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Stock-Based Payments and Tax Aggressiveness of Companies in the Industrial Goods Sector

Pagamentos Baseados em Ações e Agressividade Tributária das Empresas do Setor de Bens Industriais

Pagos Basados en Acciones y Agresividad Fiscalidad de las Empresas del Sector de Bienes Industriales

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KEYWORDS
Employee Stock Option Plan. Tax Planning. Tax Agressiveness.

Abstract: The objective of this study was to analyze whether Stock-Based Payments (SBP) influence the tax aggressiveness of Brazilian companies in the industrial goods sector, listed on B3, from 2016 to 2022. From a sample of 28 companies and using a mixed-effects linear model, it was observed that Stock-Based Payments do not have a statistically significant relation with tax aggressiveness, considering the P-value of 0.05. However, the scenario is different for a P-value reference of 0.10, as the result found (P-value = 0.073) does not allow rejecting the established hypothesis that companies adhering to SBP policy are more tax aggressive than those that do not adhere, thus corroborating most of the researched literature. Among the control variables, Roa is inversely associated with tax aggressiveness, whereas Indebtedness and Dividends show a direct association with it. The other control variables in the model (Size, Net Margin, and Growth) did not present any statistically relevant outcomes. The study contributes to the literature on the determinants of aggressive tax practices of Brazilian publicly traded companies.

PALAVRAS-CHAVE
Pagamentos Baseados em Ações. Planejamento Tributário. Agressividade Fiscal.

Resumo: *O objetivo deste estudo foi analisar se os Pagamentos Baseados em Ações (PBA) influenciam na agressividade tributária de empresas brasileiras do setor de bens industriais, listadas na B3, durante o período de 2016 a 2022. A partir de uma amostra de 28 empresas e através do uso de um modelo linear de efeitos mistos, foi possível observar que os Pagamentos Baseados em Ações não possuem uma relação estatisticamente significativa com a agressividade fiscal, ao considerar o Valor P de 0,05. Entretanto, o quadro é diferente para um Valor P de referência a 0,10, pois o resultado encontrado (Valor P = 0,073) não permite rejeitar a hipótese estabelecida de que as empresas que aderem a política de PBA são mais agressivas, tributariamente, do que as que não aderem, corroborando, portanto, a maioria da literatura pesquisada. Entre as variáveis de controle, o Roa associa-se de forma inversa à agressividade fiscal, enquanto o Endividamento e os Dividendos apresentam uma associação direta com ela. As demais variáveis de controle do modelo (Tamanho, Margem Líquida e Crescimento) não apresentaram resultados estatisticamente relevantes. O estudo contribui com a literatura acerca dos determinantes das práticas tributárias agressivas das companhias abertas brasileiras.*

PALABRAS CLAVE
Pagos Basados en Acciones. Planificación Fiscal. Agresividad Fiscal.

Resumen: *El objetivo de este estudio fue analizar si los Pagos Basados en Acciones (PBA) influyen en la agresividad fiscal de las empresas brasileñas del sector de bienes industriales, cotizadas en B3, durante el período de 2016 a 2022. Con base en una muestra de 28 empresas y a través de la utilización de un modelo lineal de efectos mixtos, se pudo observar que los Pagos Basados en Acciones no tienen una relación estadísticamente significativa con la agresividad tributaria, al considerar el P-Value de 0,05. Sin embargo, el panorama es diferente para un valor P de referencias de 0,10, ya que el resultado encontrado (valor P = 0,073) no nos permite rechazar la hipótesis establecida de que las empresas que se adhieren a la política de PBA son más agresivas fiscalmente que aquellas que no se adhieren, corroborando así la mayoría de la literatura investigada. Entre las variables de control, el Roa se asocia inversamente con la agresividad tributaria, mientras que la Deuda y los Dividendos se asocian directamente con ella. Las demás variables de control del modelo (Tamaño, Margen Neto y Crecimiento) no presentaron resultados estadísticamente relevantes. El estudio contribuye a la literatura sobre los determinantes de las prácticas fiscales agresivas por parte de las empresas públicas brasileñas.*

Introduction

Tax aggressiveness consists of strategies taken by companies to achieve the tax base reduction and the profit maximization (Martinez & Coelho, 2016). Thus, such set of actions and strategies taken by the companies by aiming to reduce the explicit taxation on the profit will maximize the company value and reach better outcomes in economic and financial terms for the entities (Blouin, 2014).

The requirement of a more aggressive tax behavior from the executives, however, may generate conflict of interest for the entities that have to find ways of making them act in favor of the value generation to the shareholders. In this sense, the Agency Theory that verifies the relation of existing opportunism between the agent and the principal and proposes mechanisms, such as compensation, for the reduction of conflict of interest between the parts (Berle & Means, 1932) is considered. The theory is grounded on the assumption that persons are opportunistic and, hence, they have their own interests; therefore, it analyzes the conflicts, it verifies the problems deriving from them, and it proposes means to balance them so that the risks derived from the agency problems may be reduced (Jensen & Meckling, 1976).

Krauter (2009) suggests the compensation use as an incentive mechanism so that the executives achieve the outcomes expected by the companies. Therefore, the agent has to accomplish tasks for the principal that, in response, will compensate the agent for the accomplishment of the activities, rewarding all according to the scope of the established outcomes (Jensen & Meckling, 1976). The Stock-Based Payments are strategies of long-term stock compensation that help to reduce the agency costs are designed to better align the interests between the executives and the shareholders. This type of compensation is considered as a significant determinant of fiscal aggressiveness, as there are pieces of evidence that it influences, positively, tax aggressiveness in the companies (Ding & Sun, 2001; Rego & Wilson, 2012; Yermack, 1995).

According to Rego and Wilson (2012), the compensation, such as the Stock-Based Payments (SBP) for the executives, can motivate them to take not only a tax more risky positioning, but also better investment and financing decisions for the entities. For the mentioned authors, the fiscal aggressiveness practices in the companies are systematically associated to outcomes, which present higher financial leverages and more profitable scenarios in their financial statements.

In North American companies, Kubick and Masli (2016) examined the relation between incentives, such as the executive compensation, and the corporate fiscal aggressiveness, as the incentives as stock options and bonus plans motivate them to assume higher risks. The authors predicted and confirmed that the referred incentives associate themselves to a higher fiscal aggressiveness, in addition to contributing to better financial outcomes for the entities.

In the Brazilian companies listed on B3, Mamede Junior et al. (2023) investigated the effect of the executive compensation on the tax aggressiveness. To assess the compensation, the authors elected the variable compensation, measured, among others, by the SBPs. The outcomes showed that the variable compensation impacts positively the tax aggressiveness of the companies, that is, the higher the compensation, the more tax aggressive the entity is.

For Ermel and Medeiros (2019), the main objective of the stock-based compensation is to align the compensation of the executives with the company performance and to provoke them to comprehend that the incentive will occur as the performance happens. Related to this, Martinez et al. (2022) affirm that the practices of tax aggressiveness have the purpose of stimulating and encouraging the managers to adopt more risky strategies to reduce the tax payment and, consequently, to maximize the company value. By considering such scenario, the current research aims to clarify the following problem: What is the relation of the Stock-Based Payments (SBP) with the tax aggressiveness of companies in the industrial goods sector listed on B3? Then, the objective of the study is to analyze if the SBPs influence the tax aggressiveness of companies in

the industrial goods sector listed on B3.

Studies on the tax aggressiveness theme are still recent in Brazil and they are not so developed as they are in the United States (Kubick and Lockhart, 2017) or in France (Jbir et al., 2021). In addition, authors such as Rego and Wilson (2012) and Ding and Sun (2001) consider the SBPs as significant determinants of fiscal aggressiveness, influencing it positively. At last, there is a strong support to use the SBPs as incentive mechanisms to executives so that they take more risks in aggressive tax practices, obtaining better economic and financial outcomes for the entities (Bebchuk & Fried, 2011).

Therefore, this study justifies itself for perceiving the importance and the contribution of studies that address the SBP thematic use as an incentive of more aggressive tax practices in the Brazilian context, still little explored. This study contribution lies in analyzing long-term incentives as it is the SBP case in more aggressive tax practices, individually, by considering that, in previous studies (Rego & Wilson, 2012; Mamede Junior et al. 2023), the executive compensation was analyzed in general by the variable compensation.

Furthermore, after reviewing the literature, one notices a small amount of studies that address the tax aggressiveness thematic in Brazilian companies versus executive compensation. Thus, the social contribution lies in analyzing the tax aggressiveness in Brazil, as such practices have shown themselves as quite common in countries of developed economy such as the United States, for example, but few studies analyze this theme in economies of developing countries as in the case of Brazil.

Research Theoretical Elements

Fiscal aggressiveness and its determinants

Tax aggressiveness, in general, can be defined as a set of actions and procedures accomplished by entities that aims to reduce the main tax liabilities (Rego and Wilson, 2009). The term, fiscal aggressiveness, in an international context, is comprehended as a set of actions and procedures accomplished by the entities to provoke a reduction of the tax burden and to present higher profits (Hanlon & Heitzman, 2010; Blouin, 2014).

In the Brazilian context, for the area researchers, there is not a concept or construct fully defined and accepted for tax aggressiveness in general. It is, as a rule, defined mistakenly by some as a synonym of tax planning. Nonetheless, Martinez et al. (2022) and Silva (2016) conceptualize it as a set of strategies implemented to avoid the payment of taxes, either unlawfully or to avoid the occurrence of the triggering event under the tax legislation in force or due to existing lacunas in it.

Although Hanlon and Heitzman (2010) have already affirmed that there is little comprehension about the company incentives and the tax evasion, Desai and Dharmapala (2006) discussed the role of the encouraged compensation for the executives as a way of influencing practices of tax aggressiveness. Hence, to use the executive compensation as an incentive for the interest alignment between the parts (agency and principal), so that the executives search for the corporate tax burden reduction and, thus, they succeed in increasing the entity accounting outcomes (Stiglitz, 1985).

According to Wilde and Wilson (2018), the tax aggressiveness determinants can be classified in four groups: firm characteristics, environmental attributes, gatekeepers' constraints (corporate governance gatekeepers) and incentives at the firm level. The firm characteristics are particularities associated to tax aggressiveness and they influence it, such as firm size, cost planning and transactions with relational parts abroad; delay in publishing the statements; business strategies and company life cycles; corporate social responsibility in its reputation and the operations in diversified businesses (Lee et al., 2015).

The environmental attributes are the second group of determinants, in which the firms operate and condition the tax aggressiveness, and they are the operation in international markets, customer concentration, product market competitiveness and the effects of repeated fiscal amnesties (Shevlin et

al., 2017; Wilde & Wilson, 2018).

The actions performed by the gatekeepers, considered as corporate governance guardians, are the third determinant, who play the role of monitoring the tax aggressiveness rate in certain settings. It is worth stressing: institutional investments, reports from the entity executives, identification and delimitation of theoretical and empirical researches, problems due to the physical distance between the fiscal authority and the taxable person head office, operation of financial regulators, such as the Securities and Exchange Commission (SEC) monitoring and the fiscal transparency role (Kubick & Lockhart, 2017).

The fourth and last group of determinants consists of the incentives at the firm level, as a great part of the investigation focuses on the monetary incentives directly connected to the tax economy. Recent studies, such as the one by Graham et al. (2014), analyzed if the reputational costs connected to the tax aggressiveness and the concern about the entity reputation became a critical incentive for the firms.

The literature suggests that the executive compensation can encourage them to make more risky decisions. Therefore, it is feasible to mention studies that observe a positive relation between the executive compensation and the tax aggressiveness in companies of several countries such as Indonesia (Fen & Riswandari, 2019), Japan (Ohnuma & Sakurada, 2014), the United States (Rego & Wilson, 2009) and China (Wang & Yao, 2021).

In Brazil, Mamede Junior et al. (2023) investigated the effect of the executive compensation structure on the tax aggressiveness. They found that there is a positive relation between the variable compensation, the SBP contained in it, and the tax aggressiveness of the companies, and it is measured by the abnormal BTD, ETR and Cash ETR metrics.

Agency theory, stock-based payments and research hypothesis

The Agency Theory explains the existing opportunism relation between agent and principal, and it proposes mechanisms of conflict reduction and interest alignment among the parts (Berle & Means, 1932) considering that it developed from the assumption that persons are opportunistic and have their own interests. Its objective, thus, is to analyze the conflicts, to verify the problems deriving from them and to propose means to minimize them (Jensen & Meckling, 1976).

The executive compensation attracts attention from the economists and many researches indicate it as a way to alleviate the agency problem in publicly traded companies; as well as the compensation agreements are also partly a product of the agency problem (Bebchuk & Fried, 2011). Therefore, it is used as a mechanism of interest alignment between the executives and entities for being used as an incentive to the executives so that they reach the outcomes desired by the entities (Krauter, 2013).

In this scenario, the SBPs have been constituted as one of the main incentive instruments for the executives, as there is a strong support for its use as a stimulus of the executive performance (Bebchuk & Fried, 2011). The SBPs have been provided to the executives from England and from the United States since the 1950s and the 1960s, as a way to grant rights to purchase shares at pre-established prices (Murphy, 1999).

In Brazil, the use of stock-based payments started in the 1970s and the regulation occurred in 1976 by Law No. 6.404, which provided on the possibility of payment to the agents via stock options. Only in 2010, the CPC 10 was issued by the de Accounting Pronouncements Committee, which presented the accounting rules applied to the SBPs, highlighting the procedures for the recognition and the disclosure of these transactions (CPC, 2010).

In this context, the SBPs have been constituted as one of the main incentive instruments for the executives so that they achieve the interests of the entities (Ermel & Medeiros, 2019). In the literature, it is feasible to find studies that address the thematic strategy on the SBP use as incentives for the executive performance. By

analyzing the companies of the United States, Rego and Wilson (2012) affirmed that the risk-incentives, via stock-based compensation, can lead the executives to make more risky investment and financing decisions, in addition to a more risky tax positioning. For these authors, the fiscal aggressiveness practices in the companies are systematically associated to the outcomes that present higher leverages and profitabilities in their financial statements.

Halioui et al. (2016) analyzed American companies listed on NASDAQ 100 and verified how the fiscal aggressiveness, dependent variable, is influenced by the independent variable, executive compensation. They found the existence of a negative relation between the executive compensation, measured by the SBPs among others, and the tax aggressiveness, measured by the effective tax rate (Etr).

Still in the United States, Kubick & Masli (2016) verified if incentives to the promotions of executive career promote a higher risk-taking and confirmed that the American executive compensation, having the SBPs as one of its elements, is positively associated to a higher company tax aggressiveness.

Zolotoy et al. (2021), by using the Behavioral Agency Theory, described a dependent relation between the structure of incentives by stock options for executives and the fiscal aggressiveness. The study showed that the executive compensation, represented by the richness of stock options, is positively associated to the tax aggressiveness, when measured by the effective tax rate, promoting the interest alignment between the executives and the entities.

In Brazil, this theme was researched by Mamede Junior et al. (2023). They investigated the effect of the executive compensation structure on the tax aggressiveness in non-financial Brazilian companies listed on B3. The hypothesis that the variable compensation results (the SBPs among them), on average, in higher tax aggressiveness was tested. They found a positive association between the executive compensation, measured by the SBPs and the tax aggressiveness in Brazil, when measured by the abnormal BTD, Etr and Cash Etr metrics, mainly in the post-impeachment period, from 2016 to 2021, in relation to the previous years.

After considering the previously mentioned studies, it is intended to assess in this research if the SBPs, as incentives for the executives, predict the tax aggressiveness of the entities in the industrial goods sector listed on B3, as there is some evidence that they can influence positively the tax aggressiveness of the companies (Huang et al., 2018). Thus, it is intended to test the following research hypothesis in this study: H1 - SBPs influence, positively, the tax aggressiveness in Brazilian companies of the B3 industrial goods sector.

Methodological Elements of Research

Population, sample and data collection

This study population consists of companies from the industrial goods sector, a sector with the highest number of companies in the Brazilian stock exchange, in addition to being considered of great importance for the country economy (Santos & Souza, 2023). The companies that did not present complete data for the variables and a minimum number of observations in the time were excluded, that is, all the companies that presented abnormal data and metrics.

Due to the above, the sample was comprised of 28 companies from the industrial goods sector. The data regarding the tax aggressiveness, dependent variable, and economic-financial data of the control variables were obtained on the Economática® platform. The independent variable, SBP, included data extracted from the Reference Forms, item 8, that deals with the compensation of the administrators; and, item 8.2, total compensation by body (Beuren et al., 2014; Rissatti et al., 2019). Data concerning the years from 2016 to 2022 were analyzed.

Research variables

Dependent variable

There are different ways of measuring the fiscal aggressiveness according to the literature (Hanlon & Heitzman, 2010; Wang et al., 2020). Hanlon and Heitzman (2010) carried out a survey about the ways of measuring the tax aggressiveness and showed that most of them used explicit taxes in the calculations. Nonetheless, it is worth highlighting that not all of them are appropriate for the various research issues (Hanlon & Heitzman, 2010; Wang et al., 2020).

The *Effective Tax Rate* (Etr) is the traditional measure used to identify the effective tax rates (Hanlon & Heitzman, 2010) and this is why it was chosen as dependent variable (of tax aggressiveness) in this study. Such metrics is estimated using data extracted from the income statement included in the Tax Accounting Bookkeeping where Tax_exp is the income tax and CSLL expense, and NIBT is the net income before taxes, as follows:

$$Etr = \frac{Tax\_exp}{NIBT}$$

This measure may capture the tax practices such as the accelerated depreciation, interests on own capital and fiscal incentives (Hanlon & Heitzman, 2010; Lee et al., 2015; Wang et al., 2020). The lower the effective tax rate is, the higher the tax aggressiveness level of the company will be (Hanlon & Heitzman, 2010).

Independent interest variable

The SBPs are this study independent variable. For Ding & Sun (2001) and Yermack (1995), there are three major reasons for the companies to adopt the SBPs as a way of compensation: first, they help to reduce the agency costs, as the stock-based payments are designed to better align the interests between the executives and the shareholders; second, they are adopted by the companies as an instrument for the cost reduction of the financial statements; and third, they are the tax and fiscal advantages associated to this type of compensation, as the capital gains from the SBPs are taxed at a reduced rate when compared to the salary compensation.

Rego and Wilson (2012) highlight that the stock risk-taking incentives are a significant determinant of the company tax aggressiveness, as they motivate the executives to make more risky investment and financing decisions. Moreover, more risky activities increase the volatility of the stock return and the portfolio value of stock options. Therefore, the SBPs were treated as a *dummy* variable that indicates if the companies compensate this way or otherwise (Ermel & Medeiros, 2019).

Independent control variables

The independent control variables adopted in the research are as follows: i) Return on Assets (Roa), as it is an important variable on fiscal aggressiveness, because more tax aggressive companies are positively associated with the return on assets (Hartmann & Martinez, 2020; Lennox et al., 2013); ii) the Dividends (Div), as they are a great possibility to generate income via strategies that aim at exempting taxes (Martinez & Martins, 2016; Procianoy & Poli, 1993); iii) Size (Sz), measured by the natural logarithm of the company total assets (Martinez & Salles, 2018), as larger companies are more susceptible to aggressive tax policies (Richardson et al., 2015); iv) Indebtedness (Ind) considered as a fiscal aggressiveness determinant, which is measured by the ratio between the long-term debts and the total assets (Martinez & Salles, 2018); v) Net margin (NM), found by the division of the net profit by the net sales revenue, as the companies with better tax performance present a higher net margin (Krauter, 2009); and vi) the sales Growth (Gr), measured by the variation in the net operational revenue of i company between t-1 and t, divided by the operational net revenue of t-1 (Krauter, 2009; Oliveira, 2017; Duarte et al. 2021), which can cause a positive effect for the tax planning of the companies, regarding the operational decisions, reflecting a more aggressive tax position (Lima et al., 2021).

Analysis procedures

Initially, descriptive statistical techniques

were adopted, used to calculate the measures of: central tendency (average and median), dispersion (standard deviation, asymmetry and kurtosis) and position (quartiles and the minimum and maximum values for the research selected sample).

Mixed-effects linear model

An alternative for data modelling instead of making use of the longitudinal data analysis techniques is to apply a larger family of models, such as the mixed-effects linear ones. These models incorporate random and fixed effects components for the modelling of a certain characteristic, and they offer an advantage of exploring different variance structures for the random effects. Such structures help to control the data present heterogeneity that can impact significantly the standard error of the estimated coefficients and the P values used to assess the statistical significance of these estimates in the traditional linear models (Fitzmaurice et al., 2011).

From the definition of the variables described previously, it is feasible to determine the SBP influence on tax aggressiveness according to the econometric model of mixed-effects presented in equation (1):

$$Etr_{i,t} = \beta_0 + \beta_1 SBP_{i,t} + \sum_{k=1}^{6} \beta_k X_{kit} + u_{t0} + u_{t1} X_{1it} + \varepsilon_{i,t} \quad (1)$$

In equation (1), the Xk variables represent Roa, Div, Sz, Ind, NM and Gr respectively k=1,2,...7. The model allows the incorporation of a random effect that intends to capture the effect of changes in the fiscal aggressiveness of a certain company concerning the fiscal aggressiveness average by taking all the companies into account, represented by the β_0 parameter. The term u_{t1} represents the random effect that captures the deviations in the Roa slope (X_{2it}) for a certain company regarding the slope average observed in Roa for all the companies (β_2). The model is based on the assumption that the random effects follow a normal distribution, and it requires the specification of a covariance structure for them. The general structure is presented in equation (2)

$$Var\begin{bmatrix} u_{0t} \\ u_{1t} \end{bmatrix} = \Sigma = \begin{bmatrix} \sigma_{u0}^2 & \sigma_{10} \\ \sigma_{01} & \sigma_{u1}^2 \end{bmatrix} \quad (2)$$

Fitzmaurice, Laird & Ware (2011) recommend using, from the estimate, the random effects in a correlated way. The estimate of the covariance structure in (2) allows to obtain single values for the variance and covariance estimates of the random effects considered in the model. The model parameter presented in (1) is developed by using the maximum likelihood method. If the model is well adjusted, the residues obtained after the estimate must follow a normal distribution.

Presentation and result discussion

Descriptive analysis

The characterization of the companies starts with a general analysis of the variables related to the fiscal aggressiveness that occur in some period (year) in the companies. It can be seen in **Erro! Fonte de referência não encontrada.** that the dependent variable, which measures the fiscal aggressiveness (Etr), has observations for all the years from 2016 to 2022, including 28 companies. A similar situation is observed for the Roa, Div and Size of the company (Sz) control variables. Nonetheless, the Ind, NM and Gr variables present at least 4 missing observations, indicating that our data set is an unbalanced panel.

As to the obtained indicators, it is observed that the dependent variable assumes values between 0,00 and 0,87. The arithmetic average value (0,28) is quite close to the estimated value for the median (0,27) and it suggests an approximately symmetrical distribution. However, there is a high heterogeneity in the fiscal aggressiveness values among companies, as estimated values for the variation coefficient of this characteristic close to 59% (see **Erro! Fonte de referência não encontrada.**) are observed. A similar analysis performed for the control variables suggests that the distributions present themselves in an asymmetrical way with a high heterogeneity in the values observed in each year. The variation

coefficient minimum value for these companies was 76%, according to Table 1.

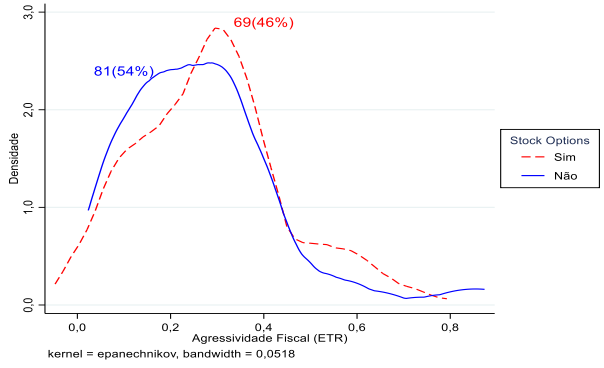
Table 1
Main statistical indicators of 28 companies

Statistic	Etr	Roa	Div	Sz	Ind	NM	Gr
N° of Obser.	150	150	150	150	146	144	146
Minimum	0,00	- 3,10	- 2.798.354,0	58.734,9	- 1.428.020,0	- 2.889,5	-
Maximum	0,87	33,10	23.600.000,0	50.500.000,0	11.700.000,0	53,2	23.600.000,0
Average	0,28	7,67	2.310.591,0	6.832.116,0	987.422,1	- 33,2	1.781.401,0
Median	0,27	6,16	410.016,5	1.494.698,0	75.215,0	3,6	936.405,0
Coeffic. Var.	0,59	0,76	1,79	1,58	2,21	-7,65	1,68

Source: Elaborated from B3 data extracted from Economatica. Access on 01/12/2023.

Regarding the stock-based payments (SBP) policy adhesion, it is observed in Figure 1 that, in the 28 analyzed companies from 2016 to 2022, in 69 observations (46% of the total) there was no adhesion to this policy in any of the years. However, in 81 (54% of the total) during this period, there was the adhesion to this policy by the companies in at least one year. Figure 1 presents the probability distribution of the variable that approximates the fiscal aggressiveness for the companies that decided for the adhesion to the stock-based payments (SBP) policy or otherwise. The chart suggests a different behavior standard of the time periods in which the adhesion to this policy was observed.

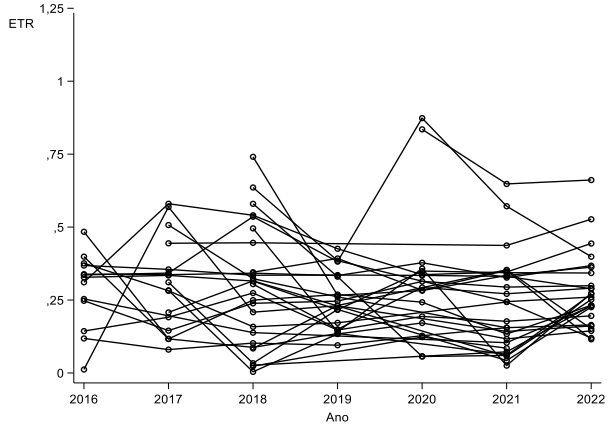
Figure 1
Kernel Estimator for the Fiscal Aggressiveness of 28 B3 companies according to the adhesion to the SBP policy



Source: Elaborated from B3 data extracted from Economatica. Access on 01/12/2023.

To ensure the correct specification of the statistical model to be used, it is crucial to assess the fiscal aggressiveness behavior (Etr) over the considered period. For this purpose, a time series chart was generated, considering the fiscal aggressiveness values for each company in this period (see **Erro! Fonte de referência não encontrada.**). One can see in the figure that the fiscal aggressiveness shows a stationary behavior for the various companies. Furthermore, **Erro! Fonte de referência não encontrada.** suggests the presence of a random effect in the average and a random slope from one of the control variables as well.

Figure 2
Time series chart for the tax aggressiveness (Etr) of 28 companies



Source: Elaborated from B3 data extracted from Economatica. Access on 01/12/2023.

Hence, the adopted strategy is to consider a fixed-effects linear model in order to adjust these data. It is worth highlighting the advantage of these models, as they allow the exploration of other

variability structures for the random effects, not always available in the longitudinal data models. The last ones are a particular matter of this model family (Fitzmaurice et al, 2011).

Mixed-effects linear model

In **Erro! Fonte de referência não encontrada.**, the adjustment outcomes of a mixed–effects linear model that aims the relation between the fiscal aggressiveness (Etr) and the adhesion to the SBP policies by 28 Brazilian companies that operate on B3 in the industrial goods sector are presented. It is observed that there is no statistically significant relation of the variable that indicates adhesion to the SBP and the fiscal aggressiveness (P Value = 0,073). Moreover, in the table, it is stressed that the average fiscal aggressiveness is lower in the Construction and Engineering (P Value =0,00) sectors; Transport Material (P Value=0,00) and Services (P Value=0,00) in comparison with the Trade sector.

Despite the outcome previously presented, if the type I error level of reference were a P Value equal to 0,10, the research hypothesis would not be rejected, that is, companies that adhered to the SBP policy are more tax aggressive than those that did not do it.

Another aspect to be highlighted is the alignment of the Agency Theory outcome, by considering that the entities, which compensate their executives (agents) via SBP, search for practices that mitigate their tax burden. This causes the accounting outcomes to be higher and, when preserved in the long term, they tend to reflect positively in the company value.

In addition, it is observed that the Roa variable associates inversely with the fiscal aggressiveness (P Value =0,008), whereas the Ind (P Value =0,008) and Div (P Value =0,036) present a direct association. In the three last cases, although there is a statistically significant association for an error level of type I of 5%, the impact, reflected on the increase or decrease of the average fiscal aggressiveness, is minimum.

In the model assumption assessment, the standardized residues were estimated and the adhesion assumption to the normal distribution was assessed. In Figure 3, the probability distribution charts for the standardized residues obtained after the mixed-effects linear model adjustment are presented, distinguishing between adhesion or non-adhesion to the SPB policy from 2016 to 2022. The figure suggests that the standardized residues, for both groups, present a symmetrical distribution. To confirm this observation, Shapiro – Francia test (Royston, 1983) was performed, resulting in a P Value equal to 0,1225. This indicates that it is not feasible to reject this test null hypothesis and it confirms that these residues adhere to a normal distribution.

Hence, the established hypothesis in the study that the adhesion to SBP policy impacts positively the fiscal aggressiveness of the companies can not be rejected, a result that confirms the outcomes by Rego and Wilson (2012), as for these authors, risk-taking incentives via compensation linked to stocks are a significant determinant of company tax aggressiveness. It also responds to other authors mentioned in this research such as Halioui at al. (2016), Kubick and Masli (2016), Zolotoy et al. (2021) and Mamede Junior et al. (2023).

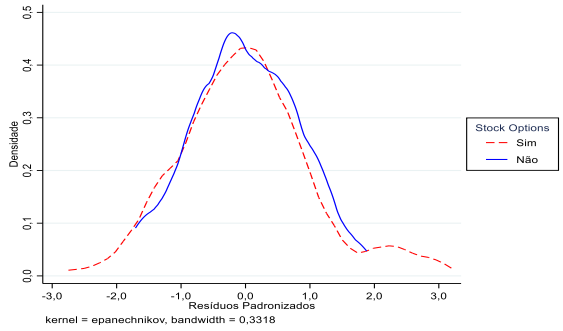
Table 1
Estimated coefficients for a mixed-effects linear model that relates fiscal aggressiveness to various characteristics of 28 Brazilian B3 companies (From 2016 to 2022)

Fiscal Aggressiveness (Etr)	Estimated Coefficient	Robust Standard Error	P Value	95% Confidence Interval	
				Inferior Limit	Superior Limit
Year					
2016	(basis)				
2017	-0,010	0,066	0,878	-0,140	0,120
2018	-0,027	0,052	0,598	-0,129	0,074
2019	-0,078	0,049	0,114	-0,175	0,019
2020	-0,051	0,054	0,346	-0,157	0,055

2021	-0,105	0,055	0,053	-0,212	0,001
2022	-0,059	0,052	0,257	-0,160	0,043
Does it have Stock-Based Payments?					
No	(basis)				
Yes	-0,043	0,024	0,073	-0,091	0,004
Sector					
Trade	(basis)				
Construction and Engineering	-0,203	0,026	0,000	-0,253	-0,153
Transport Material	-0,167	0,031	0,000	-0,228	-0,107
Machines and Equipments	-0,037	0,051	0,475	-0,138	0,064
Services	-0,190	0,053	0,000	-0,294	-0,087
Transport	0,016	0,043	0,713	-0,068	0,100
Control					
Roa	-0,005	0,002	0,008	-0,009	-0,001
Div	0,000	0,000	0,036	0,000	0,000
Sz	0,000	0,000	0,116	0,000	0,000
Ind	0,000	0,000	0,008	0,000	0,000
Ml	0,000	0,000	0,134	0,000	0,000
Gr	0,000	0,000	0,234	0,000	0,000
Constant	0,482	0,064	0,000	0,356	0,608

Source: Elaborated from B3 data extracted from Economatica. Access on 01/12/2023.

Figure 3
Kernel Estimator for the standardized residues obtained from a mixed-effects linear model



Source: Elaborated from B3 data extracted from Economatica. Access on 01/12/2023.

Final Considerations

This study aimed at analyzing if the SBPs influence the tax aggressiveness of the companies listed on the industrial goods sector from 2016 to 2022. To that end, data from 28 companies of the sector were analyzed, which were tested by using a mixed-effects linear model.

The outcome showed that the PBAs do not have a statistically significant relation with the fiscal aggressiveness, corroborating Jia and Gao (2021), when considering a P Value of 0,05. However, by considering P Value of 0,10, the study established hypothesis that the adhesion to the SBP policy impacts positively the fiscal aggressiveness of the companies can not be rejected. Such outcome corroborates a great part of the literature (Ohnuma & Sakurada, 2014; Halioui at al. 2016; Kubick & Masli, 2016; Fen & Riswandari, 2019; Zolotoy et al. 2021; Mamede Junior et al., 2023). Among the control variables included in the model, one can see that the Roa relates inversely to the fiscal aggressiveness (P Value =0,008); that Ind (P Value =0,008) and Div (P Value =0,036) present a direct association. The others did not show themselves as statistically relevant to predict the fiscal aggressiveness.

In face of the findings, it can be seen that the theme still requires additional studies for a more decisive conclusion about the compensation influence, via SBP, on the corporate tax aggressiveness. In this context, other studies are suggested to enlarge such analysis by adding other tax aggressiveness metrics prescribed in the literature and new ways of studying the SBPs.

Furthermore, it is recommended enlarging the research for other B3 sectors with distinct characteristics and draw new conclusions and more elements to the literature.

References

Bebchuk, L. A., & Fried, J. M. (2011). Tackling the Managerial Power Problem: The
Key to Improving Executive Compensation. *The Inequality Reader, 2*(1), *735-740.* https://doi.org/10.1257/089533003769204362

Berle, A. A., & Means, G. C. (1932). *The Modern Corporation and Private Property.* New Brunswick, NJ: Transaction Publishers. https://doi.org/10.4324/9781315133188

Beuren, I. M., Kaveski, I. D. S., & Rigo, V. P. (2014). Associação das medidas de desempenho para pagamento de bônus aos executivos com dependência de capital humano. *Revista Contemporânea de Contabilidade*, *11*(22), 3–24. https://doi.org/10.5007/2175-8069.2014v11n22p3

Blouin, J. (2014). Defining and measuring tax planning aggressiveness. *National Tax Journal*, *67*(4), 875–899. https://doi.org/10.17310/ntj.2014.4.06

Comitê de Pronuciamentos Contábeis. CPC 10 (R1) – Pagamento baseado em ações. www.cpc.org.br/pdf/CPC10_R1.pdf

Desai, M. A., & Dharmapala, D. (2006). Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics*, *79*(1), 145-179. https://doi.org/10.1016/j.jfineco.2005.02.002

Ding, D. K., & Sun, Q. (2001). Causes and effects of employee stock option plans: Evidence from Singapore. *Pacific-Basin Finance Journal*, *9*(5), 563–599. https://doi.org/10.1016/S0927538X(01)000270

Ermel, M. D. A., & Medeiros, V. (2019). Plano de remuneração baseado em ações: Uma análise dos determinantes da sua utilização. *Revista Contabilidade & Finanças*, *31*(1), 84 -98. https://doi.org/10.1590/1808-057x201907620

Fen, S., & Riswandari, E. (2019). Effect of Executive Compensation, Representantes of Female CFO, Institutional Ownership and Company Sizes on Tax Agressivity Measures. *Economic and Accounting Journal*, *2*(2). 104-123. https://doi:10.21831/nominal.v10i2.301184

Fitzmaurice, G. M., Laird, N. M., & Ware, J. H. (2011). *Longitudinal and clustered data. Applied Longitudinal Analysis*. New Jersey, USA: John Willey and Sons. https://doi.org/10.1002/9781119513469

Graham, J. R., Hanlon, M., Shevlin, T., & Shroff, N. (2014). Incentives for Tax Planning and Avoidance: Evidence from the Field. *The Accounting Review*, *89*(3), 991–1023. https://doi.org/10.2308/accr-50678

Halioui, K., Neifar, S., & Ben Abdelaziz, F. (2016). Corporate governance, CEO compensation and tax aggressiveness: Evidence from American firms listed on the NASDAQ 100. *Review of Accounting and Finance*, *15*(4), 445–462. https://doi.org/10.1108/RAF-01-2015-0018

Hanlon, M., & Heitzman, S. (2010). A review of tax research. *Journal of Accounting and Economics, 50*(1), 127-178. https://doi.org/10.1016/j.jacceco.2010.09.002

Hartmann, C. F., & Martinez, A. L. (2020). Tax Aggressiveness and Big4 Audit Firms. *Revista de Administração Contabilidade e Sustentabilidade*, *10*(3), 37-46. https://reunir.revistas.ufcg.edu.br/index.php/uacc/article/view/843

Huang, W., Ying, T., & Shen, Y. (2018). Executive cash compensation and tax aggressiveness of Chinese firms. *Review of Quantitative Finance and Accounting*, *51*(4), 1151–1180. https://doi.org/10.1007/s11156-018-0700-2

Jbir, S., Neifar, S., & Makni Fourati, Y. (2021). CEO compensation, CEO attributes and tax aggressiveness: Evidence from French firms listed on the CAC 40. *Journal of Financial Crime*, *28*(4), 1141-1160. https://doi.org/10.1108/JFC-10-2020-0202

Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*. *3*(4) 77-132). https://doi.org/10.2139/ssrn.94043

Jia, Y., & Gao, X. (2021). Is managerial rent extraction associated with tax aggressiveness? Evidence from informed insider trading. *Review of Quantitative*

Finance and Accounting, *56*(2), 423-452. https://doi.org/10.1007/s11156-020-00898-6

Krauter, E. (2009). *Contribuições do sistema de remuneração dos executivos para o desempenho financeiro: um estudo com empresas industriais brasileiras* (Tese de Doutorado). Universidade de São Paulo, São Paulo, Brasil. https://doi.org/10.11606/T.12.2009.tde-29052009-092957

Krauter, E. (2013). Remuneração de Executivos e Desempenho Financeiro: Um estudo com empresas brasileiras. *Revista de Educação e Pesquisa em Contabilidade,*, *7*(3), 259-273. https://doi.org/10.17524/repec.v7i3.988

Kubick, T. R., & Lockhart, G. B. (2017). Corporate tax aggressiveness and the maturity structure of debt. *Advances in Accounting*, 36, 50–57. https://doi.org/10.1016/j.adiac.2016.10.001

Kubick, T. R., & Masli, A. N. S. (2016). Firm-level tournament incentives and corporate tax aggressiveness. *Journal of Accounting and Public Policy*, *35*(1), 66-83. https://doi.org/10.1016/j.jaccpubpol.2015.08.002

Lennox, C., Lisowsky, P., & Pittman, J. (2013). Tax Aggressiveness and Accounting Fraud. *Journal of Accounting Research*, *51*(4), 739–778. https://doi.org/10.1111/joar.12002

Lima, A. P. A., Nossa, V., Nossa, S. N., & Moreira, N. C. (2021). Multinacionalidade, ativos intangíveis e agressividade fiscal. *Revista Contemporânea de Contabilidade*, *18*(47),124-139. https://doi.org/10.5007/2175-8069.2021.e76596

Mamede Junior, E., Brugni, T. V., Monte-Mor, D. S., & Beiruth, A. X. (2023). Efeito da Remuneração como Incentivo Gerencial ao Risco e Agressividade Tributária no Brasil. *Revista Gestão Organizacional*, *16*(1), 117-134. https://doi.org/10.22277/rgo.v16i1.6748

Martinez, A. L., & Coelho, L. F. de A. (2016, dezembro). Planejamento tributário com operações societárias: Critérios de validade utilizados pelo CARF. *Revista Contemporânea de Contabilidade*, *13*(30), 193-213. https://doi.org/10.5007/21758069.2016v13n30p193

Martinez, A. L., Santana Júnior, J. L. de, & Sena, T. R. (2022). Agressividade tributária como fator determinante do conservadorismo condicional no Brasil. *Revista Contabilidade & Finanças*, *33*(90),193-213. https://doi.org/10.1590/1808057x20221484.en

Martinez, A. L., & Martins, V. A. M. (2016). Alavancagem Financeira e Agressividade Fiscal no Brasil. *Revista de Contabilidade da UFBA*, *10*(3), 4-22. https://doi.org/10.9771/rc-ufba.v10i3.18383

Martinez, A. L., & Salles, A. F. (2018). Agressividade Tributária e Cash Holdings: Um Estudo das Companhias Abertas Brasileiras. *Revista de Contabilidade da UFBA*, *12*(3), 4-23. https://doi.org/10.9771/rc-ufba.v12i3.24890

Murphy, K. J. (1999). Executive compensation. *Handbook of labor economics, 3*(1), 2485-2563. https://doi.org/10.2139/ssrn.163914

Ohnuma, H., & Sakurada, Y. (2014). Does Executive Compensation Reflect Equity Risk Incentives and Corporate Tax Avoidance? A Japanese Perspective. *Corporate Ownership and Control, 11*(2), 60–70. https://doi.org/10.22495/cocv11i2p5

Procianoy, J. L., & Poli, B. T. C. (1993). A política de dividendos como geradora de economia fiscal e do desenvolvimento do mercado de capitais: Uma proposta criativa. *Revista de Administração de Empresas*, *33*(1),06-15. https://doi.org/10.1590/S00347590199300040002

Rego, S. O., & Wilson, R. (2009). Executive Compensation, Tax Reporting Aggressiveness, and Future Firm Performance. *Working Paper*, *22*(1) https://doi.org/10.1108/MF-07-2021-0306

Rego, S. O., & Wilson, R. (2012). Equity Risk Incentives and Corporate Tax Aggressiveness. *Journal of Accounting Research*, *50*(3), 775-810. https://doi.org/10.1111/j.1475679X.2012.00438.x

Richardson, G., Lanis, R., & Taylor, G. (2015). Financial distress, outside directors and corporate tax aggressiveness spanning the global financial crisis: An empirical analysis. *Journal of Banking & Finance*, *52*(1), 112-129. http://dx.doi.org/10.1016/j.jbankfin.2014.11.013

Rissatti, J. C., Souza, J. A. S. de, & Borba, J. A. (2019). O que Informam os Formulários de Referência sobre as

Características e Remuneração de Executivos? *Sociedade, Contabilidade e Gestão*, *14*(1), 54-75. https://doi.org/10.21446/scg_ufrj.v0i0.17527

Royston, J. P. (1983). Some Techniques for Assessing Multivarate Normality Based on the Shapiro-Wilk W, *Journal of the Royal Statistical Society*, *32*(2), 121-133. https://doi.org 10.2307/2347291

Santos, S. R. dos, & Souza, M. M. (2023). Divulgação e Expressividade das Subvenções Governamentais e da Reserva de Incentivos Fiscais Frente à Pandemia de Covid-19: uma Análise nas Companhias Listadas na B3. *Revista de Auditoria Governança e Contabilidade, 11*(46), 62-79. https://repositorio.ufsc.br/handle/123456789/248893

Shevlin, T., Thornock, J., & Williams, B. (2017). An examination of firms' responses to tax forgiveness. *Review of Accounting Studies*, 22(2), 577–607. https://doi.org/10.1007/s11142-017-9390-6

Silva, J. M. (2016). *A Influência do Ciclo de Vida Organizacional Sobre o Nível de Planejamento Tributário* (Tese de Doutorado). Universidade de São Paulo, São Paulo, Brasil. https://doi.org/10.11606/T.96.2017.tde-06012017-151945

Stiglitz, J. E. (1985). The general theory of tax avoidance. *National Tax Journal*, *38*(3), 325-337. https://doi.org/10.1086/NTJ41792029

Wang, F., Xu, S., Sun, J., & Cullinan, C. P. (2020). Corporate Tax Avoidance: A Literature Review and Research Agenda. *Journal of Economic Surveys*, *34*(4), 793-811. https://doi.org/10.1111/joes.12347

Wang, Y., & Yao, J. (2021). Impact of Executive Compensation Incentives on Corporate Tax Avoidance. *Modern Economy*, *12*(12), 1817-1834. https://doi.org/10.4236/me.2021.1212094

Wilde, J. H., & Wilson, R. J. (2018). Perspectives on Corporate Tax Planning: Observations from the Past Decade. *Journal of the American Taxation Association*, *40*(2), 63–81. https://doi.org/10.2308/atax-51993

Yermack, D. (1995). Do corporations award CEO stock options effectively? *Journal of Financial Economics*, *39*(2), 237-269. https://doi.org/10.1016/0304-405X(95)00829-4

Zolotoy, L., O'Sullivan, D., Martin, G. P., & Wiseman, R. M. (2021). Stakeholder Agency Relationships: CEO Stock Options and Corporate Tax Avoidance. *Journal of Management Studies*, *58*(3), 782–814. https://doi.org/10.1111/joms.12623