Tax management: analysis of the influence on the equity cost of Brazilian companies

Gestión tributaria: análisis de la influencia en el costo del patrimonio de las empresas brasileñas

Gerenciamento tributário: análise da influência sobre o custo do capital próprio das empresas brasileiras

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Abstract

Purpose: The present study sought to investigate whether tax management influences the equity cost of Brazilian companies listed in Brazil, Bolsa e Balcão (B3) from 2014 to 2018.

Methodology: The study included the analysis of Proxie Book-Tax Differences (BTD) as a tool for identifying tax management, as suggested in the work of Moreira e Silva (2019), as well as the control variables, which are the return on equity (ROE), market value (QTOBIN), company size (LNAT) and company financial leverage (ALV). For data collection, the Bloomberg® database and the Reference Form available on the B3 website were used. For that, it was used the Multiple Linear Regression of the data type in balanced panel, resulting in a final sample formed by 630 observations.

Results: Through BTD proxie, referring to the difference between accounting profit and tax profit, and used to capture tax management in this research, it was not possible to identify any relationship with the equity cost. Thus, for the purposes of this research, the theoretical adequacy and the statistical models used did not show that good tax management practices have a positive or negative effect on the equity cost.

Contributions of the Study: It is observed that Brazilian studies did not analyze the effect of tax management on the equity cost in Brazilian companies using the Book-Tax Differences (BTD) indicator as a tool for identifying tax management and its influence on the cost of capital. So, this research followed the recommendation suggested by Moreira e Silva (2019), to analyze this cost with another indicator, in this case, Book-Tax Differences (BTD). According to the results, it was not possible to identify any relationship with the equity cost, thus contributing to the consolidation of the findings by Goh et al. (2016) and Moreira e Silva (2019) who present CashETR as the best metric for tax management, given that the results presented using the variables ETR and BTD, demonstrated that the cost of capital required by investors was unrelated to the fiscal aggressiveness of companies.

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Keywords: Tax Management, Book-Tax Differences (BTD), Cost of Equity.

Resumen

Objetivo: El presente estudio buscó investigar si la gestión fiscal influye en el costo del capital de las empresas brasileñas que cotizan en Brasil, Bolsa e Balcão (B3) en el período de 2014 a 2018.

Metodología: El estudio incluyó el análisis de Proxie Book-Tax Differences (BTD) como una herramienta para identificar la gestión tributaria, como se sugiere en el trabajo de Moreira e Silva (2019), así como las variables de control, que son el rendimiento del capital (ROE), valor de mercado (QTOBIN), tamaño de la empresa (LNAT) y apalancamiento financiero de la empresa (ALV). Para la recopilación de datos, se utilizaron la base de datos Bloomberg® y el Formulario de referencia disponible en el sitio web B3. Para eso, se utilizó la regresión lineal múltiple del tipo de datos en el panel equilibrado, lo que resultó en una muestra final formada por 630 observaciones.

Resultados: A través del proxy BTD, refiriéndose a la diferencia entre el beneficio contable y el beneficio fiscal, y utilizado para capturar la gestión fiscal en esta investigación, no fue posible identificar ninguna relación con el costo del patrimonio. Por lo tanto, a los fines de esta investigación, la adecuación teórica y los modelos estadísticos utilizados no mostraron que las buenas prácticas de gestión tributaria tengan un efecto positivo o negativo en el costo de la equidad.

Contribuciones del Estudio: Se observa que los estudios brasileños no analizaron el efecto de la gestión tributaria sobre el costo de la equidad en las empresas brasileñas utilizando el indicador Book-Tax Differences (BTD) como herramienta para identificar la gestión tributaria y su influencia en el costo del capital. Entonces, esta investigación siguió la recomendación sugerida por Moreira e Silva (2019), para analizar este costo con otro indicador, en este caso, las diferencias de impuestos en libros (BTD). Según los resultados, no fue posible identificar ninguna relación con el costo de la equidad, lo que contribuyó a la consolidación de los hallazgos de Goh et al. (2016) y Moreira e Silva (2019), quienes presentan CashETR como la mejor métrica para la gestión fiscal, dado que los resultados presentados utilizando las variables ETR y BTD, demostraron que el costo de capital requerido por los inversores no estaba relacionado con la agresividad fiscal de las empresas.

Palabras clave: Gestión fiscal, diferencias libro-impuesto (BTD), coste del patrimonio.

Resumo

Objetivo: O presente estudo buscou investigar se o gerenciamento tributário influencia no custo de capital próprio das empresas brasileiras listadas no Brasil, Bolsa e Balcão (B3) no período de 2014 a 2018.

Metodologia: O estudo compreendeu a análise da *proxie Book-Tax Differences* (BTD) como ferramenta de identificação do gerenciamento tributário, como sugerido no trabalho de Moreira e Silva (2019), bem como as variáveis de controle, que são o retorno sobre o patrimônio líquido (ROE), valor de mercado (QTOBIN), tamanho da companhia (LNAT) e alavancagem financeira da empresa (ALV). Para a coleta de dados utilizou-se o banco de dados da *Bloomberg*® e o Formulário de Referência disponível no sítio eletrônico do B3. Para tanto, utilizou-se da Regressão Linear Múltipla do tipo dados em painel balanceado, resultando em uma amostra final formada por 630 observações.

Resultados: Por meio da *proxie* BTD, referente à diferença entre lucro contábil e lucro tributário, e utilizado para capturar o gerenciamento tributário nessa pesquisa, não foi possível identificar qualquer relação com o custo de capital próprio. Assim, para fins dessa pesquisa, a adequação teórica e os modelos estatísticos utilizados não evidenciaram que boas práticas de gerenciamento tributário tenham efeito positivo ou negativo no custo de capital próprio.

Contribuições do Estudo: Observa-se que os estudos brasileiros não analisaram o efeito do gerenciamento tributário sobre o custo de capital próprio nas empresas brasileiras utilizando o indicador *Book-Tax Differences* (BTD) como ferramenta de identificação do gerenciamento tributário e a sua influência no custo de capital. Então, a presente pesquisa seguiu a recomendação sugerida por Moreira e Silva (2019), de analisar esse custo com outro indicador, neste caso, *Book-Tax Differences* (BTD). De acordo com os resultados, não foi possível identificar qualquer relação com o custo de capital próprio, contribuindo, assim, para a consolidação dos achados de Goh *et al*. (2016) e de Moreira e Silva (2019) que apresentam o CashETR como melhor métrica para o gerenciamento tributário, tendo em vista que os resultados apresentados utilizando as variáveis ETR e BTD, demonstraram que o custo de capital exigido pelos investidores não teve relação com a agressividade fiscal das empresas.

Palavras-chave: Gerenciamento Tributário*, Book-Tax Differences* (BTD), Custo de Capital Próprio.

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1 Introduction

It is known that the tax burden in Brazil is quite high, according to Oliveira and Gonçalves (2013), this increase in taxes directly impacts the cash of Brazilian companies, increasing their costs and, consequently, causing a retraction in profit, and decreasing their competitiveness in the Marketplace. These consecutive increases in taxes happen when the government needs greater collection and one of the ways it has to raise resources to finance social objectives is through the expansion of taxes, directly affecting companies (Formigoni, 2008).

Corporate governance presents itself with a range of tools to be applied both internally and externally in companies, aiming to reduce and alleviate costs, among those arising from the conflict of interest between agent and principal. When it comes to managers and investors, it is common to run into conflicts of interest resulting from the separation between ownership and control of companies' capital, informational asymmetry and other problems among the main-agent relationship. In response to this problem, Agency Theory emerges to study the conflicts resulting from this relationship, seeking for solutions to this impasse (Jensen & Meckling, 1976).

However, the changes suffered in recent years have caused changes in the corporate structures of the companies, accompanied by conflicts between controlling and management of the projects, after the management was shared through the phenomenon of the pulverization of capital in the stock market (Martin, Santos, & Dias Filho, 2004). As a way to reduce this conflict of interests, there is tax management, in response to the need to efficiently use available resources and with it, provide a series of mechanisms that seek to reduce the tax burden (Formigoni, 2008 ; Minnick, & Noga, 2010; Machado, 2011).

From the moment that companies started growing, the complexity of their operations and transactions increased, requiring the use of specialists to manage the operational sectors of companies, aiming to maintain positive future flows (Arruda, Madruga, & Freitas Junior , 2008). Even though this division is necessary, there is a conflict of interests, as the manager-agent seeks a greater retention of net income for the valuation of the company over time, while the main shareholder seeks to distribute a larger share of this same resource (Ross, 1973; Eisenhardt, 1989).

A common point between principal and agent is the interest in the real cost of capital, as this information will provide a basis for decision making for both. This cost is nothing less than the minimum rate of a given investment required by investors as a return, based on a second option that presents a risk lower or equivalent to keeping the resource in the company (Gonçalves, Medeiros, Niyama, & Weffort, 2013).

From the perspective of cost of capital and tax governance, at the international level, some researches were developed, including: Harrington and Smith's (2012); Goh, Lee, Lim, and Shevlin's (2016); Balakrishnan, Blouin, and Guay's (2019). However, the effect of tax management in relation to the equity cost capital of Brazilian companies was not analyzed.

On the national scene, research on tax governance has also advanced, such as, Formigoni, Antunes and Paulo's (2009); Pohlmann and Iudícibus's (2010); Oliveira and Gonçalves'(2013); Martinez and Silva's (2017); Quirino, Moreira, Melo and Mól's (2018). As for the relationship of tax governance with the equity cost, Moreira and Silva's study (2019) stands out. They sought to analyze the effect of Tax Governance on the equity cost capital of Brazilian companies, using Effective Tax Rates as metrics (ETR), Long-Run Cash.

However, these studies did not analyze the effect of tax management on the equity cost in Brazilian companies using the Book-Tax Differences (BTD) indicator as a tool for identifying tax management and its influence on the cost of capital for a period of five years. Thus, based on tax governance relevance and the equity cost, this research will follow the recommendation suggested by Moreira and Silva (2019), and will analyze this cost with another indicator, in this case, Book-Tax Differences (BTD).

Therefore, the theme choice was motivated by two studies: Martinez and Silva's (2017), who recommended using other metrics and different costs in the relationship of fiscal aggressiveness with corporate debt, and Moreira and Silva's (2019) that recommended the use of other metrics to identify the relationship between tax governance and the equity cost, such as the Book-Tax Differences (BTD).

Given the above, the following research problem arises: **what is the influence of tax management on the equity cost capital of Brazilian companies?** Thus, the research has as a general objective to analyze the influence of tax management on the equity cost of Brazilian companies listed on B3 from 2014 to 2018. Also, as specific objectives, there are: (1) calculate the Book- Tax Differences (BTD) of Brazilian companies; (2) verify which Brazilian companies presented tax management; (3) point out the impact of tax management on the equity cost.

For the literature, the tax theme is still little explored at the national level. So, this research contributes to the expansion and consolidation of the theme in Brazil. In addition, once this relationship is consolidated, there is a possibility for academia to explore more deeply the relationship among the variables, expanding debates on the topic, and therefore, forming a broad base on tax management and its techniques. The study also differs from the previous ones, in that it uses the Book-Tax Differences (BTD) indicator as a tool for identifying tax management, which has been little explored so far, and it is expected that good tax management practices influence the cost of own capital, thus presenting a negative relationship, that is, the greater the management to reduce taxes, the lower the cost required by capital investors in the organization.

The work aims to present to the market a new strategic business vision through BTD test as a metric to measure tax management, seeking to improve research carried out previously and analyze the relationship among the two constructs, aiming to assist in decision making and in the possibility of maximizing the profits with the relief of the tax burden of Brazilian companies. In addition to it, the study presents to the accounting professional who works with a focus on tax management techniques, a competitive differential, in addition to a new perspective of economy to be presented to entities, reinforcing the important role that accounting professionals have been playing in the area consulting focused on reducing business costs to provide better organizational performance.

2 Literature Review

2.1 Tax Government

Tax avoidance, tax administration, aggressive tax planning, tax management and tax management are treated as synonymous with tax governance by several authors, such as Desai and Dharmapala (2008), Formigoni et al. (2009), Minnick and Noga (2010), Gomes (2016)

and Martinez and Silva (2017). The authors presented above present convergence in understanding, while dealing with the same theme in their work and describe the subject as a management mechanism whose purpose is to legitimately explore the existing gaps in tax legislation, in order to alleviate the pressure on company results.

According to Balakrishnan et al. (2012), although companies have high quality internal information that can facilitate tax avoidance, managers seem to be unable to convey to market participants some important information about financial and organizational structures, prioritizing their own interests and leaving shareholders at a disadvantage. Organizations aim to increase their market value by applying tax management, reducing short-term tax disbursements, minimizing the impact of taxes on the firm's value (Gomes, 2016). As a result, in addition to market value, it is also possible to increase performance (Machado, 2011).

For tax governance to be considered efficient, according to Scholes, Wilson and Wolfson's study (1992), it is necessary to consider the company/business as a whole and, in order to do it, they developed a method that has three central aspects. The first step, known as all parties, argues that an efficient tax planning must consider all parties to the transaction, its implications or consequences. The second step, called all taxes, suggests that both explicit and implicit taxes should be considered in investment transactions, financing and financial decisions in general. And the last one, the whole cost, which deals with the costs of taxes, direct and indirect related to the operation, should be considered, as the implementation of a tax planning should not only consider the costs of taxes, but all that are direct or indirectly related to the operation. Such reasoning is submitted to the observation of the operationalization input of a new process and, many times, more robust costs are required.

2.1.1 Ways to detect Tax Management

In the literature there are several metrics to detect tax governance in companies, such as *Temporary* (BTD), *Long-run cash* (ETR), *GAAP* ETR, *Current* ETR, ETR *Differential*, DTAX, *Total* BTD, *Abnormal Total* BTD, *Unrecognized Tax Benefits*, *Tax Shelter Activity* and *Marginal Tax Rate*. This research is limited only to the analysis of the Book-Tax Differences (BTD), which comprises the facts that gave rise to the differences between accounting income and tax income and later emphasizing the findings of BTD association, as an indicator of quality of income, with the current and future results of the companies (Hanlon, & Heitzman, 2010; Martinez, & Passamani, 2014; Gomes, 2016). Table 1 presents the main metrics for detecting tax management.

Table 1
Key Metrics for Tax Management Detection

Metric	Formula	Authors
Effective Tax Rates (ETR)	$ETR = \dfrac{\text{Tax expense}}{\text{Profit before IR and CSLL (LAIR)}}$	Martinez and Silva (2017); Quirino *et al*. (2018).
Cash EffectiveTax Rate (CashETR)	$CashERT = \dfrac{\text{Tributospg}}{\text{Profit before IR and CSLL (LAIR)}}$	Quirino *et al*. (2018), Moreira e Silva (2019).
Book-TaxDifferences (BTD)	BTD = Profit before IR and CSLL (LAIR) – Taxable Profit	Hanlon e Heitzman (2010); Martinez and Passamani (2014); Gomes (2016).

Source: *Made by the authors (2019).*

Formigoni *et al.* (2009) explain that in the literature there are some definitions linked to *book-tax differences* (BTD), among them are permanent differences and temporary differences. This classification is due to the existing distinction between the corporate legislation applied to financial accounting and the tax legislation for tax accounting, therefore, which, in the course of its exercise, generate different values between the accounting result and the tax result.

Martinez and Passamani (2014) highlight in their work the following concepts linked to *Book-Tax Differences* (BTD): non-discretionary or normal difference (NBTD); discretionary or abnormal difference (ABTD); Accounting Result Management (*Earnings Management-EM*); Tax Management (*Tax Management-TM*), accounting income and taxable income; discretionary *accruals* and non-discretionary *accruals*; *reporting-entity differences*.

It is classified as normal or non-discretionary BTD (NBTD) when there are inconsistencies between accounting and tax rules and the regulation is applied without opportunism. Recognizing the existing incentives that administrators have to manage tax and accounting numbers, one finds discretionary differences or abnormal BTD. BTD has its beginnings, in the evident misalignment between accounting standards and tax standards in relation to earnings management (Formigoni *et al.*, 2009). For better visualization, in Figure 1 BTD classifications are presented.
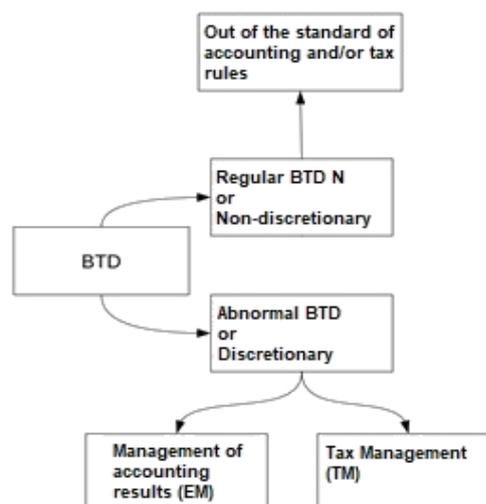

Figure 1 *BTD Classifications*
Source: *Adapted from Formigoni et al. (2009).*

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Hanlon (2005) addressed the importance of *Book-Tax Differences* (BTD) as an indicator of earnings persistence and the use of investors to help reliably measure future earnings forecasts. He exposed a warning that the market signals about the great differences among the BTDs that reflect the accounting profit and the tax profit, as they assume a reduction in the estimates of the companies' future earnings. In the negative difference scenario, where accounting income is less than taxable income, investors overvalue the recurrence of earnings *accrual* components.

Hanlon and Heitzman (2010) also dealt with the reasons that cause the difference between accounting and taxable income. The important contribution of the authors' research were the discoveries that associated BTD with the current and future results of companies, considered by them to be an important indicator of profit quality and an innovative research tool, in the international literature, when it comes to taxation.

Given the above, this research will use the *Book-TaxDifferences* (BTD) as a metric for identifying tax management, as this is also used as one of the ways to measure fiscal aggressiveness (Dumbar, Higgins, Phillips, & Plesko, 2010).

2.2 *Capital Asset Princing Model* (CAPM)

Capital Asset Princing Model (CAPM) was an economic model developed by Willian Sharpe (1964) derived from Harry Markowitz's findings (1952), in which it seeks to simultaneously analyze the risk and return variables of an investment, with the profitability or expected return of the business, with variations in the direct proportion of the market risk indicator. It is the asset pricing method that aims to represent the equity cost, being the most used by the market; in CAPM, the expected return on an investment will be directly proportional to ß (beta), the market risk indicator (Breeden, 2005).

According to Salmasi and Martelanc (2009), the equity cost in essence is not easily measured, hence the need for a metric that, as a rate, reflects this cost, thus facilitating understanding for stakeholders. The opportunity cost is part of the study's variables, which seeks to verify whether the return offered by multiple different application alternatives is relevant to consider the degree of risk involved in each available option; the simple comparison of results regarding the expected returns on each option makes the evaluation imperfect (Goulart, 2002).

There are criticisms about CAPM model; two examples are regarding the choice of the risk premium value that will be used to calculate the expected return of the market index and the care to correctly use the risk-free rate, as this value makes up the model to calculate the equity cost. Despite the criticisms, the model is almost a consensus in the economic assessment (Assaf Neto, Lima, & Araújo, 2008). Table 2 shows the composition of CAPM.

Table 2
Composition of Capital Asset Princing Model (CAPM)

Data	Variable	Proxy
CAPM	B	Beta risk
	Re	Expected return
	Rf	Risk-free rate (Public bonds)
	Rem	Average expected return on the market portfolio – SELIC
	(Rem –Rf)	Difference between the expected average return on the market portfolio and the risk-free rate.

Source: *Adapted from Kroenke, Lunardi, Vergini and Hein (2017).*

CAPM is represented as it follows:

$CAPM = Rf + \beta (Rem – Rf)$
Where:
Re: cost of equity;
Rf: risk free rate;
β: beta;
(*Rem –Rf*): Difference between the expected average return on the market portfolio and the risk-free rate.

Sharpe (1964) in his original proposal discusses that the estimation of the equity cost was achieved through CAPM, in which the premium value was determined by the investor, being based on the expected return from the investment of its resources in assets (shares) of the company, estimating a rate of return higher than that of another investment considered risk-free (Rf) and considering an adjustment to the company's risk, measured by the beta coefficient (β).

In Brazil, three "risk-free" rates are usually used to estimate the equity cost capital by CAPM, which are the Interbank Deposit Certificate (CDI), federal government bonds and the return on the Savings Account (Silveira, Barros, & Fame, 2003).

2.3 Previous Studies

Previously developed international works related themes such as the cost of capital, corporate governance, profitability, corporate transparency, which deal with company characteristics, capital structure, with the adoption of the tax management theme.

Desai and Dharmapala (2008) related the tax system to corporate governance, while outlining research already carried out on the intersection of themes. These authors present that the tax system can mitigate or increase vices arising from corporate governance practices, and that the nature of the governance environment can influence the nature and consequences of the tax system. It was concluded that the literature has neglected how tax management can interact with the various mechanisms that have emerged, in order to minimize governance problems and their impact on corporate control in general.

Harrington and Smith (2012) sought to dismember the capital structure of companies, relating it to fiscal suppression, by using the proxy of Dyreng *et al.* (2008) and multiple cross-section regression. The authors reached the conclusion that the capital structure of the companies surveyed, which have a robust management of their taxes, partially have more debts.

Balakrishnan, Blouin and Guay (2012) presented how aggressive tax planning, combined with a lack of transparency, can cause a series of costs for companies. Information was collected from the Compustat, CRSP, I / B / E / S and NYSE TAQ databases using a cycle from 1990 to 2013 as a reference. The work found lesser financial transparency as a potential cost of aggressive tax planning, helping to explain why some companies seem to engage in more conservative tax planning than would otherwise be ideal from a prospective tax economy.

Kroenke et al. (2017) researched the influence of corporate governance mechanisms on the equity cost, using the Financial Asset Pricing (CAPM) model as a valuation mechanism for Brazilian companies listed on BM&FBovespa, belonging to the Differentiated Corporate Governance Stock Index - Novo Mercado (IGC - NM), in addition to Pearson's correlation and multiple linear regression. The research concluded that there is a directly proportional relationship with the number of members on the company's board of directors, and the equity cost, among the companies surveyed.

Goh *et al.* (2016) sought in their research to elucidate the relationship between tax evasion and the cost of capital of companies in the period from 1993 to 2010, taking into account less aggressive forms of tax planning, through multiple regression. They found as a result the requirement of stock investors for a lower expected rate of return (expectation) due to the positive effects of the cash flow generated by the tax management/tax evasion carried out by the companies. The results also pointed to an even greater acceptance, when the monitoring of companies is carried out by an external source; companies with good quality information and that maintain greater benefits with tax reductions. The finding that tax evasion is associated with a lower cost of equity suggests that tax planning is a valuation activity that investors appreciate.

On the national scenario, in turn, the topic of tax management has gained prominence through research that has related the theme to the equity cost, cost of third-party capital, earnings management, corporate governance and tax aggressiveness.

Formigoni *et al.* (2009) aimed to analyze the accounting result management and/or tax management as a way to explain the difference between the accounting result and the taxable result. BTD and the econometric models KS (1995) and Pae (2005) were used as a way to measure the relationship between tax management and accounting results, and to treat all data, they used the multiple regression and correlation method. The descriptive-exploratory research was based on a sample of 46 companies listed on the former São Paulo Stock Exchange, showing the used metrics did not find a relationship between tax and accounting management that would justify the difference between the accounting result and the taxable result, but reinforced the need for continuity of research, aiming at the quality of accounting information for the area of tax planning, in view of the high burdens practiced in Brazil and the effects on decision-making by stakeholders.

Pohlmann and Iudícibus (2010) focused on taxes and the cost of capital of companies. They sought in the trade off theories and in the theory of the hierarchy of financing sources (pecking order), which deal with the capital structure, as a basis for analyzing the composition of companies' indebtedness and the influence of the taxation of profits on this result. They used as a basis the 500 largest companies operating in Brazil and

their average data from 2001 to 2003. They concluded by presenting the existence of the relationship between income taxation and the degree of indebtedness, both for companies with a low level of taxation of the profit and high indebtedness, as for the others. The results brought by the authors regarding the influence of income taxation on the debt decision, pointed to the consolidation of the forecasts brought by the trade off theory to the detriment of the pecking order theory.

Gomes (2016) sought to analyze the characteristics of corporate governance and its relationship with the performance of companies. He presented aspects of how the independence and composition of the Board of Directors and the remuneration of the executive board contributed to the tax management of Brazilian companies. Thus, the study also proposed to observe the tax management of previous years, considered as a reflection on subsequent administrations. The study performed the findings by calculating the ETR, CashETR, BTD and the regression model with panel data in a sample of 355 companies listed on BM&FBOVESPA, from 2001 to 2014. The results confirmed that variable remuneration paid to executives can be considered as a characteristic that influences tax management in Brazilian firms, and that previous tax management reflects on future tax management.

Martinez and Silva (2017) confirmed that the cost of debt of publicly-held companies listed on the BM&FBOVESPA from 2009 and 2014, through the application of multiple regression with panel data with fixed effects, was influenced by fiscal aggressiveness. The work revealed that less aggressive companies result in a higher cost of debt. The findings showed that creditors analyze the level of tax planning of companies to assess the cost of debt.

Moreira and Silva (2019) sought to analyze the effect of Tax Governance on the equity cost capital of Brazilian companies, using Effective Tax Rate (ETR), the Long-Run Cash (CashETR) and multiple pooled regression as a tool to sustain your results. The study found a significant influence between the reduction of the tax burden, through good management, and the decision of investors on where to apply the resources.

3 Methodological procedures

3.1 Research characterization and sample

Aiming to analyze the influence of tax management on the equity cost of Brazilian companies listed on B3 from 2014 to 2018, this research is classified as empirical-analytical in terms of its objectives, as it seeks to verify the existence of the relationship among variables (Pohlmann & Iudícibus, 2010), which specifically, in this study, has as an independent variable of interest the "tax management" and as a dependent variable the "equity cost".

As for the approach to the problem, it is classified as quantitative, since econometric models were used, in this case, multiple linear regression, to respond to the proposed problem, aiming to identify a cause and effect relationship between tax management and cost equity capital (Formigoni et al. 2009).

As for the procedures, it is classified as documentary, considering that all data used were obtained from Bloomberg® platform and from the Reference Form, available on the B3 website, that is, secondary data and unedited materials (Collis & Hussey, 2005).

The study population comprises all companies listed in B3 from 2014 to 2018, excluding financial companies, as they have different characteristics in relation to other

companies, and also those that do not have all the data for the calculation of BTD, tax management metric used in this research. Thus, the final sample is composed of 126 companies, resulting in a balanced panel formed by 630 observations.

3.2 Measurement of variables and model estimation

Table 3 shows the composition of the variables that were used in the econometric model, and indicates, respectively, the CAPM as the variable related to the equity cost (dependent variable), the BTD as the tax management variable (independent and interest variable), and ROE, Q-TOBIN, LNAT, and ALV as the control variables.

Table 3
Variables used in research

Variable	Description	Composition	Objective
CAPM	Equity cost	$CAPM = Rf + \beta\,(Rem - Rf)$	Dependent variable representing the equity cost
BTD	Total difference between accounting income and taxable income	BTD= LAIR – Taxable profit	Independent and interest variable representing tax management
ROE	Return on equity	$ROE = \dfrac{Net\ income}{Net\ worth}$	
Q-TOBIN	Ratio between the firm's value and the replacement value of company assets	$Q\text{-}tobin = \dfrac{Capital + Total\ Debt + Preferred\ Shares}{Total\ Assets}$	control variables
LNAT	Natural logarithm of total assets	Natural logarithm of total assets	
ALAV	Financial leverage	$ALAV = \dfrac{Total\ Liabilities}{Net\ worth}$	

Source: *Adapted from Moreira and Silva (2019).*

CAPM represents the equity cost and will be used as a dependent variable of the model presented above, and to explain it, the independent variable BTD will be used as a tax management metric and the control variables, which are the return on equity (ROE), market value (QTOBIN), company size (LNAT) and company financial leverage (ALV), as shown in Table 3.

BTD is used as a proxy for tax aggressiveness. It is calculated using the difference in LAIR, which is the result of the company before the incidence of total income tax and social contribution, and the taxable income, which is the basis for calculating the taxes. The application of BTD requires estimating the taxable income, which is typically made by extrapolating current tax expense to the statutory tax rate (Dumbar et al., 2010). Then, the BTD model is represented according to the following formula:

$$BTD = LAIR - Tax\ Profit$$

Table 4 shows the composition of the metrics calculating BTD, so, accounting income, tax income and their differences, and which, in the case of this research, will be used as a proxy for the tax management of Brazilian companies.

Table 4
Book-Tax Differences Composition (BTD)

Variable	Metric composition
Accounting profit	Profit before IR and CSLL (LAIR)
Taxable profit	Current expense with IR and CSLL
BTD	Nominal Tax Rate

Source: *Made by the authors (2019).*

In order to calculate BTD, it is necessary to differentiate the two types of profit involved in its composition. To identify the accounting profit, the profit before IR and CSLL was considered. For taxable income, the model by Passamani, Martinez and Teixeira (2012) was used, which was adapted to the Brazilian reality by Martinez and Ronconi (2015), whose model is represented according to the following formula:

$$TItj = \frac{FTEtj}{strt}$$

So:
TItj = tax income;
FTEtj = current IR/CSLL expense (Provision for IR and CSLL);
strt = Nominal rate of IR and CSLL. This amount will be represented by the rate of 34%, as it corresponds to the sum of the normal rate of IR (15%), additional IR (10%) and CSLL (9%).

After calculating the two profits, with the result of the difference between the accounting and tax profits, BTD is obtained. Thus, after establishing the metrics to be used in this study, the data were tabulated in a panel-type multiple regression, which, according to Wooldridge (2015), this model use is justified due to the characteristics of the sample itself, which it has cross-sectional data and time series data, that is, different companies were analyzed over several years. Thus, the econometric model that will be used in this research can be summarized by Equation 1, whose econometric procedures were performed using the STATA 13 software.

$$CAPM = \alpha_0 + \beta_1 BTD + \beta_2 ROE + \beta_3 QTOBIN + \beta_4 TAMNHO + \beta_5 ALAVANCAGEM + \varepsilon_{it} \tag{1}$$

The dependent variable CAPM represents the equity cost, α represents the intercept (linear coefficient), $\beta2$, $\beta3$, $\beta4$ and $\beta5$ are the coefficients of each independent variable, and BTD is the variable of interest, that is, of tax management, ROE, QTOBIN, SIZE and LEVERAGE are the model's control variables, and $\varepsilon\_$ is the regression error.

Initially, it was necessary to carry out specific tests to define which type of panel would be the most suitable for the defined regression model. Therefore, two tests were performed, the Breusch-Pagan test to analyze the adequacy between pooled effects versus random effects, and the Hausman test to justify the use of the fixed-effect model or the random-effect model. The results presented by the tests (Table 5) indicate that the most suitable panel model was the fixed effect type.

Table 5
Test results - identification of the panel model

Tests	Hypotheses	Results
Breusch-Pagan	H0: The variance of the residuals that reflects individual differences is equal to zero (pooled).	Prob > F = 0.0011
	H1: The variance of the residuals reflecting individual differences is non-zero (random effects).	
Hausman	H0: Error correction model (random effects) is adequate.	Prob > F = 0.0000
	H1: Fixed effects model is suitable.	
Most suitable Panel Model	Fixed Effects	

Source: *Made by the authors (2019).*

From the results obtained, with the fixed panel model, it was possible to carry out other specification tests, which in this case, Wald test for heteroscedasticity and testpar were performed to evaluate the action of time in the model. As the proposed model presented heteroscedasticity problems, as recommended by Newey-West (1987) in its proposal, the model was re-estimated with correction of the variance-covariance matrix, so, the model became robust in relation to the presented heterocedastity. Thus, by carrying out these tests, it was possible to observe the consistency of the model, whose purpose is to analyze the influence of tax management on the equity cost of Brazilian companies listed on B3 from 2014 to 2018.

4 Results and Analysis

The regression method was used in order to determine whether tax management has any influence on the equity cost of Brazilian companies, and the results can be seen in Table 6.

In this work, fixed effect multiple regression was used, with the CAPM as the dependent variable, which represents the equity cost, BTD as an independent variable of interest for tax management, and the ROE, QTOBIN, LNAT and ALAV as a set of control variables for return on equity, market value, company size and company financial leverage, respectively, whose purpose of inserting these control variables is to neutralize the effects that may influence the analysis.

Table 6
Regression model of the CAPM variable and explanatory variables

CAPM = $\alpha 0 +\beta 1BTD+\beta 2ROE+\beta 3QTOBIN+ \beta 4TAMANHO+\beta 5ALAVANCAGEM$			
Variable	Coeficient	Standard Error	P-value (Significance)
Intercepto	33,39402	3,403791	0,000*
BTD	-0,0000118	0,0000156	0,454
ROE	0,0113512	0,0042544	0,009*
QTOBIN	-0,6502894	0,1966346	0,001*
LNAT	-2,177139	0,3930049	0,000*
ALAV	0,0431442	0,0107863	0,000*

Note: *, ** and *** reveal statistical significance at 1%, 5% and 10% respectively.
Source: *Made by the authors (2019).*

The result of the regression when relating the independent variable BTD, used to measure the tax management of Brazilian companies with the variable CAPM representing the equity cost, did not show statistical significance, so, the results are indicating that there is no relationship, either positive or negative, between tax management and the equity cost required by investors.

Confronted with the findings of Moreira and Silva (2019), it is observed that the authors did not find a relation between the equity cost in relation to the ETR, but in relation to the variable CashETR, also used as a tax management metric, the statistical significance was 1%, thus showing, according to the results, the strong influence of tax management on the equity cost.

In the international context, findings by Goh et al. (2016), are against the results of the survey that used Brazilian companies listed on B3, and revealed that the positive increase in cash flow resulting from good tax management by companies makes equity investors assess the risk , thus requiring a lower rate of return.

Also at the international level, Harrington and Smith (2012) concluded that the capital structure of North American companies has a higher value of third-party capital in its composition, as they obtain greater funding for this resource type. The companies that obtained these results were the ones that were most focused on efficient tax management.

In Brazil, Martinez and Silva (2017) presented similar results in relation to the cost of third-party capital of companies listed in B3, proving in their findings that, contrary to the equity cost, there is the influence of tax management, therefore, lenders consider it to calculate the return requirement on their investments. As an aggravating factor, they showed that companies with low fiscal aggressiveness end up bearing a higher cost of debt, that is, the lower the level of tax planning, the greater the return expected by investors.

About the results of this research, there was no relationship between tax management and the equity cost from an econometric point of view, showing that regardless of whether or not there is a reduction in cash flows from good tax management practices, this practice it does not change the cost demanded by investors in investing capital. An opposite relationship is found regarding the cost of third-party capital, which, as presented by other authors, has an inversely proportional relationship, so, when the level of fiscal aggressiveness is higher, the lower the cost of raising these funds is, thus indicating which case if there are no good tax management practices, a higher cost will be required for the acquisition of these resources.

As for the control variables, they were the same used by Moreira and Silva (2019), and when confronted with the results presented in Table 1, it is possible to verify that in both studies the Q-TOBIN, so, the market value of the company as a control variable has a negative statistical significance of 1%, showing a relationship with the equity cost, showing that by adding market value, companies reduce the equity cost. As for Size, the results were opposite, the present work showed a negative significance of 1%, that is, the larger the company, the lower the demand from investors.

The other two control variables, ROE and ALAV, which represents financial leverage, were statistically significant to explain the equity cost, but positively at 1%, contrary to the results of Moreira and Silva (2019) who presented a negative significance at 5% for the ROE and no relationship with the variable ALAV. The results conclude that as ROE increases, return on invested resources, the equity cost also increases, the same relationship with ALAV, which proves that raising third-party funds to increase the effects of variation in profit contributes to explain the increase or decrease in the rate of return required by capital depositors in the companies analyzed.

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The results in general showed that BTD proxy used to measure tax management has no relationship with the equity cost, reinforcing the findings of Moreira and Silva (2019), when they used ETR variable as a metric for management and concluded that there was no relationship either. However, when using the variable CashETR as a metric, there was a positive significance at 1%. Comparing the results with the findings of Goh et al. (2016), in the international scenario and with the conclusions of Moreira and Silva (2019), at the national level, CashETR proxy was presented as the best metric to measure tax management in relation to the equity cost among the three existing metrics, ETR, CashETR and BTD.

5 Final Considerations

This research sought to analyze the influence of tax management on the equity cost of Brazilian companies listed on B3 from 2014 to 2018. Multiple regression with fixed effect was used as a research tool and the data were organized in a balanced panel formed by 126 companies analyzed, totaling 630 observations.

The initially expected conclusion was that good tax management practices had an influence on the equity cost, thus presenting a negative relationship, so, the greater the management to reduce taxes, the lower the cost required by equity investors in the organization. However, through BTD proxy, referring to the difference between accounting income and tax income, and used to capture tax management in this research, it was not possible to identify any relationship with the equity cost. Thus, for the purposes of this research, the theoretical adequacy and the statistical model used did not show that good tax management practices have a positive or negative effect on the equity cost.

Thus, this research contributed to the consolidation of the findings by Goh et al. (2016) and Moreira and Silva (2019), who present CashETR as the best metric for tax management, given that the results presented using the ETR and BTD variables, showed that the cost of capital required by investors is not related to the fiscal aggressiveness of companies.

It should be noted that the relationship between the two constructs - tax management and cost of equity - was studied both from a theoretical and an empirical perspective, as it sought to analyze the influence that management exerts on the equity cost , contributing to the advancement and discussion of debates about this relationship, considering the scarcity of national studies on this subject, and that the research found is still incipient, therefore, there is a need for greater depth in the subject.

The research advances in the theoretical and practical fields, but some limitations can be pointed out, especially with regard to the information for calculating BTD, a fact that made it impossible to analyze a larger sample. For this reason, it is recommended that for future research, CashETR use as a metric to measure companies' tax management, considering that it was the only proxy that showed statistical relevance for purposes of relation with tax management.

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