

TRIBUTACIÓN

Tax leverage and third-party capital cost for Brazilian companies*

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This study empirically investigates whether Brazilian companies that are more tax-leveraged have a lower capital cost from third parties than those that are less tax-leveraged. The survey data comprises financial information from 315 companies listed on the stock exchange - B3 and was structured containing information on the total liabilities due (PET), tax liabilities (PT), and the third parties' capital cost (ki) of the sampled companies for the years between 2013 to 2017. The research is descriptive, with a quantitative approach, using methods of descriptive statistics and Pearson's Correlation Coefficient for data analysis. The results indicate that the tax leverage provides a lower capital cost for third parties compared to the companies' other onerous liabilities in the sample analyzed, proving, in this paper, that the financial strategy of not collecting taxes and using these resources to finance the activities of the companies can generate savings in the capital cost of third parties. The research contributes academically to provide an opportunity for discussion on the topic, contributes to society by exposing the public policy implications of granting tax installments, and contributes to companies by indicating the possibility of reducing the cost of third-party capital via tax leverage.

Keywords: tax leverage, tax liabilities, third-party capital cost, tax installments

* This paper is a result of a master's dissertation defended in the postgraduate program in Accounting Sciences at the Federal University of Mato Grosso do Sul – UFMS.



Apalancamiento fiscal y costo de capital de terceros para empresas brasileñas

Este estudio investiga empíricamente si las empresas brasileñas que están más apalancadas fiscalmente tienen un costo de capital de terceros más bajo que las que están menos apalancadas fiscalmente. Los datos de la encuesta comprenden información financiera de 315 empresas que cotizan en la bolsa de valores (B3). Se estructuró con información sobre el total de pasivos adeudados (PET), pasivos fiscales (PT) y el costo de capital de terceros (ki) de las empresas de la muestra para los años entre 2013 y 2017. La investigación es de naturaleza descriptiva, con enfoque cuantitativo. Se utilizaron métodos de estadística descriptiva y coeficiente de correlación de Pearson para el análisis de datos. Los resultados indican que el apalancamiento fiscal proporciona un menor costo de capital para terceros en comparación con el resto de pasivos onerosos de las empresas de la muestra analizada. Así, en este trabajo, se demuestra que la estrategia financiera de no recaudar impuestos y utilizar estos recursos para financiar las actividades de las empresas puede generar ahorros en el costo de capital de terceros. La investigación contribuye académicamente a brindar una oportunidad de discusión sobre el tema, y aporta a la sociedad al exponer las implicaciones de política pública del otorgamiento de cuotas tributarias y a las empresas al indicar la posibilidad de reducir el costo del capital de terceros mediante apalancamiento tributario.

Palabras clave: apalancamiento tributario, pasivos tributarios, costo de capital de terceros, cuotas tributarias

A Alavancagem Tributária e o Custo de Capital de Terceiros das Empresas Brasileiras

Este estudo investiga empiricamente se de fato as empresas brasileiras mais alavancadas tributariamente possuem menor custo de capital de terceiros do que as menos alavancadas tributariamente. Os dados da pesquisa compreendem informações financeiras de 315 empresas listadas na bolsa de valores – B3 e foi estruturado contendo as informações sobre os passivos exigíveis totais (PET), os passivos tributários (PT) e o custo de capital de terceiros (ki) das empresas da amostra para os anos de 2013 a 2017. A pesquisa é de natureza descritiva, de abordagem quantitativa, utiliza métodos de estatística descritiva e o Coeficiente de Correlação de Pearson para análise dos dados. Os resultados indicam que a alavancagem tributária proporciona menor custo de capital de terceiros comparativamente com os demais passivos onerosos das empresas da amostra analisadas, sendo comprovado, neste trabalho, que a estratégia financeira de não recolher tributos e utilizar estes recursos no financiamento das atividades das empresas pode gerar economia no custo de capital de terceiros delas. A pesquisa contribui academicamente para oportunizar a discussão sobre o tema, contribui com a sociedade ao expor as implicações da política pública de conceder parcelamentos tributários, e contribui com as empresas ao indicar a possibilidade de redução no custo do capital de terceiros via alavancagem tributária.

Palavras-chave: alavancagem tributária, passivos tributários, custo de capital de terceiros, parcelamentos tributários.

1. INTRODUCTION

In the competitive world, companies need financial resources to meet unmet demands for their products or services. The origin of these resources to subsidize its activities, of crucial importance for its success, is called the capital structure. The composition of corporate financing can assume a greater or lesser degree of dependence on third-party capital, being called financial leverage (Myers, 1984; Ross et al., 2015; Severo et al., 2015;). Considered by many studies as a relevant decision for the success of companies, the composition of the capital structure, called the capital puzzle by Myers (1984), was the object of investigation and generated important theories for the area of finance such as Trade-Off Theory (TOT) and the Pecking Order Theory (POT), which for decades have been tested empirically by researchers interested in the topic (Brito et al., 2007; Ross et al., 2015).

The Brazilian tax scenario, marked by the complex range of taxes and taxation systems at the federal, state, and municipal levels, has led many companies to inadequacy with the tax authorities, these tax liabilities being often relevant in the composition of the indebtedness of large national companies (Andrade, 2015; Lima, 2016;). Public policies for government fiscal management, especially at the federal level, have promoted installment programs in recent decades for these tax liabilities contracted by taxpayers, enabling them to comply with their debts via long-term installments, often offering discounts on late payment charges arising from tax defaults.

It is common knowledge in the Brazilian business environment that, given the successive offer by the governments of installment programs, commonly known as "REFIS" (Tax Recovery Program), it has become a business strategy not to pay taxes due within the legal terms, accumulating the tax liability until the opening of a new installment program, since, paying over long-term installments, companies can use these resources to finance their activities (Paes, 2012; Plutarco, 2012).

Studies on the companies' capital structure and their capital cost previously addressed aspects of the tax economy resulting from the use of third-party capital to the detriment of own capital, due to the possibility of reducing taxes payable for the use of financial charges arising from the third-party capital as a deductible expense for calculating taxes on the profit. However, the adventurous strategy of using tax liabilities as working capital to finance activities in substitution for common third-party capital such as loans and financing has not been analyzed in previous studies, being the object of this study, therefore, to investigate whether Brazilian companies with greater tax indebtedness, that is, more tax-leveraged, has a lower capital cost than companies less tax-leveraged.

Lima (2016) and Rodrigues et al. (2017) demonstrated in their studies the financial viability of the strategy of failing to collect taxes within the term for subsequent installment payments through government programs, showing that the costs of these installments indicate the financial viability of using the installments as a capital structure, findings that corroborate the assumption that, if this strategy results in a lower financial cost, the companies that adopt it consequently have a lower capital cost from third-parties compared to those that use the other usual sources of financing.

Because of this scenario, the question arises: Do companies that are more tax-leveraged have a lower capital cost from third parties? The research aims to analyze whether the most tax-leveraged companies have a lower capital cost from third parties. This research is of economic and social importance, because, if companies do not pay taxes, the country does not collect, and the role of the State in society is impaired since it is through these collections that public health policies, education, and social security of Brazilians are financed. In this sense, the social function of taxes for society stands out, considering that they serve to serve a typically social function, promote social well-being, meeting the needs of the population through the financing of public services whose need, scope, and management are defined by society itself through its representatives (Da Silva Cardoso, 2012).

2. THEORETICAL FRAMEWORK

2.1. Capital structure and leverage

The capital structure of companies has been subject to numerous studies over the past decades, and its discussion emerged from the studies of Modigliani and Miller (1958), who launched a theory in their paper known as “MM” theory, which dealt with the irrelevance of the capital structure for determining the value of a company. Contradicting the conventional wisdom that until then, through an optimal capital structure, a lower cost of capital would be obtained, maximizing the company’s value (Ahmad et al., 2011; Brito et al., 2007; Cheng & Green, 2008).

In a review of their own theory, Modigliani and Miller (1963) published an addendum to the original 1958 text, addressing the importance of taxes on capital structure, in the sense that the existence of interest on third-party capital in a given structure of capital provides the company with an advantage in a scenario where this interest is deductible from the tax on profits, suggesting that a maximum appreciation of the company would be achieved if it were fully financed by third-party capital. Zani (2005) argues that MM theory is anchored in three propositions, namely:

- I. The market value of any company is independent of its capital structure and given by the capitalization of its expected returns;
- II. The cost reduction by third-party capital is offset by the increase in the equity cost, whose risk was high; and
- III. The marginal capital cost for a company is equal to the average capital cost. (p. 37).

However, subsequent studies, driven in large part by the theoretical provocation of Modigliani and Miller (1963), started to analyze the question of the capital structure from other perspectives not covered by the MM theory. Especially Myers (1984), who, in his article called “The Capital Structure Puzzle” published in one of the leading finance journals at the time, returned to the question: how do companies choose their capital structures? Responding in the first paragraph that the answer to this question was still unknown, despite the various studies elaborated from the “MM” theory (Myers, 1984; Severo et al., 2015).

Myers (1984), while recognizing the lack of consensus on the determinants of the capital structure of companies, promotes an important contribution to the development of studies on how capital structures are composed, by presenting what he calls two modes of thinking about capital structures, which are: i) Trade-Off Theory (TOT), a scenario in which companies are compelled to choose between financing options with equity or debt with third-parties, depending on which option offers less capital cost, where the tax benefits of debt are compared with the costs and risks of bankruptcy that increase proportionally to the increase in indebtedness and ii) Pecking Order Theory (POT), a scenario in which a hierarchy of capital financing options is assumed by companies, in which they tend to always choose the use of equity capital over foreign capital, through the retention of their profits.

From the study on the composition of companies’ capital structure, the concept of financial leverage emerges, defined by Ross et al. (2015), as an indicator that represents how much a company depends on debt arising from third-party capital in its capital composition, considering that a financially leveraged company must make interest payments regardless of its commercial performance, being such interest representative of companies’ “fixed finance costs” (p. 434). Ross et al. (2015) argue that a given company may be financially leveraged when it has some debt in its capital structure, the company being more or less financially leveraged according to its choices of the composition of its capital structure.

2.2. Capital cost

The capital cost is defined by Ross et al. (2015) as the “minimum rate of return required to undertake a project” (p. 1160), and it represents the cost incurred by the company to obtain the necessary capital to finance its activities, whether these are own or third-party capital. As approached by Myers (1977), Modigliani and Miller (1958), and Ross et al. (1997), the great question of the equation of the companies’ capital structure is to define their composition between equity or third parties, these options being permeated by several variables, among them the comparison between the cost of these equity or third parties.

Catapan et al. (2010) define the capital cost of third parties as “the rate of return that creditors require to lend additional capital or resources to the company”, classifying them as short and long term, indicating that longer payment terms would represent a greater risk to creditors and, therefore, would have a higher cost than short-term loans (p. 179). Considering that the capital cost of third parties (K_i) is contracted by the company’s management and, therefore, known, explicit, and recognized in the financial statements of the companies during the fiscal year, its calculation is possible when comparing the item of the company’s financial expenses disclosed in the financial statements with their average liabilities for the same period, thus identifying the cost of third-party capital of companies by fiscal year (Assaf Neto, 2008).

The consideration of onerous liabilities arises from the existence in Brazil of the disclosure of accounting information in quarterly reports to the Brazilian Securities and Exchange Commission (CVM), per CVM Instruction no. 480, these disclosures being available to the market on the websites of the Brasil, Bolsa Balcão (B3) stock exchange and the CVM. In the same sense, Sengupta (1998) states that the capital cost for third parties is measured by dividing the financial expense of the period by the short and long-term onerous liabilities.

2.3. Installments and default programs for federal taxes in Brazil

In Brazil, it has always been the practice of the Federal Revenue to offer defaulting taxpayers with their tax obligations installment options for these taxes, called ordinary installments, which allow debtors to pay their debts in installments, as long as the debts are not recorded on active debt, at least from 1967 with the promulgation of Decree-Law 147, of February 3, 1967, without however granting any discount on interest and fines due to untimely nature.

At least since the year 2000, with the enactment of Law 9.964/2000 by the Federal Government, it has become common practice in Brazilian fiscal public policies to offer special installments of tax debts to defaulting taxpayers with their tax obligations. It has been offered 9 (nine) installment opportunities in federal programs (table 1), since 2000 with the Refis program until July 2018.

Table 1. Federal special installment programs

Name	Law	Date	Debts Until	Deadline
Refis	9.964/2000	10th April 2000	29th Feb. 2000	Determinado em função de percentual da receita bruta
Paes	10.684/2003	30th May 2003	28th Feb. 2003	Up to 180 installments
Refis of Crisis	11.941/2009	27th May 2009	30th Nov. 2008	Up to 180 installments
Refis of Crisis - Reopening	12.865/2013	09th Oct. 2013	30th Nov. 2008	Up to 180 installments
Refis of Crisis - Reopening	12.973/2014	13th May 2014	30th Nov. 2008	Up to 180 installments
Refis of Crisis - Reopening	12.966/2014	18th June 2014	31st Dec. 2013	Up to 180 installments
Refis of Crisis - Reopening	13.043/2014	13th Nov. 2014	31st Dec. 2013	Up to 180 installments
New Refis - PERT	13.946/2017	24th Oct. 2017	30th April 2017	Up to 180 installments

Note. Refis - Tax Recovery Program; Paes - Special Installment Program; PERT - Special Tax Regularization Program. Adapted from *Incentivo público às empresas para utilizarem os tributos como estrutura de capital* [Conference presentation] from E. M. Lima, 2016, 2° Congresso UnB de Contabilidade e Governança, Brasília, Brasil (<https://conferencias.unb.br/index.php/ccgunb/ccgunb2/paper/view/5188>).

Table 2. Benefits granted by federal installment programs

Law	Correction after installment	Interest Reduction	Fine Reduction
9.964/2000	TJLP starting from March 1st, 2000	None	None
10.684/2003	TJLP from the date of consolidation	None	50% plus additional at the rate of twenty-five hundredths percent on the remaining amount for each percentage point of the debt balance that is settled by the date foreseen for the installment application.
11.941/2009	Selic	45% if paid in cash	100% of late payment and official fines, 40% of isolated fines, 100% of the legal charge, if paid in cash.
11.941/2009	Selic	40% if paid in 30 installments	90% of the late payment and official fines, 35% of the isolated ones, 100% of the amount of the legal charge, if divided into 30 installments.
11.941/2009	Selic	35% if paid in 60 installments	85% of late payment and official fines, 30% of isolated fines, 100% of the legal charge, if divided into 60 installments.
11.941/2009	Selic	30% if paid in 120 installments	70% of late payment and official fines, 25% of isolated fines, 100% of the amount of the legal charge, if divided into 120 installments.
11.941/2009	Selic	25% if paid in 180 installments	60% of late payment and official fines, 20% of isolated fines, 100% of the amount of the legal charge, if divided into 180 installments.
13.946/2017	Selic	90% if paid in a single installment, excluding 20% down payment of the consolidated debt in installments in 5 installments	70% of late payment, ex officio, or isolated fines, if paid in a single installment, excluding 20% down payment of the consolidated debt in installments in 5 (five) installments.

13.946/2017	Selic	80 % if paid in 145 installments, excluding the 20% down payment of the consolidated debt in installments in 5 installments	50% of late payment, ex officio, or isolated fines, if paid in 145 installments, excluding 20% down payment of the consolidated debt in installments in 5 (five) installments.
13.946/2017	Selic	50 % if paid in 175 installments, excluding 20% down payment of the consolidated debt in installments in 5 installments	25% of late payment, ex officio, or isolated fines, if paid in 175 installments, excluding 20% down payment of the consolidated debt in installments in 5 (five) installments.

Note. TJLP - Long Term Interest Rate. Adapted from *Incentivo público às empresas para utilizarem os tributos como estrutura de capital* [Conference presentation] from E. M. Lima, 2016, 2° Congresso UnB de Contabilidade e Governança, Brasília, Brasil (<https://conferencias.unb.br/index.php/ccgunb/ccgunb2/paper/view/5188>).

With some differences between percentages of discounts, terms and taxes covered, these programs have the similarity of providing, consecutively, the extension of tax debts of taxpayers in longer periods than originally established by the specific legislation of each tax. Therefore, making it possible for Brazilian companies in the period to fail to pay taxes that have an average maturity of 30 days after the taxable events, paying them off in terms of an average of 180 months.

Lima (2016) analyzed the financial viability of the strategy of failing to collect taxes in time for subsequent payment in government programs, in his paper entitled “Public incentive for companies to use taxes as a capital structure”, he concludes that, except for losses to the operation and continuity of the company’s activities in Brazil, the planned default of federal taxes for the application of these resources in the financing of the company’s activities may be financially viable.

At the state and municipal levels, the Brazilian governments also have the practice of providing installments of taxes within their competencies; the last installment program of the Government of the State of Mato Grosso do Sul (December 2017) provided for discounts of up to 90% on fines and interest on overdue taxes, while on the program offered on the same date by the Municipality of Campo Grande-MS, fine and interest discounts reached up to 95%.

2.4. Previous studies on the topic

Previous studies have analyzed the determinants of capital structure in Iran, the United Arab Emirates, the United Kingdom, Portugal, China, Pakistan, and Brazil, among others. Where the theories of trade-off and pecking order continue to be addressed, and in which it is observed that the search for the determinants of the capital structure of companies remains without an ideal and comprehensive composition for all companies.

With the impacts of taxes on the composition being recognized as predicted by the classic studies of Modigliani and Miller (1963), Myers (1984), Abdulla (2017), Brito et al. (2007), Devereux et al. (2018), Fatemian and Rezaei (2018), Ahmad et al. (2011), Mota and Moreira (2017) and Qian et al. (2009). Qian et al. (2009) analyzed 650 Chinese companies from 1999 to 2004, also seeking to identify the determinants of their capital structure, where they concluded that the size of the firm, government control, profitability, growth opportunity, asset immobilization, operating profit are predictors that influence companies in the composition of their capital structure.

In Brazil, Brito et al. (2007) obtained evidence in the financial information of 466 companies from 1998 to 2002, that the variables risk, size, asset composition, and growth are relevant for determining the capital structure of the companies analyzed, while the variables profitability and type of capital were not considered statistically relevant to explain the composition of capital. If, on the one hand, numerous studies address the companies' capital structure, on the other there are no previous studies that provide empirical evidence that tax leverage is advantageous as a strategy for financing companies' capital, which is why this study seeks to answer this question.

3. METHODOLOGY

The research has an applied characteristic, as it aims to produce empirical knowledge about the research problem, with its objective being classified as descriptive, for seeking to describe the characteristics of the population object of the study and to establish relationships between variables of this population (Gil, 2017). The research approach regarding the procedures for the description and explanation of the phenomena is quantitative, as it uses statistical procedures to test the proposed hypothesis and examine the behavior of the variables, especially the correlation between them, which allows specifying the degree whereby the different variables are related (Richardson, 1999).

In the research design, bibliographic and documentary research was used, applying the bibliographic to identify the current literature on the topic under study and documentary research to obtain the data to be analyzed (Gil, 2017). The documentary research was applied to obtain the empirical data of the studied population, with the

researched documents being the financial statements of the analyzed companies, based on the information extracted from the B3 stock exchange website.

3.1. The studied sample

The sampling method applied was non-probabilistic sampling for convenience, given that, out of all the companies listed on the Brazilian stock exchange - B3, the criterion was to exclude, from the total of 426 companies listed on the stock exchange, companies from the financial sector (86 companies) and companies that did not have all the complete financial information for the analyzed period (25 companies); the selection of the remaining 315 companies did not aim to obtain a statistically representative sample of the population (Hair, et al., 2006).

Having identified the sample of companies whose data make up the object of this study, it was decided to research the data for the years 2013 to 2017, as they were the last years in which the companies in the sample released financial statements when the research started and. For this period, the various long-term tax installment programs listed in table 2 are in effect, which is why it is expected that the impact of these liabilities on the sample companies' capital cost can be extracted. The companies listed on the Brazilian stock exchange - B3 are divided by sectors and subsectors, as shown in table 3 below.

Table 3. Total companies in the sample - by sector

Sectors	Companies Qt.	%
Industrial Goods	64	20%
Cyclic Consumption	75	24%
Non-Cyclical Consumption	23	7%
Basic Materials	30	10%
Other	22	7%
Petroleum. Gas and Biofuels	9	3%
Health	14	4%
Information Technology	7	2%
Telecommunications	5	2%
Public Utility	66	21%
Total	315	100%

Note. Adapted from B3 from Brasil, Bolsa Balcão Brasil, Bolsa Balcão (B3), 2022, (http://www.b3.com.br/pt_br/).

3.2. Variables hypotheses

Given the problems exposed in this study, the research hypothesis is: Companies that are more tax-leveraged (that have higher tax indebtedness) have lower capital costs from third parties when compared to companies that are less tax-leveraged (companies that have less tax indebtedness). The variables used for the model in line with the theoretical concepts were the indicator of the capital cost of third parties (K_i), tax leverage (LEV), financial leverage (LEV), and capital cost of third parties (CCT) determined according to table 4.

Table 4. Research variables

Variables	Acronyms	Formulas
Financial leverage	LEV	$LEV = POT/PL$
Tax leverage	LEV _T	$LEV_T = PT/POT$
Third-party capital cost indicator	K_i	$K_i = \text{Despesas financeiras}/POT$
Third-party capital cost	CCT	$CCT = \text{Financial expenses in R \$ thousand}$

The LEV variable is the indicator that represents the share of Total Interest Liabilities (POT) in the companies' capital structure, indicating the proportion of third-party capital that makes up the total capital of the company, as conceptualized by Myers (1977), Modigliani, and Miller (1958) and Ross et al. (2015). The LEV_T variable was determined from the literature on the term in the studies by Lima (2016) and Rodrigues et al. (2017) and represents the participation of Tax Liabilities (PT) in the composition of the Total Interest Liabilities (POT) of the companies, indicating the proportion in which this type of indebtedness is being used by the company's management to finance its operation each year.

The use of the indicator of the proportion of annual financial expenses disclosed by the companies divided by the total interest-bearing liability as representative of the capital cost of third parties (K_i) was applied aiming at the direct relation of these expenses with the companies' capital of third parties (Assaf Neto, 2008; Queiroz et al., 2010; Sengupta, 1998). Additionally, the nominal value of financial expenses in thousands of reais (CCT) was used because of the availability of this information in the financial statements of the sample companies and their direct relationship with onerous liabilities.

3.3. Statistical methods for data analysis

From the information collected, the annual data on financial expenses, total liabilities, shareholders' equity, and tax liabilities disclosed by the companies in their annual financial statements were extracted and tabulated. To achieve the general objective of the research and to identify if companies that are more tax-leveraged have a lower capital cost from third parties than companies that are less tax-leveraged, the Pearson Correlation Coefficient (r) statistical test was used.

The existence of a relationship between variables represents the purpose of several studies, with the Person Correlation Coefficient (r) being an indicator of the strength of the linear relationship between two metric scale interval variables, indicating the measure of the association between these variables between -1 and $+1$, inclusive, with the extremes of the indicator representing greater positive or negative correlations between the variables (Martins & Domingues, 2017).

Subsequently, for the analysis of the specific objectives, descriptive statistics were used, which is a set of techniques applicable to evaluate the characteristics of a series of data, which comprises the representation and synthesis of information such as tables and graphs, as well as descriptive measures related to the set of data analyzed (Becker, 2015).

Using descriptive statistics, the composition of the companies' capital structure will be identified each year, subdividing the total capital into equity, represented by the annual value of the Equity (PL) of each company, and the capital of third parties, represented by the Total Onerous Liabilities (POT). In the same way, the tax leverage (LEVT) of each company will be presented, represented by the ratio between Tax Liabilities (PT) and Total Interest Liabilities (POT), thus segregating the capital of third parties into tax indebtedness and non-tax indebtedness.

4. ANALYSIS OF RESULTS

4.1. Analysis of descriptive statistics

The analysis of descriptive statistics provides a view of the research data behavior, showing the measures of central tendency: mean and median, the measures of dispersion: maximum and minimum values and standard deviation, sample variance, kurtosis, asymmetry, useful information for characterizing the type of distribution of the research data.

Table 5. Descriptive statistics of the research variables

Variables	Ki	LEVT	OPO	POT	PL
Mean	0,14	0,13	0,87	1,04	-0,04
Std. Error	0,02	0,00	0,00	0,08	0,08
Median	0,08	0,06	0,94	0,63	0,37
Std. Deviation	0,88	0,19	0,19	3,25	3,25
Variance	0,77	0,03	0,03	10,56	10,56
Minimum	0,00	0,00	0,00	0,00	-69,37
Maximum	31,24	1,00	1,00	70,37	1,00

Note. Caption: Ki (capital cost of third parties); LEVT (tax leverage); OPO (other onerous liabilities); POT (total interest-bearing liabilities) and PL (equity).

It can be seen the mean of the LEVT variables of 0.13 and OPO of 0.87 indicate that the general tax leverage of the 1,575 observations is on average approximately 13%, while the other onerous liabilities represent on average approximately 87% of the companies' third-party capitals in the period analyzed, with the capital cost of third parties averaging approximately 14% of the total interest-bearing liabilities in the period.

Regarding the capital structure of the sampled companies, considering the 1,575 observations, it is possible to observe that the POT variable presents an average ratio of approximately 104% while the PL variable presents approximately -4%, indicating the importance of third-party capital in the composition of the sample companies' capital in the analyzed period, with the amplitude of third-party capital varying between 0 and 70,37% in the set of analyzed data.

The analysis of tax leverage by sector shows, according to table 6, that companies in the other sectors, non-cyclical consumption, oil, industrial goods, and cyclical consumption have a higher degree of mean tax leverage in the periods analyzed compared to the other sectors. It is also observed that, in the general mean, the tax liability of the companies in the sample represents approximately 13% of the total interest-bearing liability of the companies in the analyzed period.

Table 6. Capital composition of the sample companies by sector and by year

Sectors	2013		2014		2015		2016		2017		MEAN	
	PT	OPO	PT	OPO	PT	OPO	PT	OPO	PT	OPO	PT	OPO
Others	0,10	0,90	0,23	0,77	0,26	0,74	0,30	0,70	0,29	0,71	0,24	0,76
Non-Cyclical Consumption	0,18	0,82	0,15	0,85	0,14	0,86	0,16	0,84	0,14	0,86	0,16	0,84
Petroleum. Gas and Biofuels	0,14	0,86	0,08	0,92	0,12	0,88	0,16	0,84	0,16	0,84	0,13	0,87
Industrial Goods	0,13	0,87	0,12	0,88	0,13	0,87	0,14	0,86	0,13	0,87	0,13	0,87
Cyclic Consumption	0,13	0,87	0,13	0,87	0,13	0,87	0,12	0,88	0,12	0,88	0,13	0,87
Basic Materials	0,14	0,86	0,13	0,87	0,11	0,89	0,11	0,89	0,11	0,89	0,12	0,88
Public utility	0,09	0,91	0,09	0,91	0,09	0,91	0,11	0,89	0,10	0,90	0,10	0,90
Health	0,08	0,92	0,09	0,91	0,09	0,91	0,08	0,92	0,09	0,91	0,09	0,91
Information Technology	0,05	0,95	0,06	0,94	0,07	0,93	0,09	0,91	0,07	0,93	0,07	0,93
Telecommunications	0,07	0,93	0,05	0,95	0,04	0,96	0,05	0,95	0,06	0,94	0,05	0,95
Overall Mean	0,12	0,88	0,12	0,88	0,13	0,87	0,13	0,87	0,13	0,87	0,13	0,87

Note. Caption: PT (Tax Liabilities) and OPO (Other Onerous Liabilities).

Nominally the 50 companies (15.87% of the sample) with the highest average tax debts in the five years analyzed are shown in table 7 below, which together total an average tax debt in the order of 109 billion reais (79% of the total) in the analyzed period.

Among the first 10 placed in the ranking in table 7, the companies AMBEV stand out, with average leverage of 22,52%, ENERGISA with average leverage of 14,92%, and COSAN SA, with 12,92% of average leverage, being among these, the ones that most use percentage of tax debt to finance their total assets.

Table 7. Ranking of the 50 companies with the highest average nominal tax debt

N.	Company name	LEVT	PT (in R\$ Thousand)
1ª	PETROLEO BRASILEIRO S.A. PETROBRAS	4,25%	20.813.600
2ª	VALE S.A.	5,73%	9.757.287
3ª	AMBEV S.A.	22,52%	7.607.014
4ª	CENTRAIS ELET BRAS S.A. – ELETROBRAS	5,55%	6.425.007
5ª	OI S.A.	6,96%	5.152.750
6ª	JBS S.A.	6,24%	4.457.390
7ª	CPFL ENERGIA S.A.	7,94%	2.252.511
8ª	ENERGISA S.A.	14,92%	2.228.601
9ª	CIA BRASILEIRA DE DISTRIBUICAO	7,06%	2.135.600
10ª	COSAN S.A.	12,92%	2.086.803
11ª	CIA ENERGETICA DE MINAS GERAIS – CEMIG	8,31%	2.080.591
12ª	TELEFÔNICA BRASIL S.A	6,31%	1.914.928
13ª	MENDES JUNIOR ENGENHARIA S.A.	27,41%	1.853.787
14ª	REDE ENERGIA PARTICIPAÇÕES S.A.	19,13%	1.797.278
15ª	CENTRAIS ELET DE SANTA CATARINA S.A.	28,40%	1.713.211
16ª	BRASKEM S.A.	3,64%	1.698.873
17ª	CONC SIST ANHANG-BANDEIRANT S.A. AUTOBAN	52,03%	1.685.883
18ª	SUZANO HOLDING S.A.	9,00%	1.603.722
19ª	COSAN LOGISTICA S.A.	15,32%	1.602.927
20ª	CTEEP - CIA TRANSMISSÃO ENERGIA ELÉTRICA PAULISTA	36,38%	1.596.516
21ª	SUZANO PAPEL E CELULOSE S.A.	8,89%	1.573.856
22ª	KLABIN S.A.	11,53%	1.476.312
23ª	REFINARIA DE PETROLEOS MANGUINHOS S.A.	57,97%	1.454.590
24ª	CPFL GERACAO DE ENERGIA S.A.	11,53%	1.373.133
25ª	EMBRAER S.A.	5,63%	1.298.105
26ª	MARFRIG GLOBAL FOODS S.A.	7,02%	1.268.677
27ª	METALURGICA GERDAU S.A.	3,97%	1.259.268
28ª	GERDAU S.A.	4,17%	1.246.025
29ª	TIM PARTICIPACOES S.A.	7,31%	1.183.367

30ª	KROTON EDUCACIONAL S.A.	32,80%	1.180.514
31ª	CEMIG DISTRIBUICAO S.A.	9,32%	1.172.479
32ª	CPFL ENERGIAS RENOVÁVEIS S.A.	15,03%	1.118.276
33ª	NATURA COSMETICOS S.A.	14,10%	1.046.240
34ª	RUMO S.A.	5,83%	1.022.326
35ª	CIA SIDERURGICA NACIONAL	2,60%	1.008.505
36ª	CIA PARANAENSE DE ENERGIA – COPEL	6,98%	952.638
37ª	EDP - ENERGIAS DO BRASIL S.A.	9,19%	873.767
38ª	AES TIETE ENERGIA S.A.	15,19%	812.811
39ª	LIGHT S.A.	6,89%	733.238
40ª	NEOENERGIA S.A.	4,31%	722.849
41ª	SANSUY S.A. INDUSTRIA DE PLASTICOS	65,50%	671.770
42ª	SAO MARTINHO S.A.	14,71%	643.416
43ª	ENGIE BRASIL ENERGIA S.A.	7,20%	629.382
44ª	DURATEX S.A.	14,35%	624.276
45ª	PDG REALTY S.A. EMPREEND E PARTICIPACOES	7,62%	614.225
46ª	MUNDIAL S.A. - PRODUTOS DE CONSUMO	63,93%	604.198
47ª	CCR S.A.	5,11%	588.278
48ª	EQUATORIAL ENERGIA S.A.	6,81%	579.155
49ª	JHSF PARTICIPACOES S.A.	18,76%	567.960
50ª	ALUPAR INVESTIMENTO S/A	10,70%	564.587

Note. Caption: LEVT (Tax Leverage) and PT (Tax Liabilities).

4.2. Hypothesis testing

Table 8 shows the results of Pearson's correlation coefficients for the investigated variables.

Table 8. Pearson Correlation Matrix

Variables		Pearson's r	p.value
LEVT	- CCT	-0,081**	0,001
LEVT	- Ki	0,139***	0,001

* p <.05, ** p <.01, *** p <.001

Note. Caption: LEVT (tax leverage); CCT (capital cost of third parties in R\$ thousand); Ki (third-party capital cost indicator).

Pearson's correlation coefficient calculated between the variables LEVT and CCT, indicates a negative correlation between tax leverage and the third parties' capital cost of the 1,575 observations in the sample, indicating that increases in tax leverage provide reductions in the capital cost for third parties. The Ki indicator, on the other hand, shows the existence of a positive correlation between the variables, where it is interpreted that increases in tax leverage (LEVT) provide increases in the indicator of the percentage of financial expenses (Ki).

To interpret Pearson's Correlation Coefficients, the parameters indicated by Callegari-Jacques (2003) were used, where: i) results between 0,00 and 0,30 indicate a weak linear relationship between the variables; ii) results in between 0,30 and 0,60 indicate a moderate linear relationship between the variables; iii) results in between 0,60 and 0,90 represent a strong linear relationship between variables; and iv) results in between 0,90 and 1,00 indicate a very strong linear relationship between the variables.

Based on these parameters, it is observed that the general correlation of -0,081 between the variables tax leverage (LEVT) and capital cost of third parties (CCT) and the correlation of 0,139 between the variables tax leverage (LEVT) and indicator of the percentage of financial expenses (Ki) is characterized as weak linear correlations. Between 0,00 and 0,30, even though both correlations presented have a high probability of significance (p. value 0,001), which indicates that the correlation between these variables is statistically significant.

Also considering the concentration of tax liabilities (PT) in the sample in the 50 companies with the highest average tax indebtedness in the period from 2013 to 2017, the Pearson Correlation Coefficient was further evaluated, limiting the sample to these 50 companies, the result being shown in table 9.

Table 9. Pearson Correlation Matrix - 50 largest PT

Variables			Pearson's r	p.value
LEVT	-	CCT	-0,219**	0,001
LEVT	-	Ki	-0,135***	0,033

* p <,05, ** p <,01, *** p <,001

Note. Caption: LEVT (tax leverage); CCT (capital cost of third parties in R\$ thousand); Ki (third-party capital cost indicator).

The correlation coefficient for this cut of the sample of the 50 largest tax debtors reveals that the correlation between tax leverage (LEVT) and the capital cost of third parties (CCT) is stronger (-0,219) concerning the general correlation between these

same variables when measured with the totality of the sample data (-0,081), indicating that the higher the company's tax liability, the lower its capital cost for third parties.

It is also observed, in the evaluation of the correlations of this sample cut, that the indicator of the capital cost of third parties (K_i) has a significant negative correlation with the variable tax leverage (LEVT), and we attribute this behavior to the representativeness of the tax liability of these companies in the composition of their third-party capital.

4.3. Discussion of results

Pearson's Correlation Coefficient of -0,081 between the tax leverage (LEVT) and third-party capital cost (CCT) variables indicates that the research hypothesis: more tax-leveraged companies (which have higher tax indebtedness) have a lower third parties capital cost compared to less tax-leveraged companies is true, as it reveals an inverse linear relationship between the two variables built from the data of the 315 companies in the five years analyzed. When segmenting the sample of companies, limiting it to the 50 largest tax debtors, it is revealed that the correlation between tax leverage (LEVT) and the capital cost of third parties (CCT) is stronger (-0,219), indicating that, the higher the company's tax debt, the stronger the correlation between the variables.

This result converges with the conclusions of Lima (2016) that analyzed the financial viability of the strategy of not collecting taxes in time for later payment in government programs, in his work entitled "Public incentive to companies to use taxes as a structure of capital", concluding that the planned default of federal taxes for the application of these resources in the financing of the company's activities may be financially viable.

In the same sense, the result of the correction between tax leverage and the capital cost of third parties is compatible with the findings by Lima (2016) and Rodrigues et al. (2017) who stated that the financial costs of installment payments in Brazil are lower than the costs of obtaining credit from Financial Institutions, and also found that the cost of installments was less than the cost of raising funds in the market throughout the analyzed period (2011 to 2014), indicating the financial advantages of using installments as a capital structure, whose constant offer of these installments, according to Paes (2012), reduces the predisposition of the regularity of Brazilian taxpayers.

The representativeness of 13% of indebtedness of a tax nature in the composition of third-party capital of the companies in the sample reveals the relevance of tax indebtedness in the capital structure of Brazilian companies, converging with the

statements of Rezende (2015) which highlights that several companies adopt as strategy the non-payment of certain taxes through judicial discussion of their incidence or legality, thus postponing, many times, the payment of these taxes, which, in a certain way, finance their operations while not paid.

5. FINAL CONSIDERATIONS

Tax leverage provides a lower third parties capital cost compared to the other onerous liabilities of the companies in the sample analyzed, proving in this paper that the financial strategy of not collecting taxes and using these resources to finance companies' activities can generate cost savings third-party capital. The results obtained, given the applied methodology and the database used, provided evidence that the capital cost of third parties is inversely proportional to the tax leverage, even though researchers are aware that, in the other onerous liabilities of the sampled companies, they include all obligations with third parties of these companies, and the researchers are aware that many of them do not generate financial charges, which implies a correlation possibly greater than that identified in the applied statistical tests.

If it would be possible to segregate the other onerous liabilities, defined in this research as all non-tax obligations in obligations subject to financial charges and not subject to finance charges, such as obligations with personnel and suppliers that do not automatically generate financial expenses, possibly the results of the correlation between tax leverage and the capital cost would be stronger. And the impossibility of segregating these liabilities into financial expense generators and non-financial expense generators is one of the limitations of this research.

The survey also indicates the relevance of tax indebtedness in the Brazilian business scenario, which, in the sample surveyed, makes up, on average, 13% of third-party capital used by companies, is such an indicator representative of the weight of tax charges in the capital structure of Brazilian companies; from the 138 billion tax liabilities of the 315 companies in the sample, 79% are concentrated in the 50 largest debtors. Such information is important for the Government and consecutively for society in general, given that it is possible to ask whether the Government has any advantage in maintaining this policy of tax installments, and it is proven that, when applying this policy, it may end up indirectly financing private companies, which can use tax defaults as a financial strategy to reduce their capital cost.

The results likewise indicate that tax installments are advantageous for the companies' management in the context of the financial planning of their operations since the strategic implementation of taxes installments or even postponement in

administrative or judicial discussions for subsequent installment proves to be financially advantageous by generating a lower capital cost than other onerous liabilities. From the point of view of the general society, the results incite a financial disadvantage for taxpayers who strive to maintain their compliance with the tax authorities, since the existence of installment programs and the existence of financial advantage for debtors in their adhesion can discourage those who honor their obligations on time.

Finally, future research on the subject could analyze, with the obtaining of more specific data, only tax liabilities in installments, comparing their capital cost with the other essentially onerous liabilities that also generated financial expenses in the companies in the analyzed period. It is believed that such data would reveal an even greater correlation between tax leverage and the third parties' capital cost.

Contribución de autores

Duarte, J.M.C.: Conceptualización, Metodología, Software, Validación, Análisis formal, Investigación, Curación de datos, Redacción borrador original, Supervisión, Administración del proyecto. **Lima, E.M.:** Conceptualización, Metodología, Supervisión, Validación, Administración del proyecto. **Lima, J.M.:** Metodología, Software, Análisis formal, Curación de datos, Supervisión.

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Declaración de conflicto de intereses

El (los) autor(es) declara(n) que, durante el proceso de investigación, no ha existido ningún tipo de interés personal, profesional o económico que haya podido influenciar el juicio y/o accionar de los investigadores al momento de elaborar y publicar el presente artículo.

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Fecha de recepción: 4/08/2021
Fecha de aceptación: 26/02/2022
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