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EARNINGS MANAGEMENT BY OPERATIONAL DECISIONS AND DEBT FINANCING IN THE BRAZILIAN CAPITAL MARKET[1]

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ABSTRACT

This article analyzed if earnings management by operational decisions at publicly held companies is influenced by companies' capital structures. It verified if some companies with a greater emphasis on debt financing would be more likely to practice earnings management by operational decision. The study used a sample of the non-financial publicly held companies listed in the Brazilian capital market in the period from 2010 to 2018. As a result, it was found that there was a significant and positive correspondence between greater debt financing and a higher frequency of earnings management. Therefore, the increase in debt financing, regardless of the proxy used, implied an increase in earnings management by operational decisions. Furthermore, by analyzing the ratio between debt and equity it was found that the greater the long-term debt to the detriment of short-term debt, the more likely the managers of the firms will be to manage the results. Finally, in terms of the control variables created, the negative and significant relationship between corporate governance and earnings management in the analysis of long-term debt financing stands out.

Keywords: Capital structure. Earnings management by operational decisions. Brazilian capital market.

GERENCIAMENTO DE RESULTADOSPOR DECISÕES OPERACIONAIS E FINANCIAMENTO POR DÍVIDA NO MERCADO DE CAPITAIS BRASILEIRO

RESUMO

Este artigo analisou se o gerenciamento de resultados por decisões operacionais nas companhias abertas apresenta relação com a estrutura de capital. Buscou-se verificar se firmas com maior ênfase em financiamento por dívida teriam maior tendência a praticar gerenciamento de resultados por meio de decisões de natureza operacional. Utilizou-se como amostra as companhias abertas não financeiras listadas no mercado de capitais brasileirono período de 2010 a 2018. Como resultado, foi verificado que houve uma correspondência significante e positiva entre maior financiamento por dívida e maior frequência de

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gerenciamento de resultados. Sendo assim, o aumento do financiamento por dívida, independentemente da *proxy* utilizada, implicou em um aumento do gerenciamento de resultados por decisões operacionais. Ademais, foi verificado pela análise do quociente entre dívidas e capital próprio que quanto maior for a dívida de longo prazo em detrimento dívida de curto prazo, mais propensos os gestores das firmas estarão a gerenciar os resultados. Por fim, em termos das variáveis de controle criadas, destaca-se a relação negativa e significativa verificada entre governança corporativa e gerenciamento de resultados na análise de financiamento da dívida de longo prazo.

Palavras-chave: Estrutura de capitais. Gerenciamento de resultados por decisões operacionais; Mercado de capitais brasileiro.

1 INTRODUCTION

An extensive earnings management literature indicates that managers can distort the firm's financial information to impact the firm's stock market valuation. The firm's capital structure can generate different incentives for managers to manipulate accounting results. According to Watts and Zimmerman (1986), managers of firms predominantly financed by debt, *ceteris paribus*, are more motivated to select accounting procedures to manage results due to the need to ensure the prospects of investors according to what is established in contractual clauses. When companies have high levels of indebtedness, especially in the long term, managers understand that the cost of carrying out restrictive clauses in contracts (covenants) is higher than the earnings quality (GHOSH; MOON, 2010). When the indebtedness reaches high levels, managers understand that covenants cost is higher than the earnings management and, therefore, would choose to do so.

One can assume that the various users of the financial statements cannot differentiate between the results obtained due to the company's activities from those disclosed due to manipulation. Thus, in the context of the capital market with asymmetric information, managers, who are the best-informed part, can use this advantage to obtain benefits.

According to Kothari, Mizik and Roychowdhury (2016), earnings management can occur through two channels: accruals management and real activities management. In accruals-based earnings management, managers exercise judgment regarding accounting choices to interfere in the financial report. To the authors, the most important difference between accruals and real earnings is the generally accepted accounting principles (GAAP) that provide a framework for adequate accounting principles but there is no such framework for real operations. While auditors assess whether firms' accounting practices meet GAAP, real activities management arises from managers' operational decisions.

Earnings management through real decisions also has the characteristic that they cannot be considered as fact management by, for example, audit firms since they can be justified by companies as being strategic decisions linked to the dynamics of their businesses.

As claimed by Ghosh and Moon (2010), even though debt can have a positive influence on earnings management because of information quality's impact on lowering financing costs, when debt is high, managers may choose to manage earnings to avoid covenant violations.

Given the perspective that there are incentives for earnings management related to the company's capital structure and once there are diverging interests between creditors and managers/shareholders, this study aims to answer the following research question: what is the relation between earnings management by operating decisions and the firm's debt financing?

Therefore, the objective of this research is to verify whether earnings management by operational decisions of non-financial publicly held companies listed in the Brazilian capital market in the period from 2010 to 2018 is related to their capital structure. The development of this work is justified by the fact that previous studies have found that the quality of accounting information plays an important role in the evaluation of economic performance and the valuation process of the company. Also, earnings management by operational decisions has a direct impact on the company's operating cash flow, and since most studies focus on earnings management through discretionary accruals, this work intends to contribute to the literature on earnings management and capital structure in Brazil.

2 LITERATURE REVIEW

2.1 Capital structure

The complex functioning of the financial market and business competitiveness demands constant investments to develop new products, open new markets and insert new technologies. In this way, there is also a constant need to seek new sources of funds, whether through equity or debt.

Such sources are the object of study in capital structure literature and research on this topic aims to explain the determinants of debt and equity financing in the capital structure. Seminal studies, such as Durand (1952) and Modigliani and Miller (1958, 1963), contributed to discussions about the way companies select the composition of capital used to finance their

projects and investments, as well as showing that the use of different sources of funds can impact a company's value creation.

The current stage of this theme in Modern Finance Theory is due to contributions from seminal studies of Durand (1952), represented by the Conventional Theory, in which the author claims the existence of an optimal capital structure capable of maximizing the firm's value by reducing the total cost of capital involved to obtain resources from different sources of funding. Thus, due to a minimum total cost of capital, the firm's market value increases, and consequently, the shareholder's wealth increases. On the other hand, Modigliani and Miller (1958), in their Theory of the Irrelevance of Capital Structure, shows that considering conditions of "perfect capital markets" (no transaction costs, bankruptcy, and asymmetric information) and the absence of taxes, a firm's total cost of capital and, consequently, its market value, are independent of its capital structure. Therefore, the financing decisions would be irrelevant, as they would not add value to the company, and in this way, only issues related to the firms' productive investment decisions would matter. Therefore, according to the theoretical prepositions raised by the authors in their seminal work, there would not be an optimal capital structure.

However, later, Modigliani and Miller (1963) started to consider the effect of taxes on their theoretical model. The authors concluded that, with the possibility of tax advantages arising from debt financing, the cost of capital involved reduces and, thus, becomes important in determining the value of the firm. In other words, the presence of taxes in the economy would imply a better value for the firm that is financed through debt compared to the case of financing only by equity.

From the contributions of these seminal works, several works about how firms finance themselves were carried out and other theories were elaborated to explain what determines fund's raise using equity or debt by companies. Among these, we highlight the Trade-off theory, the Free Cash Flow theory, and the Pecking Order theory.

Myers (2001) summarizes the main reasons why the financial strategy adopted by the company is relevant: taxes, agency costs, and information asymmetry. According to the author, the Trade-off Theory emphasizes taxes and predicts that companies seek levels of debt that allow them to balance tax benefits and costs of financial difficulties, represented by bankruptcy or reorganization costs and agency costs. In this perspective, the advantages of the capital structure composed of debt reside in the tax benefit arising from the deduction of interest paid by the amount on taxes (MODIGLIANI; MILLER, 1963; DEANGELO;

MASULIS, 1980), and in minimizing the problem of free cash flow (FAMA; FRENCH, 2005) that could facilitate deliberations whose objective is to maximize only the manager's utility. Thus, managers are encouraged to allocate resources in investments that have a positive present value and to reduce the cost of capital involved, which, consequently, will positively affect the value of the firm (AVELAR *et al*., 2017).

While the Trade-off Theory emphasizes taxes, the Free Cash Flow Theory of Jensen (1986) considers that the free cash flows existing in companies create a relevant agency conflict, as they increase managerial autonomy allowing managers to make decisions through opportunistic interests, seeking to maximize their utility to the detriment of shareholders. Thus, the author points out the use of debt as a possible solution to such a conflict since it would operate as a disciplinary instrument for agents due to the emergence of financial obligations to be fulfilled. Also, the threat of bankruptcy created by obligatory debt creates an incentive to make the firm more efficient and, thus, a debt advantage arises from the decreasing of the free cash flow for discretionary use by administrators.

Finally, in the Pecking Order Theory, by Myers and Majluf (1984) and Myers (1984), whose focus is the information asymmetry effect, there is no prediction of an optimal level of capital, but a hierarchical order of preference regarding sources financing. This prioritization of funding sources is based on arguments that involve informational asymmetry costs (ALBANEZ; VALLE, 2009). For this theory, the firm will opt for financing by third-party capital, instead of issuing shares, when its resources are not sufficient to finance its capital costs. Therefore, the magnitude of indebtedness will reflect the firm's accumulated need for external resources.

Considering the different theories on capital structure, Watts and Zimmerman (1986) created the Debt Hypothesis, in which, they relate capital structure with earnings management. The Debt Hypothesis emphasizes that managers of predominantly debt-financed firms are more motivated to select accounting procedures to manage results, as they aim to ensure that the perspectives of the stakeholders are met, as established in contractual clauses.

2.2 Earnings management

The Agency Theory, which among several approaches has as precursors Jensen and Meckling (1976), exposes that agency conflicts arise from the contractual relationship between principal and agent, in which the owner delegates decision-making power to

managers, who in turn, act through opportunistic interests. Managers, intending to maximize their utility, may present different interests from those who delegate decision power and, companies intending to mitigate this conflict, incur monitoring costs, which must be minimized by optimal capital structures (MATOS, 2001).

Akerlof (1970) associates quality privileged information with signaling mechanisms to deal with informational asymmetry issues in imperfect markets. In the business context, managers, who have privileged inside information that external agents do not access, can change accounting information to meet their interests or to meet external expectations about the performance of firms.

To Healy and Wahlen (1999) standards allows managers to use their knowledge about business and exercise judgment by selecting reporting methods that can potentially increase the firm's value, and by doing that, it is considered earnings management. However, managers also can make operational decisions, that have been considered more harmful to companies and users because they affect cash and not just profit (ROYCHOWDHURY, 2006).

The manipulation of accounting information can lead to severe consequences for the entity's credibility and harm public confidence in the stock market. This practice compromises the quality of accounting information and, due to the inefficiency in the allocation of resources that it can generate, it brings harmful consequences to the capital market.

Earnings management is defined by Martinez (2001) as the artificial manipulation of results with different purposes than report accounting information reliably. It is noteworthy that the managerial actions described cannot be confused with accounting fraud since it is carried out within the discretionary limits allowed in accounting standards.

The discretionary accruals, used as a proxy for earnings management involve accounting choices regarding the divergence between the cash flow and accruals basis. The earnings management by operational decisions derives from decisions and concrete actions, with implications for the company's cash flow (MARTINEZ, 2001, p. 13). According to Zang (2012), real activities manipulation and accrual-based earnings management are costly activities and managers use them as substitutes to achieve the desired earnings targets. Firms are likely to face different levels of constraints for each strategy, which will lead to varying abilities to use them.

The main metrics consolidated in the literature to capture earnings management are related to the calculation of discretionary accruals through the models proposed by Jones

(1991) and Modified Jones variations like Dechow *et al.* (1995) and Kothari, Leone and Wasley (2005). However, although these models "deal with the main metrics used in the literature, they are based on the variation of working capital and cash flow, and do not capture non-current operating accruals, in addition to measures of acquisitions and divestments and/or capitalization of fixed assets" (COSTA; MATTE; MONTE-MOR, 2018, p. 14), and thus, these models imply a limited analysis capacity on the management that may be being done.

Martinez and Cardoso (2009) differentiate earnings management by operational choices from discretionary accruals, while the former exists due to the non-correspondence between the cash and competence regime, the latter is linked to real activities decisions, which directly impact the company's operating cash flow. Thus, according to Martinez (2013, p. 5), "while operational decisions are an *ex-ante* form of earnings management, accruals are considered an *ex-post* form of manipulation". As discussed by Martinez and Cardoso (2009), there is evidence that companies that manage their results through discretionary accruals also take operational decisions to change the accounting numbers, however, in some cases, these choices are negatively correlated.

This study understands that earnings management decisions by operational decisions are those that can affect operating cash flow, production level, general and administrative sales expenses, and costs, and are made by managers to obtain accounting results different from the normal course of operations. Also "the management of operational decisions can still be understood as a lawful response to accounting regulation" (MARTINEZ; CARDOSO, 2009) and it is expected that when accounting standards are more restrictive in terms of accounting discretion, the focus would start to manipulate results through the company's operational decisions.

Some studies have shown the existence of upward real-activity earnings management. For example, Roychowdhury (2006) found evidence that managers manipulate real activities through overproduction to report lower cost of goods sold, and reduction of discretionary expenditures to improve reported margins to avoid reporting annual losses. Gunny (2010) found out that companies use earnings management by real activities to meet earnings benchmarks and Zang (2012) found a tradeoff between earnings management by accruals and real decisions and usually managers use them as substitutes.

According to Ghosh and Moon (2010), there are two possible links between debt financing and earnings quality. On one hand, debt might have a positive influence on earnings quality because of lower credit risk. In this case, managers would have incentives to report

more informative earnings to reduce the firms' cost of borrowing. Also, Fung and Goodwin (2013) explain that debt's beneficial effects are associated with short-term debt because in this case, the firm is required to approach lenders more often to obtain new loans. On the other hand, under the debt covenant perspective, the accounting manipulation can increase with debt as firms try to avoid covenant violations that are associated with long-term debt.

2.3 Previous studies

Castro and Martinez (2009) analyzed earnings management in Brazilian companies from 2003 to 2007 in terms of income smoothing and its relationship with management decisions linked to the capital structure and cost of capital. The model used to measure earnings management was the one proposed by Eckel (1981) which relates the variation in profits with the variation in sales. The capital structure, on the other hand, was measured by debt indices and segregated between total, short and long-term debt. It was found by the tests obtained via panel data estimation that income smoothing is determinant for the capital structure because, by signaling stability it increases the company's capacity to capture more amounts and thus reduces "the perception of risks gradually progressing to privilege, also progressively, the financing with third party capital"(CASTRO; MARTINEZ, 2009, p. 35).

Ghosh and Moon (2010) aimed to relate debt and quality of profits in companies that belonged to the North American stock market between 1998 and 2004. According to the authors, debt can have a positive influence on the earnings quality because they reverberate on cheaper financing, but when they reach high levels, the influence on profits becomes negative because there are incentives to manage discretionary accruals to avoid the covenants' realization. Thus, managers understand that the cost of covenants is higher than the earnings management and, therefore, choose to do so. Earnings management was measured by using the methodology proposed by Dechow and Dichev (2002) and the consequent modifications of the model proposed by McNichols (2002). Consequently, the results showed that for almost 80 % of the sample, there was a positive relationship between the quality of the debt and the earnings quality, but this relationship became the opposite when the debt started to show extremely high levels.

Fung and Goodwin (2013) sought to understand how the firm's credibility affects the relation between short-term debt and earnings management. They analyzed data from American companies between the years 2003 and 2006 that were considered credible according to the investment rating. The model used to measure discretionary accruals was the

one proposed by Kothari, Leone and Wasley (2005). As a result, the authors found that short-term debt is positively associated with earnings management by discretionary accruals in companies with less credibility, but that this association is lower for firms with higher ratings, a finding consistent with increasing monitoring.

The study by Costa, Matte and Monte-Mor (2018) with Brazilian data corroborates the study by Ghosh and Moon (2010) and thus, it verified the existence of a non-linear relation between the debt and the quality of profit reported by them. The authors analyzed data from publicly traded Brazilian companies not belonging to the financial sector between 2008 and 2015. To measure discretionary accruals, it was used the Jones (1991) and Dechow, Sloan and Sweeney (1995) models and the methodology developed by Dechow and Dichev (2002) and McNichols (2002), which considers the discretionary component of profit. It was found that companies that have higher debt costs report profits with a greater discretionary component and they found evidence of the concave relation between debt and discretionary accruals. This concave relation can be explained by the fact that managers, encouraged by the imminence of non-compliance with restrictive contractual clauses, choose to "report profits that reduce the likelihood of a violation of accounting covenants" (COSTA; MATTE; MONTE-MOR, 2018, p. 2). Once contractual clauses are generally related to long-term contracts, the authors found that the non-linear relationship is mostly associated with long-term debt. In contrast, companies with lower debt levels tend to manage their results less, to signal the real situation of the company and, due to the greater credibility earned, incur lower costs in new financing.

Martinez and Cardoso (2009) aimed to verify if the companies that manage their results via accruals, also do through operational decisions, measured by the level of production, and selling general and administrative expenses. They justify that the operational decisions differ from the typical discretionary accruals because accruals only exist due to the difference between the cash and competence regime and it tends to disappear in the long run, as the cash is recognized. The sample used to conduct the research was Brazilian companies with shares traded on the stock exchange, excluding those related to the financial market, between 1998 and 2004. For the operational decision’s manipulation estimation, the reference was the model used by Zang (2012) for American companies. The estimation of discretionary accruals was based on the KS model developed by Kang and Siveramakrishnan (1995). As a result, it was found that decisions about the level of production and sales, general and administrative expenses are used to manage accounting numbers and decisions in terms of

discretionary accruals and they "are generally used as substitutes for one another" (MARTINEZ; CARDOSO, 2009, p. 620).

Reis, Lamounier and Bressan (2015) analyzed earnings management by real activities to avoid disclosing losses. The study used Brazilian publicly traded companies as a sample, except those belonging to the financial sector, in the period from 2008 to 2013. Like Martinez and Cardoso (2009), operational manipulation was measured in terms of production level and general, administrative, and sales expenses. However, the authors added an analysis of the possibility of manipulating sales. It was found that companies with a profit margin between 0 and 1% had higher operating cash flow and did not use production levels to change their results but used selling, general and administrative expenses to increase their results.

3 MATERIAL AND METHODS

The research can be classified as a predominantly positive and empirical-analytical study. The study can be classified as a positivist, since it focuses on the observation of facts, based on theories that guide the explanations. It can also be classified as empirical-analytical, as its operational definitions are systematized based on quantitative techniques for data collection, treatment, and analysis (MARTINS; THEÓPHILO, 2009).

The study's population comprised all non-financial companies listed in the Brazilian capital market from 2010 to 2018. The sample was limited to the study of 270 companies with common shares, whose financial information was available in the database Economatica. The data were analyzed annually, and it began in 2010, due to the convergence of accounting standards with international practices (International Financial Report Standards - IFRS). Also, financial companies were excluded for presenting particularities in accounting procedures, which may interfere with the measurement proxies of the study.

The study used regression analysis with panel data for data analysis once there were 270 companies analyzed through 18 years, and, according to Greene (2012), it is a special type of data combined, with elements of time series, being analyzed at different moments of time and cross-section, which involves a data set of one or more variables at the same point in time.

Based on the assumption that firm managers can be motivated to manage the accounting results to influence the contractual results that depend on the accounting numbers of the firms (HEALY; WHALEN, 1999) and, considering that the management of accounting

accruals does not have direct consequences on the company's cash flow, because it is based on the accrual basis, this study focused on earnings management through real activities, that is, earnings manipulation via operational decisions that directly affect cash.

Thus, the construction of the model-dependent variable, real earnings management (REM), was based on the study by Roychowdhury (2006). According to the model, to estimate the management of operating results, first, it is necessary to estimate the normal level of the variables CFO–Cash Flow from Operations, SG&A - Selling, General, and Administrative Expenses and PROD – Production Costs using equations 1, 2 and 3.

$$\frac{CFO_{i,t}}{A_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{NR_{i,t}}{A_{i,t-1}} + \beta_3 \frac{\Delta NR_{i,t}}{A_{i,t-1}} + c_i + \varepsilon_{i,t} \quad (1)$$

$$\frac{SG\&A_{i,t}}{A_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{NR_{i,t}}{A_{i,t-1}} + c_i + \varepsilon_{i,t} \quad (2)$$

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{NR_{i,t}}{A_{i,t-1}} + +\beta_3 \frac{\Delta NR_{i,t}}{A_{i,t-1}} + \beta_4 \frac{\Delta NR_{i,t-1}}{A_{i,t-1}} + c_i + \varepsilon_{i,t} \quad (3)$$

In which:

$CFO_{i,t}$= Cash Flow from Operations of the company i in period t;

$SG\&A_{i,t}$= Selling, General and Administrative Expenses of the company i in period t;

$PROD_{i,t}$= Cost of Good Sold + Variation in Stock of company i in period t;

A= Total assets of the company i in period t - 1;

$NR_{i,t}$= Net revenue of the company i in period t;

$\Delta NR_{i,t}$= Variation in Net Revenue of the company i in period t in relation to t-1;

$\Delta NR_{i,t-1}$= Variation in Net Revenue of the company i in period t – 1 in relation to t – 2;

$\beta_0, \beta_1, \beta_2, \beta_3 e \beta_4$= Estimated Coefficients of the Model;

c_i= Random component that indicates the specific unobservable individual effect, which differs

between companies and is time-invariant;

$\varepsilon_{i,t}$= Error term of the regression model, which differs between companies and time.

Roychowdhury (2006) explains that real activities manipulation is measured as departures from normal operational practices. In terms of Cash Flow from Operations, sales can be manipulated by accelerating the timing of sales or generating additional unsustainable sales through increased price discounts. The increased sales volumes as a result of the

discounts are likely to disappear when the firm re-establishes the old prices and the cash inflow per sale, from these additional sales is lower as margins decline. Total earnings in the current period are higher as the additional sales are booked, assuming positive margins, in this case, the lower margins due to the price discounts cause production costs relative to sales to be abnormally high.

In terms of reduction of discretionary expenditures, firms can reduce reported expenses, and increase earnings, by reducing discretionary expenditures. It is expected that the higher the sales revenue, the higher the expenses, and thus the estimation is expressed with a linear function of lagged sales. About the production costs, the higher the sale, the higher the production is necessary to supply the demand, so, in normal situations, variations in net sales revenue should be accompanied by the variation in production. The manipulation can occur by increasing production to report lower COGS, with no corresponding sales. With higher production levels, fixed overhead costs are spread over a larger number of units, lowering fixed costs per unit.

Thus, the real earnings management (REM) proxy was obtained through the difference between the observed values of CFO, SG & A, and PROD and the estimation equations 1, 2, and 3, originating, the abnormal levels ACFO, ASG & A, and APROD. To analyze the relation between earnings management and operational decisions, an aggregated measure of the three REM proxies was used, as proposed by Gunny (2010) and showed in Equation 4.

$$REM_{i,t} = (ACFO_{i,t} + ASG\&A_{i,t} + \left(APROD_{i,t}\right) \times (-1)) \quad (4)$$

For the independent variables, it was considered that firms that have a capital structure with higher debt are more likely to select accounting procedures that increase profit (WATTS; ZIMMERMAN, 1986). Thus, given the restrictions and contractual conditions imposed by creditors, due to the indebtedness structure, firms are encouraged to present positive results to satisfy market expectations.

A model was estimated for each perspective of capital structure: i) STCS - short-term capital structure; ii) LTCS - long-term capital structure; and iii) TCS - total capital structure, respectively, according to equations 5, 6, and 7, adapted from Ghosh & Moon (2010) and Costa, Matte and Monte-Mor (2018) (2018). The term debts refer to the short and long-term accounting item "Loans and Financing".

$$STCS_{i,t} = \frac{\text{Short-term debts}_{i,t}}{Equity_{i,t}} \quad (5)$$

$$LTCS_{i,t} = \frac{\text{Long-term debts}_{i,t}}{Equity_{i,t}} \quad (6)$$

$$TCS_{i,t} = \frac{\text{Total debts}_{i,t}}{Equity_{i,t}} \quad (7)$$

The control variables were defined considering what prior empirical research defined as variables that impact the association between earnings management by operational decisions and the capital structure as shown in Table 1.

Table 1 – Independent control variables

Variables	Measurement	Previous studies	Expected Sign
Capital Structure	Equations 5, 6 and 7.	Watts and Zimmerman (1986), Ghosh and Moon (2010), Costa, Matte and Monte-Mor (2018).	Positive
Debt Cost	(Financial Dispenses$_{it}$ / Average total debts$_{it}$) * (1 – Income tax)	Ghosh and Moon (2010), Costa, Matte and Monte-Mor (2018). (2018)	Positive
Operating Cycle	Log[360/(Sales$_{it-1}$/Average of bills to be received$_{it}$)] + [360/(Cost of sold product$_{it}$ /Stock Average$_{it}$)]	Dechow *et al.* (2010), Dechow and Dichev (2002), Costa, Matte and Monte-Mor (2018). (2018)	Positive
Size	Log(Asset$_{it}$)	Dechow *et al.* (2010), Costa *et al*. (2018)	Negative
Sales	Sales$_{it}$ / Assets$_{it}$	Dechow *et al.* (2010), Dechow and Dichev (2002), Costa *et al.* (2018)	Negative
CashFlow	Cash Flow from Operations$_{it}$ / Asset$_{it}$	Dechow *et al.* (2010), Dechow and Dichev (2002), Costa *et al*. (2018)	Negative
Loss	Dummy: 1 = loss; zero = earnings	Dechow *et al*. (2010), Costa *et al.*	Positive
Growth	(Sales$_{it}$/Sales$_{it-1}$) – 1	Dechow *et al.* (2010), Costa *et al*. (2018)	Positive
GrossMargin	Gross Earnings$_{it}$/Sales$_{it}$	Dechow *et al.* (2010), Healy and Wahlen (1999), Costa *et al.* (2018)	Negative
ROA	Net Earnings$_{it}$ /Total Asset$_{it}$	Dechow *et al.* (2010), Dechow and Dichev (2002), Costa *et al*. (2018), Martinez and Cardoso (2009)	Negative
CorporateGovernance	Dummy: 1 = belongs to New Market; zero = Does not	Dechow *et al.* (2010), Costa *et al*. (2018)	Negative
Big4	Dummy: 1 = Audited by Big 4; zero = Does not	Dechow *et al.* (2010), Martinez (2013), Costa *et al.* (2018)	Negative
Segment	8 dummies were created for sample segments	Costa *et al*. (2018)	Positive/ Negative

Source: Authors (2021).

The data was analyzed using the Stata *software*, version 14, and the econometric models defined to analyze the relation between earnings management by operational decisions and capital structure are shown in equations 8, 9 and 10:

$$REM_{i,t} = \beta_0 + \beta_1 STCS_{i,t} + \beta_2 DebtCost_{i,t} + \beta_3 OperatingCycle_{i,t} + \beta_4 Size_{i,t} + \beta_5 Sales_{i,t} + \beta_6 CashFlow_{i,t} + \beta_7 Loss_{i,t} + \beta_8 Growth_{i,t} + \beta_9 GrossMargin_{i,t} + \beta_{10} ROA_{i,t} + \beta_{11} CorporateGovernance_{i,t} + \beta_{12} Big4_{i,t} + \beta_{13} Segment_{i,t} + c_i + \varepsilon_{i,t} \quad (8)$$

$$REM_{i,t} = \beta_0 + \beta_1 LTCS_{i,t} + \beta_2 DebtCost_{i,t} + \beta_3 OperatingCycle_{i,t} + \beta_4 Size_{i,t} + \beta_5 Sales_{i,t} + \beta_6 CashFlow_{i,t} + \beta_7 Loss_{i,t} + \beta_8 Growth_{i,t} + \beta_9 GrossMargin_{i,t} + \beta_{10} ROA_{i,t} + \beta_{11} CorporateGovernance_{i,t} + \beta_{12} Big\ 4_{i,t} + \beta_{13} Segment_{i,t} + c_i + \varepsilon_{i,t} \quad (9)$$

$$REM_{i,t} = \beta_0 + \beta_1 TCS_{i,t} + \beta_2 DebtCost_{i,t} + \beta_3 OperatingCycle_{i,t} + \beta_4 Size_{i,t} + \beta_5 Sales_{i,t} + \beta_6 CashFlow_{i,t} + \beta_7 Loss_{i,t} + \beta_8 Growth_{i,t} + \beta_9 GrossMargin_{i,t} + \beta_{10} ROA_{i,t} + \beta_{11} CorporateGovernance_{i,t} + \beta_{12} ABig4_{i,t} + \beta_{13} Segment_{i,t} + c_i + \varepsilon_{i,t} \quad (10)$$

The most appropriate model for the analysis of the data in the panel was carried out through tests that compare the pooled data, fixed effects, and random effects. The following tests were performed: Chow's F test to compare pooled data and fixed effects; Breush-Pagan test for the comparison between pooled data and random effects, and the Hausmann test for the comparison between random effects and fixed effects (FÁVERO, 2013). To verify the suitability of the proposed model, usual validation tests were performed.

4 RESULTS AND DISCUSSION

The study used as a sample all the companies listed in the Brazilian capital market from 2010 to 2018, except financial companies because of their financial statement's structural differences, in a total of 270. There are specific procedures for estimating earnings management in companies related to financial activities, which goes beyond the focus of this research. Figure 1 shows the behavior over time of the dispersion of short and long-term and total debt financing of the sample through the relation between debt and equity. It is possible to verify that the dispersion of the data is stronger among the units than over time. This is due to the heterogeneity of debt between firms in different segments.

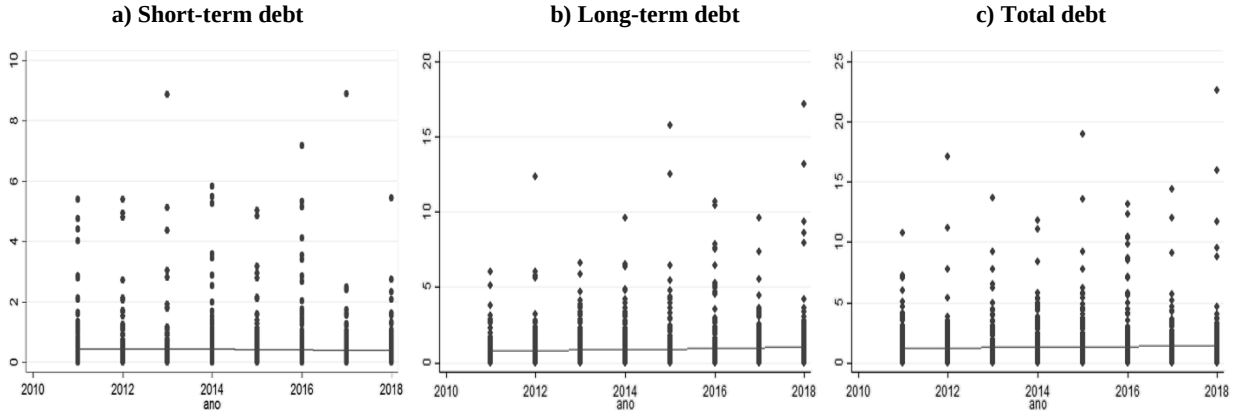

Figura 1 – Evolution of debt financing for firms over time
Source: Authors (2021).

According to the information contained in Table 2, the different stages of the debt financing variables show greater variation between firms (between) than over time (within), which corroborates the graphical analysis. It is possible to infer that firms on average tend to maintain their debt structure over time. Besides, the prevalence of long-term debt (0.906) and signs of high financial leverage (1.335) are observed, indicating that the capital structure of firms is mostly composed of debt because in the short term there is a more balanced proportion between debt and equity (0.429).

Table 2 – Descriptive statistics and decomposition of variance

Variables		Mean	Standard Deviation	Minimum	Maximum	Coefficient of Variation
STCS	overall	0.429	0.771	0.000	8.894	1.796
	between		0.719	0.006	4.679	
	within		0.515	-2.212	6.302	
LTCS	overall	0.906	1.408	0.000	17.180	1.554
	between		1.213	0.000	7.561	
	within		0.844	-4.540	10.526	
TCS	overall	1.335	1.914	0.001	22.627	1.433
	between		1.702	0.013	9.802	
	within		1.179	-5.972	14.656	

Source: Authors (2021).

To reduce the outliers' effect and allow comparability with other results in the literature, the Bacon methodology to detect outliers as described by Billor, Hadi and Velleman (2000) was used. REM average value was positive, which shows the existence of a management strategy for firms to reduce the accounting result. The minimum and maximum

values numbers, -29.429 and 39.525 respectively, show that there are firms that manage the accounting result more aggressively.

The variable Debt Cost presented a different result from the study presented by Costa *et al*. (2018). However, the authors did not consider the tax benefit of the debt. In addition, the variables Loss and Growth also presented different results from those presented by the authors. In this case, the justification for the difference is given by the operationalization of the proxies once the gross profit was used to create the loss dummy and the revenue to identify growth. The average values of the other control variables are similar and consistent with the results of Costa *et al*. (2018). Table 3 presents the descriptive statistics of the variables used in this study.

Table 3 – Descriptive statistics of the variables

Variables	Mean	Standard Deviation	Minimum	Maximum	Coefficient of Variation
REM	1.903	3.595	-29.429	39.525	1.889
DebtCost	0.160	0.269	-0.010	2.348	1.688
OperatingCycle	4.738	0.895	-0.693	8.125	0.189
Size	15.278	1.727	9.893	20.770	0.113
Sales	0.688	0.495	0.000	3.858	0.719
CashFlow	0.068	0.079	-0.301	0.697	1.169
Loss	0.024	0.153	0.000	1.000	6.403
Growth	0.051	0.336	-0.851	4.694	6.626
GrossMargin	0.303	0.195	-1.637	0.936	0.643
ROA	0.031	0.079	-0.791	0.543	2.555
CorporateGov.	0.408	0.492	0.000	1.000	1.206
Big 4	0.824	0.381	0.000	1.000	0.462

Source: Authors (2021).

To identify the effect of debt financing on the aggregate measure of earnings management by operational decisions (REM), the models presented in equations 8, 9, and 10 were estimated by GLS including corrections regarding heteroscedasticity and correlation, assuming the adjustments to relax the hypotheses of the classic model regression. Table 4 shows the results obtained using these models. The estimated models met the assumption of absence of multicollinearity, verified through values observed for VIF.

Table 4 – Results

Independent Variables	Expected Sign	Short-term[1]	Long-term[2]	Total[2]
Capital Structure	+	1.297	2.166	1.790
		0.046***	0.007***	0.005***
Debt Cost	+	0.213	0.245	-0.151
		0.105**	0.024***	0.032***
Operating Cycle	+	-0.070	0.065	-0.011
		0.018***	0.004***	0.005**
Size	-	0.101	-0.016	0.031
		0.008***	0.003***	0.003***
Sales	-	-0.334	-0.056	-0.097
		0.049***	0.012***	0.015***
Cash Flow	-	-0.325	-0.002	-0.067
		0.054***	0.059	0.054
Loss	+	-0.391	-0.162	-0.003
		0.125***	0.061***	0.046
Growth	+	0.062	0.030	-0.006
		0.023***	0.010***	0.012
Gross Margin	-	-0.623	-0.276	0.095
		0.108***	0.027***	0.028***
ROA	-	-0.715	-0.274	0.662
		0.200***	0.067***	0.076***
Corporate Gov.	-	0.011	-0.030	0.046
		0.028	0.004***	0.007***
Audited by Big Four	-	-0.012	0.026	0.114
		0.039	0.010***	0.011***
Segment				
Communications	+/-	-1.078	-0.181	-0.186
		0.134***	0.031***	0.031***
Cyclic consumption	+/-	-0.388	-0.034	-0.038
		0.045***	0.013***	0.012***
Non-cyclical consumption	+/-	-0.623	0.023	-0.085
		0.067***	0.014	0.018***
Basic materials	+/-	-0.300	-0.078	0.058
		0.072***	0.014***	0.015***
Oil, gas and biofuels	+/-	0.600	-0.034	0.105
		0.180***	0.023	0.026***
Health	+/-	-0.137	-0.078	0.057
		0.058	0.014	0.015
Information technology	+/-	-0.275	0.078	-0.038
		0.143**	0.015***	0.022***
Public utility	+/-	0.035	0.003	0.018
		0.064**	0.010***	0.011
_Cons		0.000	0.005	-0.714
		(omitted)	0.039	0.048***

Note:* P-Value < 0.10; ** P-Value < 0.05; e *** P-Value < 0.01.
[1]Estimated Model for Generalized Least Squares in Heteroscedasticity and Autocorrelation.
[2]Estimated Model for Generalized Least Squares in Heteroscedasticity.
Source: Authors (2021).

As expected, in all models, the Capital Structure variable was significant and positive, that is, the increase in debt financing, regardless of the proxy used, implied an increase in earnings management by operational decisions (REM). The relation found between debt financing and earnings management is, therefore, in agreement with the seminal study by

Watts and Zimmerman (1986) that firms predominantly financed by debt are more motivated to select procedures to manage results to ensure the prospects of investors as set out in contractual clauses.

It was observed that the increase in debt financing generates an increase in earnings management, regardless of the proxies used to measure them, which corroborates the Debt/Equity Hypothesis. Furthermore, the ratio between debt and equity shows that firms prefer long-term debt. With this, it can be inferred that the greater this long-term debt (2.166) to the detriment of short-term debt (1.297), the more likely the managers of the firms will be choosing accounting mechanisms to manage the results, especially if the firms are subject to covenant clauses subordinated to financial indicators. The coefficient of the long-term debt is almost double of the short-term's coefficient, which may imply that, as stated by Costa *et al.* (2018), companies with lower debt levels tend to manage less their results and contractual clauses are generally related to long-term contracts which imply in more earning management to not incur in covenants violation.

In addition, Costa *et al*. (2018) add that after a certain level of indebtedness, due to the covenant clauses, the gains from the reduction of debt costs would be mitigated by the risks of not complying with the clauses, resulting in incentives for earnings management.

In terms of the effects of the control variables created on earnings management, it is observed that the variables related to the economic characteristics of the firms (Operating Cycle, Size, and Loss) showed a relation contrary to that expected in the short-term debt model. For the long-term debt model, the variables that presented a different relation than expected were Loss and Audited by Big Four. In the total debt financing model, the opposite relation was also expected for variables related to economic characteristics (Debt Cost, Operating Cycle, and Size) and those related to growth factors (Gross Margin, ROA, Corporate Governance, and Audited by Big Four).

According to Dechow and Dichev (2002), accruals quality is negatively related to the length of the operating cycle because a long operating cycle implies that a considerable amount of future cash flows is recognized in current earnings. The negative relation between the operating cycle might show the tradeoff between accruals and real earnings management. Companie's size is positive associated with real earning management considering short-term and total and it can be justified as bigger companies have more complex activities that can be used to manage results, but in terms of the opposite relation verified in the long-term, it can imply that close monitoring can mitigate earning management.

It was found, as expected, that firms that have higher debt costs report profits with a higher managed component, which corroborates the results obtained by Costa *et al.* (2018) and Ghosh and Moon (2010). Besides, the negative relation of the Corporate Governance variable, for the short-term model, provides evidence that different levels of Corporate Governance have a negative impact on earnings management. In this way, governance can act as an instrument for monitoring the inappropriate behavior of managers' activities, aiming to minimize the earnings management and contributing to improving the quality of the financial information disclosed. Also, when the companies have robust governance, accountability is required for deviations of decisions.

In addition, the influence of several variables on earnings management by operational decisions was observed. However, the effects found were also contrary to expectations, depending on the variable and the debt proxy employed. In this case, the control variables suggest that, given the hypothesis under consideration, for positive relations, firm managers tend to adopt policies to manage results, as well as, for negative relations, firms report higher quality information. It should also be considered that there is the possibility of managing results for upward and downward, depending on the term to be analyzed and this may be associated with the results found for the different models in question. In other words, in the short term, a firm may be increasing its results, but in the medium or long term, including due to the accruals reversal process, the direction of management may be inverted.

Finally, the results agree with the study by Fung and Goodwin (2013) for the North American market since the positive relation between short-term debt and earnings management was verified. On the other hand, similarly to the national literature, there was a relationship between long-term debt and earnings management. As explained by Costa *et al*. (2018), it turns out that, because contractual accounting covenants are generally associated with long-term debt, these contractual clauses will play an important role in the accounting choices made by the firms concerning results.

5 FINAL CONSIDERATIONS

This research analyzed the influence of earnings management by operational decisions on the capital structure of firms segregated for the short and long term and in total terms, through the examination of Brazilian public companies, from 2010 to 2018.

The work used as a proxy for earnings management through real activities, that is, the manipulation of results via operational decisions that directly affect cash flow. The construction of the model-dependent variable, earnings management by operational decisions (REM), was based on Roychowdhury's (2006) study, and debt financing was represented by the ratio between the company's liability and its equity. Besides, other control variables were specified.

As result, it was found that firms predominantly financed by debt are more motivated to select procedures to manage results to ensure the prospects of investors as set out in contractual clauses, once the variable referring to Capital Structure was significant and positive, that is, the increase in debt financing, regardless of the proxy used, implied an increase in the level of earnings management by operational decisions.

The result of the study corroborates therefore with the Debt/Equity Hypothesis of Watts and Zimmerman (1986) that, *ceteris paribus*, the managers of firms predominantly financed by debt are more motivated to select procedures to manage results to ensure the prospects of investors as set out in contractual clauses.

As a research limitation, it is understood that the estimation models used to estimate real earning managements in this study as well as widely used in international research, still require refinements to improve the proxies of earnings management through operational decisions. Thus, future research could be developed considering possible variables that were not included in the statistical models used.

As a theme for future work, it is suggested to deepen the study of the relations between the differences between the time profile of contracted debts and the economic sectors and the practice of earnings management. Also, it is suggested an analysis that considers both the management through operational decisions and the use of accounting accruals, against the background of the different capital structures of the companies.

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