment in the elaboration of accounting statements and in the structure of companies' transactions to alter the statements and mislead certain accounting information users regarding the economic and financial situation of the entity, or to influence the contractual results that depend on the accounting numbers reported.

There are various incentives for managers to manage earnings. Healy and Wahlen (1999) classify them into three main groups: a) reasons linked to the capital market; b) contractual reasons; and c) regulatory and political cost reasons.

Martinez (2008) highlights four modalities of EM: a) accounting management to maximize earnings with the aim of achieving certain pre-established goals; b) management to minimize earnings; c) accounting management known as income smoothing, which seeks to avoid high fluctuations in results by maintaining them within a certain interval; and d) management known as big bath accounting, in which companies manage their current earnings downward in order to report better results in the future.

EM is possible due to the flexibility in the accounting rules of each country (Almeida & Almeida, 2009). In the Brazilian context, the advent of Law 11,638/07 and of Law 11.941/09 has made more alternatives available to managers regarding the recognition, measurement, and disclosure of accounting information; that is, the new accounting criteria ensure the manager has various options for treating economic events, leaving it up to them to choose to faithfully portray the firm's financial and economic position or show a reality that favors their own particular interests (Ferreira et al., 2012).

However, it is important to highlight that the discretionary practices used by managers through AEM occur within the limits set by the accounting rules, so there is a certain limit and it cannot be considered as accounting fraud (Dechow & Skinner, 2000; Formigoni et al., 2012; Healy, 1985).

Managers mainly use discretion in the measurement and disclosure process, which enables judgment to disclose the desired result (Formigoni et al., 2012). However, even though EM is not considered as fraud, it interferes in the quality of the disclosure of accounting reports (Martinez, 2008).

Earnings quality is another important issue linked to EM. When relating earnings quality to EM, Sunder (2014) concluded that earnings quality is inversely proportional to EM; that is, the more the manager manages earnings, the lower the earnings quality will be. Accruals are an indicator of earnings quality (Chan et al., 2006). Various authors have found that accruals are negatively related to earnings quality and to future stock returns; that is, high profits in combination with high accruals indicate low quality and low future returns (Chan et al., 2006).

2.2 OEM

Roychowdhury (2006) argues that making inferences about EM by analyzing discretionary accruals alone is probably inappropriate. The author addresses this issue, as there is another type of EM that is not as widely addressed in the literature as EM through accounting decisions.

OEM has been given various labels. Roychowdhury (2006) calls it "earnings management through real activities manipulation." Gunny (2010), in turn, uses the expression "real earnings management" (real EM). Zang (2012) prefers "real manipulation." Independently of the label, the concepts converge to explain the practice of using real operations to alter earnings.

Martinez and Cardoso (2009) highlight that the authors who conceptualize management through operational practices use the term "real" to indicate manipulation that encompasses decisions that directly influence company cash flow, unlike AEM, which does not affect cash flow.

Using the concept of Roychowdhury (2006), the operational decisions to manage earnings represent the decisions the company makes with the aim of achieving its economic-financial goals and misleading the accounting users by showing that these goals have been achieved over the normal course of daily operations.

Martinez and Cardoso (2009) believe that the management of accounting information through operational decisions involves both operational choices inherent to the company's activity, such as reducing sales, initiating a program to incentivize them, and offering discounts, among others, as well as decisions that are not directly linked to the activity, such as making donations, having get-togethers, and selling fixed assets, intangible assets, or investments.

In short, the main proxies used for operational EM identified by the researchers are: sales manipulation (Gunny, 2010; Reis et al., 2014, 2015; Roychowdhury, 2006); production level (Gunny, 2010; Martinez & Cardoso, 2009;

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Reis et al., 2014, 2015; Roychowdhury, 2006; Santos et al., 2011); discretionary expenses (Gunny, 2010; Martinez & Cardoso, 2009; Reis et al., 2015; Roychowdhury, 2006; Santos et al., 2011); sale of fixed assets and investments (Gunny, 2010); and research and development (R&D) expenses (Gunny, 2010).

2.3 ABTD

Accounting rules are created with the aim of establishing the procedures and techniques for the elaboration and publication of accounting reports for stakeholders, while tax rules determine the criteria for calculating taxes and other fiscal requirements (Formigoni et al., 2009).

For companies subject to the actual profit tax system, taxable income is calculated based on accounting profit, which is subject to adjustments stipulated by the government regarding the events that should not be recognized in profit (permanent differences) or regarding events that should be recognized, but at different times and in different values (temporary differences).

Temporary differences arise as the moment of revenues and expenses recognition is not the same in every one of the rules; however, in the long run the amount recognized will be the same. Permanent differences are those not recognized by the tax system but recognized in the accounting results and vice-versa (Ferreira et al., 2012).

These adjustments regarding the accounting profit foreseen in the tax legislation reveal the disagreement that exists between the accounting and tax rules (Sunder, 2014). This discrepancy is one of the factors that generate a difference between accounting profit and taxable income, called BTD (Ferreira et al., 2012; Formigoni et al., 2009). Another factor that generates BTD is EM, in which managers make choices that are inconsistent with the reality of the business; that is, they act discretionarily (Ferreira et al., 2012; Formigoni et al., 2009).

The difference between accounting and taxable profit, derived from the divergence between the rules, is called normal book-to-tax differences or, simply, NBTD, while the difference that emerges based on managers' discretionary actions is called abnormal book-to-tax differences, or ABTD (Ferreira et al., 2012; Formigoni et al., 2009).

Research carried out reveals that the difference between accounting profit and taxable income is also a proxy for verifying the quality of companies' earnings (Graham et al., 2012). Hanlon (2005) identified that companies with low BTD better represent earnings quality. Moreover, the author concludes that the market attributes a poor outlook for the earnings persistence of entities that present high BTD values.

2.4 Previous Studies

Formigoni et al. (2009) had the general aim of discovering the composition of BTD in order to identify the reasons for that difference, which may be the result of EM and/or tax management. The results rejected the hypotheses assumed, which meant that there was no relationship between the variables. The authors highlighted that the models developed up until then did not provide the proper support for calculating EM and tax management.

The research of Piqueras (2010) aimed to verify whether the differences between accounting profit and taxable income (BTD) are able to capture managers' discretionary actions (EM) through ABTD. As a result, the correlations between the residuals were significant, but the values of the correlation were small, indicating that the behaviors isolated by the residuals have no connection.

Ferreira et al. (2012) sought to verify the relationship between BTD and EM. The research had a total of 485 firm-year observations, covering the period from 2005 to 2009. As a result, the authors obtained evidence that companies manage their earnings in the same direction as the sign assumed by the BTD; that is, EM and BTD are positively related and firms seek to present a BTD amount at a level and variation around the 0 point to avoid revealing low quality earnings. Moreover, they found that adhesion to the Transitionary Tax System (RTT), as well as company size, were inversely and proportionally related to the level of discretionary accruals.

Similarly to the present study, Dridi and Boubaker (2015) aimed to identify whether ABTD detects EM and tax management. 21 non-financial Tunisian companies were analyzed in the period from 2003 to 2012. The authors used EM through accruals (accounting) as a proxy for EM and manipulations of sales, of discretionary expenses, and of the level of production (combined in a single variable) as a proxy for operational EM. A negative relationship between ABTD and accounting and operational EM was revealed, which, according to the authors, may be explained by the possibility of companies in Tunisia being concerned about managing their earnings to reduce taxes, to the detriment of improving earnings quality and increasing financial results.

Furtado et al. (2016) verified what the impact of tax practices were over the EM of companies listed on the São Paulo Stock, Commodities, and Futures Exchange (BM&FBOVESPA), in the period from 1999 to 2012. In the analysis, the dependent variable was EM (DA) and

among the independent ones were BTD and ABTD. The findings revealed an inverse relationship between BTD and EM, which indicates that the tax practices measured by BTD negatively affect the accounts management; that is, the greater the difference between accounting and taxable profit, the lower managers' discretionary actions will be. The authors affirm that the findings are consistent with the literature, indicating that a greater misalignment between accounting and taxable profit improves the quality of the accounting information.

Also according to Furtado et al. (2016), the sample was separated into "pre-IFRS" and "post-IFRS" and it was revealed that the negative relationship between BTD and EM only persists in the pre-IFRS period, since in the post-IFRS period the variable was not statistically significant; that is, there are divergences in managers' discretionary behaviors and BTD related to the normative periods in Brazil. Finally, the authors also substituted the independent variable BTD for ABTD and the results did not identify significant relationships between the variable and EM.

Fonseca and Costa (2017) aimed to identify which institutional and non-institutional factors determine the types of BTD of publicly-traded Brazilian companies using 124 non-financial companies in the period from 2010 to 2015. Among the different variables employed in the models, the authors used discretionary accruals as a non-institutional variable and related it with three types of BTD: total BTD, temporary BTD, and permanent BTD. A positive relationship was expected between DA and BTD; however, in all the models, the relationship was not significant.

Brunozi et al. (2018) verified whether ABTD (independent variable) may be an indicator of EM (dependent variable). The period analyzed covered 2002 to 2015 and the authors also aimed to verify the relationship between ABTD and EM in pre-IFRS and post-IFRS periods. For the full period, a positive relationship was revealed between ABTD and EM. For the pre-IFRS period, no significant relationship was identified, while for the post-IFRS period the positive relationship between ABTD and EM persisted. According to the findings, the authors concluded that ABTD are indicative of increasing accounting profit and/or reducing taxable income through accruals to attend to the opportune actions of managers who use their discretion to manage earnings.

2.5 Development of the Research Hypotheses

Tang and Firth (2011) explain that BTD emerges from the normative differences between the accounting and the tax frameworks, from EM and tax planning, and that, independently of the strategy chosen by the company, its actions necessarily cause variations in BTD.

Tang and Firth (2011) empirically revealed that ABTD has a positive relationship with EM and tax planning. Following that premise, the first hypothesis of this study is:

H_1: ABTD is positively explained by AEM.

It warrants stressing that the variable that reflects tax planning will not be used in this research, as the focus is on explaining the management of accounting profit, and not taxable income.

Brunozi et al. (2018), Formigoni et al. (2009), Furtado et al. (2016), Piqueras (2010), and Tang and Firth (2011) addressed managers' discretionary actions using AEM alone; however, there are situations in which managers manipulate earnings through operational decisions. These operational choices to manage earnings can also cause variations in ABTD and in BTD.

Variations in ABTD through operational management may be the result of choices that generate accounting effects, but that are not recognized for tax purposes (permanent differences) or that are recognized at different moments in the accounting and for tax purposes (temporary differences); for example: donations not recognized by the government, get-togethers, and the sale of fixed assets that have different depreciation values recognized in the accounting and for tax purposes, among others.

Dridi and Boubaker (2015) used the manipulation of sales, of discretionary expenses, and of production levels as a proxy for OEM; however, they combined the values of the three variables to form a single one to represent it. On the other hand, this study treats the values obtained for manipulation of sales and of sales, general, and administrative expenses as individual variables to verify whether OEM also explains ABTD. Thus, hypotheses H_2 and H_3 are:

H_2: ABTD is positively explained by sales OEM (OEM Sales).

H_3: ABTD is positively explained by sales, general, and administrative expenses OEM (OEM Exp).

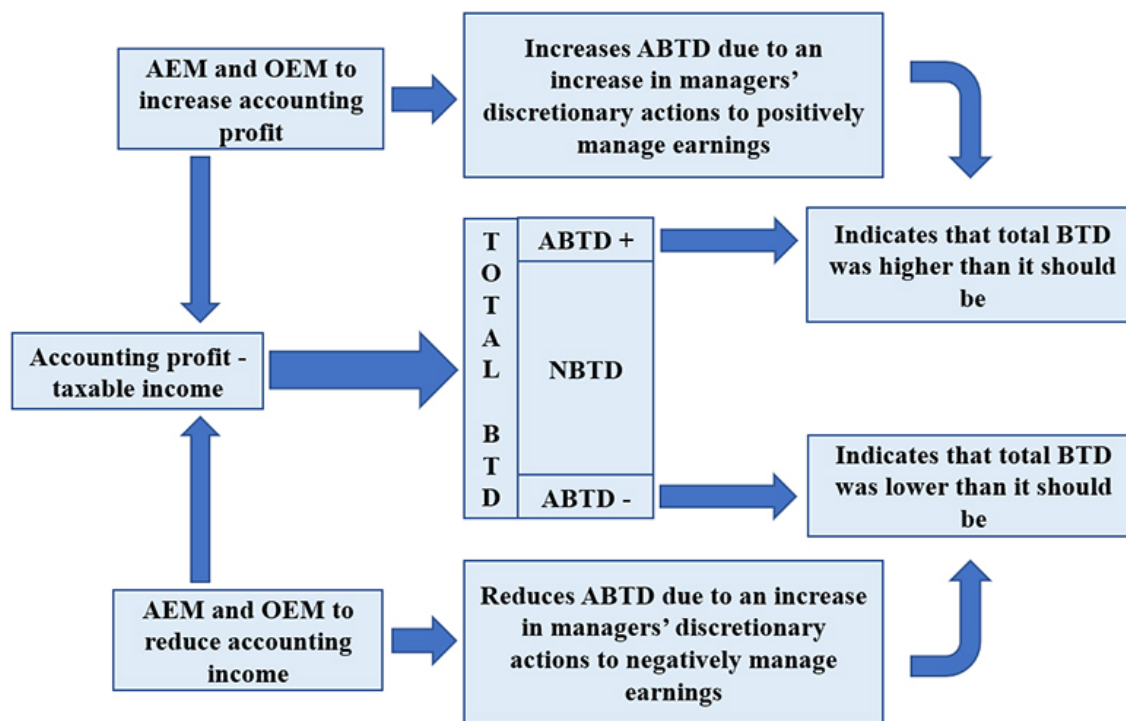The logic related to these hypotheses is described in Figure 1.

Figure 1 *Logical flow of the hypotheses*
ABTD = abnormal book-tax differences; BTD = book-tax differences; AEM = earnings management through accounting decisions; OEM = earnings management through operational decisions; NBTD = normal book-tax differences.
Source: *Elaborated by the authors.*

In short, the positive residuals of each EM model indicate manipulations to increase accounting profit. This increase leads to an increase in total BTD. Here, the increase in BTD was generated by managers' discretionary actions to engage in EM and not through the natural discretion that exists in the accounting rules to portray the reality of the company's business. Thus, total BTD is greater than it should normally be. This greater value caused by EM increases ABTD and is reflected with a positive sign. For that reason, the positive residuals of the EM model are expected to be associated with the positive residuals of the ABTD. The opposite occurs with the negative residuals.

It warrants highlighting that ABTD is composed of different variables, and not only of EM, so the previously explained logic indicates the increase in ABTD is due to earnings management to increase profit and the reduction in ABTD is the result of EM to reduce profit.

3. METHODOLOGICAL PROCEDURES

3.1 Universe, Sample, and Data Collection

The universe of this research are publicly-traded non-financial Brazilian companies with stocks traded on the *Brasil, Bolsa, Balcão* exchange (B3 S.A.) (former BM&FBOVESPA). These companies were chosen for the research due to the availability of information on them on websites. The sample was composed of non-financial companies that published all the data needed for the econometric models. Financial companies (banks, insurers, financial services, etc.) did not form part of the research as they have different accounting and tax characteristics, which could bias the result.

For example, up to mid-2015 financial institutions paid 15% in Social Contribution over Net Profit (CSLL), while mercantile companies paid 9%. From the second half of 2015 up to the end of 2018, the CSLL rate for financial institutions rose to 20%. In accounting terms, financial institutions also diverge with regards to the nature of their revenues and expenses, since for other

companies net revenue is derived from their main operations, while for financial institutions there are revenues from financial intermediations and expenses from financial intermediations derived from various asset and liability operations. The classifications of accounts are quite different between financial institutions and other companies, which causes changes in the disclosure of accounting statement information.

Moreover, holding companies were also excluded, as their activities are different from a company that targets a particular market based on a particular product.

These divergences in nature, tax rates, and classifications may create significant differences in the econometric models, as the variables calculated for these institutions would be based on accounts with a different nature and tax rates from the rest.

The data were collected from the Economatica® system or directly from the companies' footnotes. Consolidated statements were used. The research covers the period from 2012 to 2016, after the implementation of IFRS. It

should be mentioned that information from 2010 and 2011 was also collected, as the statistical models require calculations of the variations between one year and the next and there are models that require lagged variables.

The period was chosen to verify the behavior of the companies in relation to EM and BTD after the adoption of the new accounting standards that brought an increase in discretion (Baptista, 2009), which may indicate that harmonization with the international accounting procedures exerted an influence over the levels of EM in the companies and in relation to the abnormal part of the difference between accounting profit and taxable income (ABTD).

The research was conducted in two parts. The first involves the use of intermediate regressions to retrieve the residuals, and the second involves the use of the residuals removed from the intermediate models in a final model. These processes are explained in more detail in the next subsection.

Table 1 reveals the final sample of the intermediate models and the period analyzed.

Table 1

Composition of the final sample of the intermediate models (2011 to 2016)

Composition of the final sample	TF (2011)	Roy (2006)	Pae (2005) and ABJ (2003)
	2011 to 2016		2012 to 2016
1. Total non-financial companies	459	459	459
2. (-) Total exclusions of null or inverted values	-254	-254	-254
(-) Null fixed assets	-8	-8	-8
(-) Null or negative revenue	-35	-35	-35
(-) Null or zeroed operating cash flow	-87	-87	-87
(-) Null total assets	-16	-16	-16
(-) Null or inverted sales and administrative expenses	-5	-5	-5
(-) Null current income tax	-103	-103	-103
3. (=) Partial sample (1-2)	205	205	205
4. (-) Missing information	4	-	-
5. (=) Final sample (3-4)	201	205	205
6. Number of years analyzed	6	6	5
7. (=) Number of observations of the models (5 × 6)	1,206	1,230	1,025

Note: *The models indicated in the table are: TF (2011) = Tang and Firth (2011) model; Roy (2006) = Roychowdhury (2006) model; ABJ (2003) = Anderson et al. (2003) model; and Pae (2005) = Pae (2005) model.*
(-) indicates subtraction (minus); (=) indicates equality (equal to).
Source: *Elaborated by the authors.*

It is observed that for the Anderson et al. (2003) and Pae (2005) models only five years were analyzed, as these

models require lagged values and use information from previous periods to measure current variables.

The missing information shown in Table 1 refer to three companies whose financial period ends on a different date from December 31st; therefore, the values reported regarding tax loss used diverge from the data of the other companies and the one that is in receivership.

The sample of the final regression was formed of the companies common to the four models, which are 201 companies in the period from 2012 to 2016, totaling 1,005 observations.

To make the models more robust, the outliers were identified with the interquartile interval method. It was verified that the models had approximately 5% of outlier values. Thus, to treat the outliers, the decision was made to "winsorize" the variables in 2.5% of the extreme negative values and 2.5% of the extreme positive values.

3.2 Econometric Models

The model of Tang and Firth (2011), which was based on the model of Manzon and Plesko (2002), captures ABTD through the residual of the regression. The positive residuals indicate that the BTD is abnormally greater, an extra value that may have been generated by an increase in accounting profit or by a reduction in taxable income, as the BTD value is obtained by the difference between these. The negative residuals indicate that the BTD is abnormally smaller, a value that may have been generated by a reduction in accounting profit or by an increase in taxable income. The closer the value of the residual is to 0, the less the company has ABTD.

It warrants mentioning that in the model of Tang and Firth (2011), shown in Table 2, there are four independent variables that control the normal part of BTD (PPE, ΔNR, NOL, TLU), but in the original model there are five variables. The fifth independent variable of the original model is TAX_DIFF, which was not used in this study as it is difficult to measure. This variable is calculated by the difference between the tax rate of a particular company in relation to the mean rate tax of the economic group to which it belongs. As already mentioned, this research uses consolidated information and not that of individual statements of companies from an economic group, which makes it difficult to calculate the TAX_DIFF variable.

Even if the study was conducted using individual statements of the companies from a group, it would be difficult to calculate this variable because of the non-disclosure of the information needed to measure it, as there are various private corporations that comprise the economic groups studied. These companies are not subject to the same rules and disclosure laws required for public corporations.

To identify accounting EM, Pae's (2005) model was used. Over time, Jones' (1991) model has been adjusted and improved by various researchers (Dechow et al., 1995, 2012; Kothari et al., 2005; Pae, 2005). Pae's (2005) model was chosen for this research because it controls the impacts of the company's operating cash flow and the reversals of accruals from previous periods. For that reason it is known as the "modified Jones model with cash flows and lagged accruals" (Pae, 2005).

The inclusion of cash flow in the model helps to control the negative correlation between current accruals and operating cash flow and the positive correlation between current accruals and operating cash flow from the previous period (Pae, 2005). The inclusion of accruals from the previous period as an independent variable serves to control the reversals occurring from one period to another, as this variable mitigates incorrect specifications caused by the inclusion of correlated non-discretionary accruals (Dechow et al., 2012).

Finally, following the recommendations of Kothari et al. (2005), the linear coefficient was also included in the regression, as including the constant in the model provides the additional control for the heteroscedasticity not totally controlled by the use of total assets as a deflationary variable and mitigates the problems of the omitted size variable and the DA measures based on models without the constant being less symmetrical, which makes the comparisons of the tests less clear.

In Pae's (2005) model, the ΔNR-ΔRecb, PPE, OCF of the current period, and lagged OCF represent the part of the companies' non-discretionary accruals, considered the non-managed part of total accruals. Lagged total accruals ($TAcc_{it-1}$) control the normal reversals of the period of the accruals generated in previous periods. Thus, the discretionary accruals are captured by the regression error and represent EM. The positive residuals represent the EM carried out to increase the company's profit, while the negative residuals represent the accounting EM for reducing the company's accounting profit. The closer the residual is to 0, the less to company manages its earnings via accounting decisions.

Table 2 reveals the models used and the variables contained in the regressions.

Table 2

Econometric models used

| Variables | Intermediate Models | | | | Final |
	TF (2011)	Pae (2005)	ABJ (2003)	Roy (2006)	
Y	$\dfrac{BTD_{it}}{TAss_{it}}$	$\dfrac{TAcc_{it}}{TAss_{it-1}}$	$Ln\left(\dfrac{SGA_{it}}{SGA_{it-1}}\right)$	$\dfrac{OCF_{it}}{TAss_{it-1}}$	ABTD
β0	Constant	Constant	Constant	Constant	Constant
β1X1	$\dfrac{PPE_{it}}{TAss_{it}}$	$\dfrac{1}{TAss_{it-1}}$	$Ln\left(\dfrac{RL_{it}}{RL_{it-1}}\right)$	$\dfrac{1}{TAss_{it-1}}$	$Ln\,TAss_{it}$
β2X2	$\dfrac{\Delta NR_{it}}{TAss_{it}}$	$\dfrac{\Delta NR - \Delta Recb_{it}}{TAss_{it-1}}$	$Ln\left(\dfrac{NR_{it}}{NR_{it-1}}\right) x\ DNR_{it}$	$\dfrac{\Delta NR_{it}}{TAss_{it-1}}$	AEM_{it}
β3X3	$\dfrac{NOL_{it}}{TAss_{it}}$	$\dfrac{PPE_{it}}{TAss_{it-1}}$	$Ln\left(\dfrac{NR_{it-1}}{NR_{it-2}}\right)$	$\dfrac{NR_{it}}{TAss_{it-1}}$	$OEM\ Exp_{it}$
β4X4	$\dfrac{TLU_{it}}{TAss_{it}}$	$\dfrac{OCF_{it}}{TAss_{it-1}}$	$Ln\left(\dfrac{NR_{it-1}}{NR_{it-2}}\right) x\ DNR_{it-1}$		$OEM\ Sales_{it}$
β5X5		$\dfrac{OCF_{it-1}}{TAss_{it-1}}$			
β6X6		$\dfrac{TAcc_{it-1}}{TAss_{it-1}}$			

Note: *The models indicated in the table are: TF (2011) = Tang and Firth (2011) model; Roy (2006) = Roychowdhury (2006) model; ABJ (2003) = Anderson et al. (2003) model; and Pae (2005) = Pae (2005) model.*

$\Delta Recb_{it}$ = variation in customers from period t-1 in relation to period t-1 of firm i; ΔNR_{it} = variation in the net revenues of company i from period t-1 for year t; $ABTD_{it}$ = abnormal book-tax differences, abnormal part of BTD (residuals) taken from the Tang and Firth (2011) regression of company i of period t; $TAss_t$ = total assets of firm i in year t; $TAss_{it-1}$ = total assets of firm i in year t-1; BTD_{it} = total difference between the accounting profit and taxable income of company i of period t; DNR_{it} = dummy variable that indicates the behavior of the variation in the net revenue of period t-1 for year t (the variable takes the value 1 if $NR_{it} < NR_{it-1}$ and 0 otherwise); DNR_{it-1} = dummy variable that indicates the behavior of the variation in net revenue of period t-2 for year t-1(the variable will take the value 1 if $NR_{it-1} < NR_{it-2}$ and 0 otherwise); OCF_{it} = operating cash flow of company i of period t; AEM_{it} = accounting earnings management, the discretionary accruals (residuals) taken from the Pae (2005) regression of company i of period t; $OEM\ Exp_{it}$ = operational earnings management through expenses represented by the abnormal sales, general, and administrative expenses (residuals) taken from the ABJ (2003) model of company i in year t; $OEM\ Sales_{it}$ = operational earnings management through sales represented by the abnormal operational cash flow (residuals) taken from the Roy (2006) model of company i in year t; $LnTAss_{it}$ = control variable of company size measured by the natural logarithm of the total assets of company i in year t; NOL_{it} = generated tax loss of company i in period t identified by the accounting loss in the financial period; PPE_{it} = fixed and intangible assets of company i in period t; NR_{it} = net revenue of company i in period t; NR_{it-1} = net revenue of company i in period t-1; NR_{it-2} = net revenue of company i in period t-2; $TAcc_{it}$ = total balance sheet accruals of firm i in period t calculated by the difference in the net profit of period t minus the operating cash flow of period t; $TAcc_{it-1}$ = total balance sheet accruals of firm i in period t-1; TLU_{it} = tax loss offset by company i in period t; SGA_{it} = sales, general, and administrative expenses of company i in year t; SGA_{it-1} = sales, general, and administrative expenses of company i in year t -1.

Source: *Elaborated by the authors.*

The Anderson et al. (2003) model was applied as it is widely used in the literature on OEM research and concerning stick costs, as in the studies of Gunny (2010), Martinez and Cardoso (2009), Richartz et al. (2014), Santos et al. (2011), and Zang (2012), among others. This model identifies operational management through sales, general, and administrative expenses. The amount of these expenses generated to manage earnings is represented by the residual (error) of the regression.

Following the procedure used in the literature (Martinez & Cardoso, 2009; Zang, 2012), the residuals were multiplied by -1 to change their interpretation as follows: positive residuals indicate abnormal cuts in expenses to increase accounting profit and negative ones indicate abnormal generation of expenses to reduce accounting profit. The closer the value of the residual is to 0, the less management there is through manipulation of the company's sales, general, and administrative expenses.

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The second model for capturing operational EM is the one proposed by Roychowdhury (2006), based on the model of Dechow et al. (1998), which estimates normal operating cash flow as a linear function of sales and of variation in these in the period. Abnormal operating cash flow is identified by the residual of the regression and indicates operational management of sales.

The positive residuals indicate that the company's total cash flow was positively influenced by the manipulations of sales, which reveals manipulation of sales to increase accounting profit as the extra sales are recognized in the accounting (Roychowdhury, 2006). In contrast, the negative residuals indicate that the company's total cash flow was lower than it should have been, revealing the manipulation of sales to reduce accounting profit. The closer the value of the residual is to 0, the less the company managed its earnings through sales.

The previously explained regressions were only generated in order to extract the residuals and thus enable the execution of the final model.

It is important to highlight that the data and results should be analyzed thoroughly, because in the final regression the variables that capture accounting and operational management are derived from residuals of other regressions. Care needs to be taken not to treat the negative residuals in the model as low EM in relation to the positive residuals. For example, a company that has a residual (AEM) of -5 indicates the same intensity of management as a company that presents a residual (AEM) of +5, however in different directions, as the former managed its earnings downward, while the latter managed them upward.

To reveal whether the management explains the ABTD and, consequently, the total BTD, it is necessary for the coefficients of the AEM, OEM Sales, and OEM Exp variables to be statistically different from 0 ($\beta \neq 0$). Besides the statistical difference, the coefficients of the three variables are expected to be positive, as, according to Tang and Firth (2011), managers' discretionary attitudes generate ABTD.

The data are organized in a balanced panel; therefore, it was verified among the pooled, fixed effects (FE), and random effects (RE) models whether there is one that is more adherent to the data of each regression, according to the Chow, Breusch-Pagan, and Hausman tests.

4. RESULTS

4.1 Presentation of the Results

The first part of the analysis consists of verifying the correlation between the variables of the final model. The results presented in Table 3 show that ABTD presents a positive and significant correlation with EM through accounting accruals and operational decisions concerning expenses. This indicates, univariately, that OEM Sales does not present a relationship with ABTD (non-significant, although positive).

Finally, it is possible to note that, among the independent variables (the EM variables), the only significant relationship is that of the AEM and OEM Exp variables (correlation of 0.0635, significant at 5%). Correlations between independent variables of a regression may indicate multicollinearity problems, so it was necessary to carry out a specific test [variance inflation factor (VIF)] to verify if that correlation indicates some collinearity problem in the final model. The results of this VIF are explained later.

Table 3
Result of the correlation analysis

$ABTD_{it}$	AEM_{it}	$OEM\ Exp_{it}$	$OEM\ Sales_{it}$	
1	**0.55212563**	**0.06995893**	0.02757379	$ABTD_{it}$
p-value	**< 0.0000**	**0.0266**	0.3825	
	1	**0.06350340**	-0.04679032	AEM_{it}
p-value		**0.0441**	0.1383	
		1	-0.00321449	$OEM\ Exp_{it}$
p-value			0.9189	
			1	$OEM\ Sales_{it}$

Note: *The variables are described in Table 2.*
The correlations significant at 5% are in bold.
Source: *Elaborated by the authors.*

Table 4 shows the p-values of the Chow, Breusch-Pagan, and Hausman tests to reveal whether there is a more consistent model among the pooled or FE or RE models.

Table 4

p-values and result of the Chow, Breusch-Pagan, and Hausman tests

Regressions	Chow		Breusch-Pagan		Hausman		Model generated
TF (2011)	< 0.0001	FE	< 0.0001	RE	< 0.0001	FE	FE
Pae (2005)	< 0.0001	FE	0.4969	Pooled	< 0.0001	FE	FE
ABJ (2003)	0.8021	Pooled	0.1204	Pooled	< 0.0001	FE	Pooled
Roy (2006)	0.9985	Pooled	0.0004	RE	0.0012	FE	FE*
Final	1.0000	Pooled	< 0.0001	RE	0.0465	FE	FE*

Note: *The models indicated in table are: TF (2011) = Tang and Firth (2011) model; Roy (2006) = Roychowdhury (2006) model; ABJ (2003) = Anderson et al. (2003) model; and Pae (2005) = Pae (2005) model. The fixed effects (FE) models controlled the individual and temporal heterogeneities.*
RE = random effect.
* = model generated decided by the authors.
Source: *Elaborated by the authors.*

Table 4 shows that the p-values lower than the significance level of the Chow and Hausman tests for the Pae (2005) and Tang and Firth (2011) models indicate that the FE regression is the most adherent. As for the Anderson et al. (2003) model, the p-values higher than 0.1 in the Chow and Breusch-Pagan tests indicate that the most consistent regression is the pooled one.

For the Roychowdhury (2006) and final models, each test revealed a different model as the most adherent, so it is up to the researcher to choose one of the three. Gujarati and Porter (2011) explain that pooling the data (pooled model) does not take into consideration the heterogeneity (individual and temporal) that exists over time and between companies, such as the sector that the companies belong to and location, among others, which are important factors in the studies on EM. Therefore, it is important to control these heterogeneities. Thus, the decision was made to adopt the FE model for the Roychowdhury (2006) regression and for the final model and hence generate the residuals free of these differences caused by the temporal and individual heterogeneity of the companies.

With relation to the assumptions of the regression, it was identified that the distributions of the errors are not normal in the models analyzed. However, the normality assumption can be relaxed when the sample has a large number of observations (Stevenson, 1981). For the case

of the White test for homoscedasticity, in turn, it is observed that all the regressions have heteroscedastic residuals. Thus, all the models were adjusted for White robust standard errors.

Finally, in relation to the collinearity assumption, it was observed that the VIF of the variables of each model was lower than 10. In the intermediate models, the VIFs were between 1.0 and 1.461. In the final model, the VIF of the LnTAss control variable was 1.003, while the management variables were 1.006 for AEM, 1.007 for OEM Exp, and 1.002 for OEM Sales, concluding that there are no multicollinearity problems in any of the models.

It is important to highlight that the VIF of the AEM and OEM Exp variables indicated non-collinearity of them in the regression, as the correlation analysis revealed a significant correlation between these two variables, initially indicative of possible collinearity between them. With the VIF analysis, therefore, it is identified that the correlation between these two variables did not generate collinearity problems in the regression.

All the assumptions were analyzed and reveal that the models are robust; so, it remains to analyze the results of the intermediate models and of the final model (Table 5).

The p-value lower than 0.1 of the F test or of the Wald χ^2 test of the models indicates that the R^2 in all the regressions is significant.

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Table 5

Results of the intermediate and final models

Models:	Intermediate Models				Final
	TF (2011)	Pae (2005)	ABJ (2003)	Roy (2006)	
Variable	Constant	Constant	Constant	Constant	Constant
Coefficient	0.0314106	0.00742370	0.0312284	-0.0317908	0.241492
Stand. Coeff.	-	-	-	-	0
t-ratio	3.355	0.4658	5.0876	-2.773	1.430
p-value	0.0009***	0.6418	< 0.0001***	0.0061***	0.1543
Variable	PPE_{it}	$1 / TAss_{it-1}$	$Log\left(\dfrac{NR_{it}}{NR_{it-1}}\right)$	$1/TAss_{it-1}$	$LnTAss_{it}$
Coefficient	-0.0401860	2592.48	0.418032	-374.003	-0.0162769
Stand. Coeff.	-	-	-	-	-0.914536
t-ratio	-1.777	1.092	8.7482	-0.7650	-1.424
p-value	0.0772*	0.2761	< 0.0001***	0.4452	0.1559
Variable	ΔNR_{it}	$\Delta NR - \Delta Recb_{it}$	$Log\left(\dfrac{NR_{it}}{NR}\right)xDNR_{it}$	ΔNR	AEM
Coefficient	0.0513580	0.0965618	-0.00873842	-0.0294539	0.445125
Stand. Coeff.	-	-	-	-	0.533763
t-ratio	2.787	4.093	-0.1697	-1.296	10.98
p-value	0.0058***	< 0.0001***	0.8653	0.1964	< 0.0001***
Variable	NOL_{it}	PPE_{it}	$Log\left(\dfrac{RL_{it-1}}{RL_{it-2}}\right)$	NR_{it}	OEM Exp
Coefficient	-0.308080	0.0775007	0.0901777	0.0644925	0.0378901
Stand. Coeff.	-	-	-	-	0.0180053
t-ratio	-3.438	2.255	2.4026	3.588	1.963
p-value	0.0007***	0.0252**	0.0164**	0.0004***	0.0511*
Variable	TLU_{it}	OCFt	$Log\left(\dfrac{NR_{it-1}}{NR_{it-2}}\right)xDNR_{it-1}$		OEM Sales
Coefficient	-0.00716605	-1.01273	-0.0195406		0.0453484
Stand. Coeff.	-	-	-		0.0613267
t-ratio	-1.942	-21.29	-0.7366		1.676
p-value	0.0535*	< 0.0001***	0.4615		0.0953*
Variable		OCFt-1			
Coefficient		0.161198			
Stand. Coeff.		-			
t-ratio		2.431			
p-value		0.0159**			
Variable		TAcct-1			
Coefficient		0.121679			
Stand. Coeff.		-			
t-ratio		2.261			
p-value		0.0248**			
R²	0.640054	0.774534	0.245307	0.157420	0.348874
F or Wald χ² p-value	< 0.0001***	< 0.0001***	< 0.0001***	< 0.0001***	< 0.0001***

Note: *The models indicated in table are: TF (2011) = Tang and Firth (2011) model; Roy (2006) = Roychowdhury (2006) model; ABJ (2003) = Anderson et al. (2003) model; and Pae (2005) = Pae (2005) model. The variables are described in Table 2.*

*** = significant at 1%; ** = significant at 5%; * = significant at 10%.

Source: *Elaborated by the authors.*

First, the analysis of the intermediate models indicated that the lowest R^2 was that of the Roychowdhury (2006) model, at 15.74%, while the highest was 77.45%, for the Pae (2005) model. It is observed that most of the independent variables were significant in their models and with the expected signs. Thus, it is possible to affirm that, in general, the intermediate models were consistent and that the residuals generated and extracted from each model to run the final regression are robust.

The final regression obtained an R^2 of 34.88% and all the independent variables were significant in the model, indicating that the accounting EM and operational EM through manipulation of sales and sales, general, and administrative expenses have a relationship with ABTD.

As expected, the significant (at at least 10%) and positive coefficients of the variables indicate that the accounting EM and operational EM through manipulation of sales and sales, general, and administrative expenses carried out to increase accounting profit generate positive ABTD, while the accounting EM and operational EM executed to reduce accounting profit generate negative ABTD.

It is important to highlight that the results should be interpreted with caution, in order to avoid errors in the affirmations. As explained in the methodological procedures, the negative residuals do not indicate low EM to the detriment of positive EM. The signs of the residuals merely indicate the direction of the EM, in which positive EM indicates management to increase accounting profit and negative EM indicates management to reduce it.

Therefore, the further from 0 the value of the residual is, in any direction, the greater the company's EM. Thus, it is not possible to read the results as follows: the greater the EM, the greater the ABTD.

These results lead to the non-rejection of the three research hypotheses, as the three forms of EM were shown to be significant at at least 10% and with the expected signs. Therefore, it is observed that ABTD captures the managers' discretionary actions via AEM and via EM using operational choices.

From analyzing the values of the standardized coefficients of the final regression, it is observed that accounting EM has the highest value, followed by OEM through sales and then OEM through expenses. This indicates that, among the three variables that represent EM, AEM is the one that most explains ABTD, while operational EM through sales explains less that AEM, but more than operational EM through expenses. It is possible to note that the impact generated over ABTD by OEM through expenses equals 3.37% of the impact generated by AEM, while OEM through sales decisions has an impact equivalent to 11.48% of the impact of AEM.

Due to the possible endogeneity problems between the independent variables and the dependent variable caused by the simultaneity between them, the decision was made

to analyze the robustness of the results of the final model, following the recommendations of Reinaldo (2017), Roberts and Whited (2012), and Wooldridge (2002 and 2008). In other words, the results below seek to test the robustness of the findings of the present research for the case of there being reverse causality between ABTD and the EM variables (AEM, OEM Sales, and OEM Exp).

According to Roberts and Whited (2012) and Wooldridge (2002), there are two pathways for processing the data suspected of endogeneity: through the use of panel data and through the use of the generalized method of moments (GMM) estimator.

According to Reinaldo (2017) and Roberts and Whited (2012), the use of panel data, more specifically FE, can offer a partial solution for the endogeneity problem, provided it is not derived from a correlation between the error and the independent variables. This means that the simultaneity problems have already been addressed (even if partially) by the FE estimation.

For Wooldridge (2008), in turn, GMM estimation using instrumental variables (GMM-IV) offers a more definitive solution for any endogeneity problem. For it to be adequate, an instrumental variable should not have any correlation with the errors, but it should have with at least one of the regressors. Thus, to validate the instruments, the Hausman tests for consistency of the instruments, the Sargan test for over-identification of the instruments, and the J-test for poor specification of the instruments were all carried out.

The results for this robustness analysis with GMM-IV estimation are summarized in Table 6.

Table 6

Results of the robustness analysis [Generalized Method of Moments (GMM-IV)] for the final model

Variable	$LnTAss_{it}$
Coefficient	0.002996
p-value	0.1666
Variable	AEM_{it}
Coefficient	0.480252
p-value	< 0.0001***
Variable	$OEM\ Exp_{it}$
Coefficient	-0.259896
p-value	0.1628
Variable	$OEM\ Sales_{it}$
Coefficient	0.086489
p-value	0.0084***

Note: *Instrumental variables – $OperExp_t/TAss_{t-1}$; $OCF_t/TAss_{t-1}$; $EBT_t/TAss_{t-1}$; $PPE/TAss_{t-1}$; $NR/TAss_{t-1}$. The other variables are described in Table 2. Validation tests of the instruments (p-value): Hausman (0.000167); Sargan (0.566313); and J-test (0.513200).*

Source: *Elaborated by the authors.*

The following instruments were used for the GMM estimation: earnings before income tax, operating cash flow, operating expenses, net revenue, and fixed plus tangible assets, with all being divided by the total assets of the previous period. Based on Table 6, it is perceived that the results of the tests for validating the instruments show that these are adequate, given that the Hausman test indicates that the GMM estimates are consistent and the Sargan and J-test show that the instruments are not over-identified nor poorly specified, respectively.

Moreover, Table 6 shows that, in general, the results obtained in the initial analysis presented in Table 5 are maintained, with reinforcement of the significance of the impact of the OEM Sales variable. Thus, in general, the results presented are robust to possible endogeneity problems derived from simultaneity and reverse causality between the ABTD dependent variables and the EM independent ones. The only exception is due to the OEM Exp variable, which in the GMM-IV model was not shown to be significant. It is noted that, in all the previous analyses, this variable was the one that presented the least importance in explaining the behavior of ABTD.

4.2 Discussion of the Results

These results are important, as they can serve as a tool for helping to identify manager opportunism related to EM.

As explained in the theoretical framework, accounting EM can be economically detrimental for users, as the accounting information disclosure would not be trustworthy, which is one of the fundamental qualitative characteristics of accounting, according to the Accounting Pronouncements Committee (CPC, 2019).

Martinez (2008) explains that accounting EM compromises informational quality and may cause damage to the capital market. Sunder (2014) argues that the greater the EM is, the lower the accounting information quality will be.

As positive ABTD signals that companies are managing their accounting profit upward and negative ABTD signals downward earnings management, accounting information users could use these findings to assist them in certain decisions.

Investors can remain alert in relation to companies they intend to invest in or in which they already invest in order to avoid economic losses with stocks in companies that engage in large scale earnings management, for example. Another point to highlight is dividends, which are also affected by earnings manipulation.

This result may also serve as a parameter for auditing firms when deciding on the level at which to analyze

the accounting statements of a particular company. Companies with ABTD far from 0 could be analyzed more than the rest.

For creditors, it could serve as a tool for helping to identify a company's credibility. Companies may manage their earnings to communicate a result needed to obtain or maintain particular credit (Sweeney, 1994).

In relation to OEM, in turn, this could lead to certain financial problems, as, unlike accounting EM, which uses accruals, operational manipulations affect company cash flow (Zang, 2012). Thus, managing earnings through operational decisions via sales and sales, general, and administrative expenses is also detrimental to accounting information users.

As operational manipulations affect company cash flow, it would be interesting for investors to take into consideration, when financially analyzing their investments, if the abnormal cash flow generated by operational manipulations would be sufficiently significant to the point of causing differences in the analyses conducted.

As creditors do not only use company profit to determine whether to approve credit, but also evaluate the company's financial capacity, the findings of this study may help these creditors to determine that capacity. Operational manipulations generate anomalies in cash flow, and so companies may have future financial problems and thus not be able to cover all their obligations.

It is thus noted that the results of this study could serve in several situations for various accounting information users.

With relation to the previous studies, the findings of this research corroborate that of Tang and Firth (2011), who revealed that ABTD is generated by managers' opportunistic behaviors to manage earnings, and they partially corroborate the findings of Dridi and Boubaker (2015), who also revealed a significant, though negative relationship between ABTD and AEM and OEM.

In comparison with the national research, the result of this study contradicts those of Formigoni et al. (2009) and Furtado et al. (2016), who did not find any relationships between ABTD and AEM. It complements the results of Ferreira et al. (2012), who revealed a positive relationship between total BTD and AEM, and those of Piqueras (2010), who revealed a correlation between AEM and ABTD, albeit a very weak one. It also corroborates the findings of Brunozi et al. (2018), who revealed a positive relationship between ABTD and AEM for the whole period of the research and also for the post-IFRS period, while for the pre-IFRS period it was not significant.

It has been identified that the international accounting standards (IFRS) led to an increase in manager discretion

(Baptista, 2009; Ribeiro et al., 2016) and changes in EM levels (Cardoso et al., 2015; Tendeloo & Vanstraelen, 2005). This increase in discretion and changes in EM levels may have also affected the relationship between EM and ABTD.

Besides the period studied, the results may differ due to methodological differences in the models, data collection, and database, among others. Table 7 highlights the main methodological aspects of each study for comparative purposes.

Table 7

Methodological comparison of the research with the previous national studies

	Research data	**Formigoni et al. (2009)**	**Piqueras (2010)**	**Furtado et al. (2016)**	**Brunozi et al. (2018)**
Stock exchange	B3	Bovespa	Bovespa	BM&FBOVESPA	B3
Number of companies	201	46	147	97	290
Total observations	1,005	276	1,029	1,358	4,060
Period	2012-2016	2000-2005	1999-2007	1999-2012	2002-2015
Database	Economatica	Economatica	Economatica	Economatica	Economatica
Companies excluded	Financial and holding	Holding	None	Financial, fund, and insurance	Financial
Significant and expressive result	Yes	No	No	No	Yes

B3 S.A. = Brasil, Bolsa, Balcão; BM&FBOVESPA = São Paulo Stock, Commodities, and Futures Exchange.
Source: *Elaborated by the authors.*

Table 7 may indicate that the differences in results between the studies could be a consequence of a combination of three points: (i) number of companies analyzed, as it is verified that the present study and that of Brunozi et al. (2018) analyzed more than 200 firms; (ii) excluded companies – as explained in the methodological procedures of this study, analyzing companies with very

different natures and operations in a similar way could bias the result; (iii) research period – the two studies that generated significant and expressive results extend the research to more recent years, to post-IFRS periods, while the others use data essentially from the pre-IFRS period, which reinforces the argument in this study and the findings of Brunozi et al. (2018).

5. CONCLUSION

This study aimed to identify whether ABTD captures the discretionary actions of managers (EM). To achieve that objective, 201 non-financial companies listed on the B3 were analyzed, using data covering 2012 to 2016, thus totaling 1,005 observations, organized in a balanced panel.

Five different models were used, four of which were intermediate and one was final: that of Pae (2005) was used to identify AEM; those of Roychowdhury (2006) and Anderson et al. (2003) were used to identify OEM, in which the first captures it through sales manipulation and the second does so through manipulation of sales, general, and administrative expenses; that of Tang and Firth (2011) served to identify ABTD, the dependent variable used to relate with EM; and the final model served to relate the residuals taken from the intermediate models and thus verify if the variables are related.

It was identified that EM through accounting choices and OEM, through manipulation of sales and manipulation of expenses (to a lesser degree), have a statistically significant and positive relationship with ABTD, indicating that the companies that manage their earnings through accounting or operational means to increase their profit have positive ABTD, while the companies that manage their earnings to reduce it have negative ABTD.

The explanatory power of the final regression was 34.88%, which means that the accounting management and operational management through sales and through sales, general, and administrative expenses explain around 34.88% of the variation of the ABTD.

The findings could be used by information users to help in their decision making. ABTD values different from 0 are associated with high earnings management, so investors,

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creditors, and auditing firms could be more rigorous in their analyses regarding those companies and, thus, avoid making rash decisions. EM can lead to economic and financial problems for companies and for users, as abnormal profits caused by EM can generate an abnormal share price or abnormal dividend payments.

This study was conducted with data taken from a period in which IFRS was already adopted in full, unlike other previous national studies elaborated before the application of IFRS and during their partial application. Therefore, the significant relationships found in the models of this study, unlike most of the previous studies, may be a result of that difference in the accounting standards.

Another contribution to highlight is the methodological improvement with the inclusion of new variables. Up until now, the models associating EM with ABTD have taken into consideration AEM, tax management, and operational EM in an aggregated way. The previous studies did not consider operational EM in an individual way (each type of OEM as a different variable in the model). The inclusion of the variables that represent operational EM individually may have made the model more consistent and thus given it significance and stronger explanatory power, unlike in the previous national studies.

The main limitations of the study relate to the methodological procedures. Convenience and exclusion sampling were used, rather than random sampling, which may mean that the results cannot be generalized to all the companies of the population. Moreover, as in any other study on EM via accruals or operational decisions, in this one the residuals (abnormal behavior of the dependent variable) of the EM models are interpreted as indications of managers' opportunistic behavior, which would be detrimental to the accounting information quality. However, according to Scott (2015), abnormal variations in the EM models may indicate positive EM behavior. This is because managers, as they have internal/privileged information, may use EM (income smoothing, for example) to signal private information they have to the market. Scott (2015) further argues that, due to so-called "blocked communication," this is the only alternative managers have to make private information reach the market. Therefore, the non-explicit consideration of the possibility of "good" EM is another limitation of this study.

As a suggestion for future research, we propose including new variables in the model, as an explanatory power of 34.88% was revealed, so 65.12% of the behavior is not explained and may derive from other types of operational earnings management, such as the sale of fixed assets and investments, or taxable income management. It would be interesting to verify how the model behaves in other populations such as financial companies, for example. Finally, to confirm whether the research period had an influence on the findings, it would be necessary to compare the relationship between EM and ABTD before, during, and after the adoption of IFRS.

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