

## DO BRAZILIAN PUBLICLY TRADED COMPANIES THAT PAY LESS TAX CREATE MORE JOBS?

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### ABSTRACT

There is a widespread assumption that lower corporate taxation will lead to higher rates of job creation, but this belief may be false, as challenged by Anderson and Pizzigati (2017). This article studies the relationship between job creation and 3 tax aggressiveness proxies in Brazilian non-financial firms listed in B3 in the period between 2011 and 2016. The estimates were created using the methods of ordinary least squares (OLS) and quantile regression. The results obtained from the estimates using OLS did not present significant evidence of an association between the rate of job creation and effective tax rates. In the quantile regressions, it was possible to find a significant and positive relationship between job creation and effective tax rates, exclusively in quantile 25 of the effective tax rate on value added. Quantiles 50 and 75 presented negative relationships between job creation and effective tax rates in different tax aggressiveness metrics. The results suggest that the firm's tax aggressiveness profile influences the relationship. While in the less tax-aggressive companies a reduction of the tax burden would potentially stimulate job creation, in those companies that are more tax-aggressive, the tax break may lead to the undesirable effect of a fall in job creation.

**Keywords:** Tax aggressiveness. Tax avoidance. Job creation rate. Effective tax rate.

### 1 INTRODUCTION

According to Leigh (2018), economic and tax literature commonly argues that a lower corporate tax burden leads to a higher job creation rate and that much of the evidence for this proposition is based on macroeconomic models. This belief, however, may be false, as suggested by Anderson and Pizzigati (2017). For the authors, the 92 most consistently profitable United States companies with a high profile of tax aggressiveness recorded, on average, a negative job growth rate of one percent between 2008 and 2016. The job growth rate in the same years among United States companies in the private sector, as a whole, was six percent. As for the 92 companies

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that paid less tax, more than half of them (48 companies in total) eliminated jobs between 2008 and 2016, reducing jobs by 483,000.

Given these results in the United States, the objective of this research was to ascertain whether there is the same relationship between job creation and tax aggressiveness in Brazilian publicly traded companies. In this quest, this paper seeks to answer the following question: Do companies that pay less tax create more jobs in Brazil? With an answer to this issue, it will be possible to illuminate what may be the effect of a reduction of the corporate tax burden on the rate of job creation by the benefited companies.

The topic of this research question is crucial in Brazil at this moment, where there are ongoing discussions about tax reform, specifically proposing a general reduction in corporate taxes to stimulate job creation. There is reasonable doubt as to whether firms that avoid paying taxes, reducing their tax burden, are willing to create jobs or whether reduced tax burden mainly represents an increase in stockholders' wealth, executive compensation packages, and investment in technologies that destroy even more jobs.

This is the first study within the Brazilian context that evaluates the relationship between job creation and a corporate profile of tax aggressiveness. It discusses one possible determinant of job creation, providing insights into strategies that may stimulate healthy economic growth. Tax aggressiveness has become a prominent topic in recent years in light of a combination of political, economic, and technological factors that have driven the focus of public interest toward corporate decisions, especially those related to taxation (Martinez, 2017).

Based on a tax accounting perspective, this research conducted a statistical analysis of the relationship between the effective tax rate and the job creation rate in Brazilian non-financial firms listed in B3 in the period between 2011 and 2016. The tests used ordinary least squares (OLS) and quantile regression in quantiles 25, 50 (median), and 75.

The results of the tests performed using ordinary least squares (OLS) and fixed effects in panel data did not show evidence of an association between the job creation rate and the effective tax rates. In the analysis of the quantile regression, the results were different according to the quantile analyzed. In quantile 25, a positive relation was observed between the job creation rate and the effective tax rate on value added.

In the other quantiles, the tests revealed a negative relationship between job creation and effective tax rates. These results occurred in quantiles 50 and 75 and were observed for all the taxes considered in the research (effective tax rate related to income tax paid, tax accounting expenses on profit, and tax expenses on value added). This is an innovative and relevant study that raises questions about the social efficiency of a general reduction of corporate taxes.

This article has five sections including this introduction. The second presents a literature review and the research hypothesis. The third presents the selection of the sample and the research project, as well as the descriptive statistics carried out on the sample. The fourth shows the multivariate analysis of the data and a discussion of the results; this is followed by the fifth section, which presents the conclusions.

## **2 LITERATURE REVIEW AND HYPOTHESIS**

The importance of this tax accounting research lies in the fact that, to the best of our knowledge, there are no studies in the respective Brazilian literature seeking evidence of the relationship between job creation rate and effective corporate rate of income tax and the tax levied on the revenues resulting from practices of tax avoidance.

Another relevant point brought up in this research is that the variables that represent the practices of tax avoidance are independent variables, which is not common in tax accounting research.

The literature around tax research uses the terms "tax avoidance" or "tax aggressiveness" as a substitute for the term "tax planning".

As Hanlon and Heitzman (2010, p. 27) point out, “the challenge for the area is that there are no universally accepted definitions of, or constructs for, tax avoidance or tax aggressiveness; the terms mean different things to different people.”

Therefore, in this article, we adopt the definition of tax avoidance and tax aggressiveness as defined by Hanlon and Heitzman (2010), that is, the reduction of the explicit taxes, which reflect all transactions that influence the explicit tax liability of the company. This definition does not distinguish between the practices characterized as “tax avoidance practices” (explicitly designed to reduce taxes) and other activities of the company toward reducing taxes, such as the use of tax breaks.

## **2.1 Economic and tax research**

According to a study by Ljungqvist and Smolyansky (2016, p. 31) with United States companies, an increase in corporate tax rates is detrimental to workers, while corporate tax cuts are ineffective in increasing economic activity unless implemented during recessions. In this study, it was found that a one-percent increase in the corporate tax rate reduces employment by between 0.3% and 0.5% and reduces employment income by between 0.3% and 0.6%, *ceteris paribus*. These estimates vary little over the business cycle and are remarkably stable through circumstances such as labor market flexibility, wealth, population density, or the dominance of small businesses. Conversely, tax breaks are only useful in recessions, where they increase job creation by about 0.6% and increase employment income by about 1% for each percentage point cut in the tax rate.

In similar research, Kouparitsas, Prihardini, and Beames (2016, p.27) sought to demonstrate the effects of tax burden reduction on the economic activity of Australian companies. Their research showed that, even after the increase in other types of taxes or cutting government spending to recover lost revenue, a cut in income taxes encourages investment. The attraction of investment increases the capital stock and labor productivity.

The authors demonstrate that a 5% reduction in the rate of corporate income tax, financed through a cut in government expenses, will cause a 1.1% pre-tax real increase in wages and an increase of 0.1% in the job creation rate. Finally, the research estimates that if there is a 5% reduction in the rate of corporate income tax, financed through an increase in value-added taxes, there will be a 1.1% pre-tax real increase in wages and an increase of 0.4% in the job creation rate.

Dixon and Nassios (2016, p.1) researched the impact of a reduction in the corporate tax rate on the Australian economy, since part of the government believed that a reduction in these taxes would attract more foreign investment, increasing wages and production. The authors concluded that a reduction in corporate taxes would stimulate production but reduce the growth of gross national income. Such a reduction, according to the authors, would result in higher real wages, which should be recognized as a distributive impact that favors workers. They assumed, however, that aggregate employment would not change in the long term.

Anderson and Pizzigati (2017, p.4) studied the validity of the United States government’s claim that a reduction in the federal corporate tax rate would lead to an increase in the job creation rate in the United States. The researchers detected that the reduction in the effective tax rate was an outcome of practices of tax avoidance employed by the companies that formed the sample used in the research, which explored loopholes in the United States Federal Tax Code. The authors argue that the resources the companies saved through tax avoidance did not stimulate job creation but often served to increase the remuneration of their executives.

Because of the slow recuperation of the United States economy from to the 2008-2009 recession, and facing the United States federal government’s inertia in economic policy, Shuai and Chmura (2013, p. 4) examined whether a cut in the state corporate tax rate would affect job growth at the state level. The authors clarify that they chose to study the state corporate tax because this tax is a political tool of the states to directly influence economic recovery.

The authors used two approaches to establish a connection between a state tax break applied to corporate profits and the job creation rate. Based on general comparisons related to job creation, it was possible to observe that, in the beginning, states that cut corporate income tax had a slower job growth rate than states that did not make any changes regarding corporate income tax. After some years, however, it was observed that states that had cut corporate income tax had rebounded or even grown faster in terms of job creation. The fixed effects panel regression model used by Shuai and Chmura (2013) found that state corporate tax rates have a significant negative effect on job growth rates. In addition, tax reduction has the benefit of inducing short-term job growth as companies react and respond to the new policy. This additional benefit, however, is temporary, lasting only a year.

Sousa and Neto (2001, p. 30) used information from tax collection and national accounting records to calculate, in Brazil, the effective macroeconomic tax rates related to i) taxation on consumption, ii) taxation on labor income, and iii) taxation on capital income. The researchers observed that the effective macroeconomic rates of taxation on consumption and taxation on labor income are negatively correlated with the job creation rate; that is, when macroeconomic tax rates increase, the job creation rate decreases. Conversely, they observed that taxation on capital income is positively correlated with the job creation rate, which means that when macroeconomic tax rates increase, the job creation rate also increases.

Shuai & Chmura (2013) confirm the observation that lower corporate state tax rates have a significant and positive effect on employment growth. The tax rate cut has the temporary benefit of promoting job creation as businesses adjust to the new tax rate. This temporary benefit only occurs during first year of the enactment of a tax cut.

Nevertheless LeRoy (2005) affirms that corporate taxes are only one small element in the investment decision and job creation. In his point of view most of the alleged American tax cuts are most of time Jobs Scam. Corporate tax cut programs rely on taxpayer confusion about the causes and effects of job creation. Also, they flourish when governments fail to monitor the real outcomes on jobs, wages, and other benefits. And most of all, these programs are built upon a corporate - controlled definition of "competition" that prevents government officials from cooperating in taxpayers best interests.

## **2.2 Accounting and tax research**

Pohlmann & Iudicibus (2006) conducted an extensive review of the literature and established the following classification of tax research, considering the multidisciplinary nature of this discipline. The author established the following classification of tax research as a whole: i) tax obedience; ii) audit and public tax management; iii) impact of tax on taxpayers' decisions; iv) optimum taxation and economic efficiency of taxes; v) macroeconomic aspects of taxation; vi) legal research, which is subdivided into a) legal tax; b) accounting and tax audit; c) tax planning.

The literature on tax avoidance discusses international operations, the relationship between investment in tax planning and taxes due, and the tax shelter as the main reason for the decline of corporate income tax in relation to GDP and total tax collection. Studies have also approached the association between the reduction of effective tax rates and executives' compensation and other issues that do not include the subject covered in this research.

Thus, to the best of our knowledge, there is no research in the Brazilian tax accounting literature addressing the issue of establishing an association between the job creation rate and tax avoidance or tax aggressiveness.

In the international tax accounting literature, a small number of studies have established a relationship between tax avoidance and the job creation rate. The work by Blouin and Krull (2009, p. 1028) is an example. The authors conducted a study on firms' characteristics and the relation of these characteristics to how they used repatriated funds to benefit from tax breaks offered by the United States government to repatriate profits obtained abroad.

Under the American Jobs Creation Act of 2004, this tax break effectively reduced the tax rate on repatriations by United States subsidiaries established abroad from 35% to 5.25%. This tax incentive was created to encourage United States multinational corporations to repatriate funds held in foreign subsidiaries to the United States and to use those funds to create jobs and capital investment.

Blouin and Krull's (2009) study, however, found that the firms that used the tax benefit to repatriate profits were those with limited investment opportunities, which means that much of the money was used in operations of share repurchases. There was no evidence of promotion of business investment, job creation, or increased expenses in research and development.

Leigh (2018, p. 3) analyzed whether profitable Australian companies that pay a lower effective tax rate on accounting profit and taxable profit have a higher rate of job creation. The author did not use macroeconomic variables but adopted variables derived from accounting profit and taxable profit. He separated the companies into two groups: those with a tax rate below 25% and those with a tax rate above 25%. Using taxes as a percentage of accounting profit or taxable profit, his results showed that, as a share of accounting profit, companies with an effective tax rate of less than 25% eliminated jobs, while companies with an effective tax rate higher than 25% had an annual rate of job growth.

Leigh (2018) then compared his results with those obtained by Anderson and Pizzigati (2017) in the United States by dividing the companies studied into those with an effective tax rate above 20% and those with an effective tax rate below 20%. His results illustrated that Australian companies with an effective tax rate below 20% eliminated jobs at a rate of 0.1% per annum, the same amount as United States companies with an effective tax rate below 20%. Conversely, Australian companies with an effective tax rate above 20% increased employment at an annual rate of 2.0%, a slightly faster rate than the annual job growth rate of 0.8% for the United States's private sector as a whole.

Finally, to test for relationships across the data, Leigh (2018) regressed the average annual job growth rate in the firm's effective tax rate. His results showed that the relationship is positive, suggesting that a higher effective tax rate is associated with a faster rate of job creation. The ratio was statistically significant when effective tax rates were calculated as a portion of taxable income, but it was not statistically significant when effective tax rates were calculated as a portion of accounting profit.

## **2.3 Hypothesis**

The relation between taxes and the job creation rate has been addressed not from an economic- or tax-related point of view (as seen in the literature presented above) but rather from the tax accounting and firm (microeconomic) perspective. In other words, the statistical tests conducted in this research allows for inferring whether job creation occurs as a consequence of tax aggressiveness practiced to reduce the tax burden on income or revenue.

The conventional wisdom is that companies that pay less tax are more willing to produce more and share this additional income with the labor force, therefore a possible result would be to create more jobs. If this is true, we would expect to see a negative relation between the effective tax rate of a firm and its job creation rate.

Nevertheless, as shown in the literature review, the evidence on a negative relationship between effective tax rate and job creation rate is not clear. Thus, based on the prevailing belief that firms with less heavy tax burdens create more jobs, this study tests the following hypothesis for Brazilian publicly traded firms:

H<sub>1</sub>: Brazilian publicly traded companies with lower effective tax rates have higher rates of job creation.

### 3 METHODOLOGY AND SAMPLING

#### 3.1 Sample selection

The software Economática® was used to select the companies tested. The sample includes publicly traded Brazilian companies listed in the stock exchange B3 and covers the period from 2011 to 2016. The sample excluded financial companies, companies with losses before taxes, and companies that did not have the necessary data to compute the variables used in the analysis. Table 1 presents the sample selection process.

Table 1

#### Sample Selection Process

Total number of companies	651
Exclusion of financial companies	(147)
Exclusion of companies with a deficit before taxes	(126)
Exclusion of companies with lack of data	(263)
Number of companies after exclusions	115
Years analyzed	6
Total of observations (115 X 6)	690

Source: Elaborated by the authors with research data using ECONOMATICA®.

#### 3.2 Measurement and models

According to Hanlon and Heitzman (2010), the literature presents several ways to measure tax avoidance. Not all forms of measurement, however, are appropriate to address the different research questions. Thus, estimates of income and tax payments, essential factors for measuring tax avoidance, can be obtained from any source. Furthermore, most measurements of tax avoidance are obtained from data collected from the firm's financial statements.

Thus, we used three measurements of tax avoidance or tax aggressiveness in this research to examine the associations between the variables adopted in our model.

The first measurement was the variable Rate\_CashETR (Cash effective tax rate), calculated as the total income taxes paid on a cash basis, divided by the pre-tax accounting income.

Because of limitations in the disclosure of firms' financial statements, the numerator of the division above (total income taxes paid on a cash basis) was obtained by using the following formula: initial balance in the payable IRPJ/CSLL<sup>i</sup> account, added to the IRPJ/CSLL calculated in the income statement, deducting the final balance of the payable IRPJ/CSLL account. Thus, the variable Rate\_CashETR may contain elements other than the effective payment of taxes, that is, procedures such as compensations, provided for in the Brazilian legal tax system.

Hanlon and Heitzman (2010, p. 34) explain that CashETR "is affected by tax deferral strategies but is not affected by changes in tax accounting accruals." The annual cash ETR<sup>ii</sup> could render the numerator and denominator incompatible if the taxes paid in cash included the income tax paid in a different period (for example, an audit of the tax authority completed in the current year) and the denominator included only the results of the current period.

The second measurement of tax avoidance or tax aggressiveness was the variable Rate\_GaapETR (Effective income tax rate), which was calculated as total income tax expense divided by pre-tax accounting income, as observed by Hanlon and Heitzman (2010). The authors clarify that "a tax strategy that defers taxes (e.g., more accelerated depreciation for tax purposes) will not change GaapETR" (p. 34) and highlight several items that are not considered tax planning strategies and could affect GaapETR.

For Hanlon and Heitzman (2010), the GaapETR is the most used measurement to indicate the degree of tax aggressiveness. Thus, a low GaapETR means that a company is more aggressively engaged in tax planning than others with a higher GaapETR.

The third measurement of tax avoidance or tax aggressiveness was the variable Rate\_VATR (Effective tax rate on value added). This measurement was introduced in the Brazilian

literature by Vello and Martinez (2014) and seeks to establish firms' tax aggressiveness realized in the total taxes levied on the value added. The authors argue that this measurement captures tax avoidance or tax aggressiveness in a similar way to GaapETR. The measurement indicates that low taxation rates on value added means that the firm adopts tax avoidance practices. Moreover, when this measurement is used to compare different firms, the one with the lower total effective tax rate is the more tax aggressive.

The data to calculate Rate\_VATR were obtained on the CVM website because it is not available on the Economática® software. For the calculation of the tax rate on revenues, we had to extract the values referring to the income tax. Thus, Rate\_VATR was calculated as the tax burden of the value added statement deducting the income tax, divided by the total value added to distribute.

It is important to emphasize that the Rate\_GAAPETR and Rate\_CashETR measurements are exclusively related to corporate taxes, IRPJ and CSLL. Therefore, they refer to the effects of avoidance of these taxes specifically. The basis for calculating aggressiveness is pre-tax income. As for the Rate\_VATR, it includes all direct and indirect taxes from the cities, states, and the union, using the value added as a basis to calculate the rate. It is noteworthy that its magnitude is not directly comparable with the measurements based on the effective tax rate (ETR).

The Rate\_VATR stands out because this third measurement of tax avoidance, atypical in studies outside Brazil, is more comprehensive than those derived from the ETR, and it captures the effects of all taxes paid by a company. The information about these other taxes is available in the case of Brazilian publicly traded companies because it is mandatory for them to report the Value Added Statement (VAR). The VAR describes how the wealth created by a firm, total value added, is divided between government, employees, creditors, and shareholders. Therefore, from the VAR statement, it is possible to identify the proportion of government taxes (federal, state, and municipal) in the total value added by a company, which in this paper is called the Value Added Tax Rate (VATR). It is different from the denominated VAT, which is broadly known as a consumption tax on the value added to goods and services. VATR in this paper includes direct and indirect taxes, using the unique information provided by the Value Added Reporting that is available in Brazil.

To measure the variation in job creation of the companies in the sample, we used the variable Job\_Gr\_Rate, (number of the firm's employees in the current year/number of employees in the previous year) – 1. The number of employees was collected from the reference form sent to CVM, using the software Empresas.NET. The model used to test the relationship between job creation rate and tax avoidance or tax aggressiveness was as follows:

$$Job\_Gr\_Rate_{i,t} = \beta_0 + \beta_1 Tax\_Avoidance_{i,t} + \beta_2 Size_{i,t} + \epsilon_{i,t} \quad \text{Equation (1)}$$

To perform the tests, we replaced the dependent variable "job" with the variable JOB\_GR\_RATE. The independent variable that measures the effective tax rate (Tax\_Avoidance) of the selected companies will be replaced by one of the following variables: Rate\_CashETR, Rate\_GAAPETR, or Rate\_VAS.

The last variable of the model (SIZE) was a control variable, which was obtained by calculating the natural log of sales.

The summary and form of calculation of all variables used in this study are presented in Table 2:

Table 2  
**Synthesis of the Variables**

Variables	Meaning	Calculation
JOB_GR_RATE	Firm's annual employment growth.	(Number of employees in the current year/Number of employees in the previous year) – 1
RATE_CASHETR	Cash effective tax rate.	Initial balance in the payable IRPJ/CSLL account + IRPJ/CSLL calculated in income statement – the final balance of the payable IRPJ/CSLL account.
RATE_GAAPETR	Effective income tax rate.	Total income tax expense divided by pre-tax accounting income.
RATE_VATR	Effective tax rate on value added	(Tax burden of value added statement – income tax)/Total value added to distribute
SIZE	Firm's size	Natural log of sales

Source: Elaborated by the authors

After the data were collected from Economatica® and the CVM website, they were processed in Excel® to generate the variables and the respective long and balanced panel. After this treatment, we performed tests on STATA®.

#### 4 RESULTS AND ANALYSIS

The data collected from Economatica® and the CVM website were processed using Excel®, generating the variables and the respective long and balanced panels, which allowed for starting the statistical tests.

The tests were conducted after the sample was separated into two groups, inspired by the procedure adopted by Leigh (2018). Thus, we performed the tests observing the mean, using ordinary least squares (OLS) and the quantile regression to calculate the results for quantiles 25, 50 (median), and 75.

Koenker and Basset (1978), pioneers of the quantile regression, point out that, while the ordinary least squares generates an estimate of the conditional mean of the dependent variable, quantile regression can be used to estimate any conditional quantile of the dependent variable.

Zamprogno, Jesus Filho, and Funchal (2009) add that it is possible to analyze the estimated coefficients, intuitively, via the quantile equation, in the same way as the coefficients of the OLS, but no longer as a mean effect but as a specific sensitivity to the quantile of the dependent variable. Thus, the coefficients of the quantile regression can be interpreted using the partial derivative of the conditional quantile in relation to each specific independent variable.

Table 3 presents the descriptive statistics, and the data was winsorized in the 1<sup>st</sup> and 99<sup>th</sup> percentages due to the existence of outliers.

Table 3  
**Descriptive Statistics**

Variables	Observations	Standard deviation	Mean	Quantile 25	Median	Quantile 75
JOB_GR_RATE	688	0.2942	0.0449	-0.0429	0.0082	0.0721
RATE_CASHETR	689	0.3696	0.2418	0.0573	0.1895	0.2947
RATE_GAAPETR	687	0.2119	0.2612	0.1407	0.2541	0.3239
RATE_VATR	689	0.2712	0.1407	0.1407	0.2213	0.3540
SIZE	690	1.5794	14.8876	13.9293	14.8845	15.8257

Source: Elaborated by the authors using Software Stata®.

The results are consistent with those of previous studies such as Martinez and da Silva (2018), where it has been verified that the effective tax rates of companies are lower than the legal

rates. The means presented for the variables RATE\_CASHETR (24.18%) and RATE\_GAAPETR (26.12%) suggest that companies are paying income taxes and calculating income tax expenses in their accounting reports that are, on average, substantially lower than the official rate of 34%.

The analysis of the quantiles reveals that the companies of the sample in quantile 25 are paying income taxes (Rate\_Cashetr) at an effective rate that is equal to or less than 5.73%. It is possible to observe in quantile 25 that these companies are calculating in their accounting reports income tax rate (Rate\_Gaapetr) at an effective rate that is equal to or lower than 14.07%. These data show that 25% of the companies that make up the sample are executing tax avoidance activities that substantially reduce their tax burden on income. The median (quantile 50), which represents 50% of the companies in the sample, shows that the cash effective tax rate is equal to or lower than 18.95% and the effective rate of income tax calculated in the companies' accounting reports is equal to or lower than 25.41%. These data indicate that 50% of companies are engaged in tax avoidance activities that substantially reduce their tax burden on income. Finally, the descriptive statistics presented in quantile 75 illustrate that only 25% of the companies in the sample are paying income taxes with an effective rate that is equal to or greater than 29.47% and that the income tax expense disclosed in the accounting reports represents an effective rate that is equal to or greater than 32.39%. These rates are below the legal tax rate of 34%, albeit not by much.

As for the effective tax rate on value added (RATE\_VATR), there is also a significant reduction of the tax burden, since the total tax burden legally provided is 39.25% (IPI and ICMS 15% each; COFINS 7.6%; and PIS/PASEP 1.65%), and the results showed the following: mean 14.07%; quantile 25, 14.07%; median 22.13%; and quantile 75, 35.40%.

The descriptive statistics for the variable JOB\_GR\_RATE revealed a positive mean, median, and quantile 75 job growth rate. The data collected demonstrated that the researched companies increased the number of jobs by an annual average of 4.49%. As for the companies in quantiles 50 and 75, they increased the number of jobs at an annual rate of 8.20% and 7.21%, respectively. As for the companies in quantile 25, however, the descriptive statistics for the variable JOB\_GR\_RATE were negative. These firms are reducing the number of jobs at an annual rate of 4.29%.

The model of fixed effect in panel data allowed for performing the tests using the ordinary least squares (OLS). The results presented, however, did not present any significant evidence of an association between the effective tax rates and the job creation rate, as shown in Table 4.

Table 4

**Multivariate Results – OLS**

Variables	Observations	JOB_GR_RATE		INTERCEPT		R <sup>2</sup> Overall
		Coefficient	P-Value	Coefficient	P-Value	
RATE_CASHETR	687	- 0.0378	0.356	1.8423	0.020	0.0031
RATE_GAAPETR	685	- 0.0739	0.161	1.9455	0.016	0.0020
RATE_VATR	687	- 0.0525	0.680	1.9792	0.017	0.0044

Source: Elaborated by the authors using Software Stata<sup>®</sup>

In the analysis using quantile regression (with the studied companies divided into quartiles), the results presented significant evidence of an association between effective tax rates and job creation rates, as observed in Table 5.

Quantile regression provides an alternative to ordinary least squares (OLS), which typically assumes that associations between independent and dependent variables are the same at all levels. The main advantage of the quantile regression methodology is that the method allows for understanding relationships between variables outside of the mean of the data, making it useful in understanding outcomes that are non-normally distributed and that have nonlinear relationships with predictor variables (Lê Cook & Manning, 2013).

Table 5  
**Multivariate Results – Quantile Regression**

JOB_GR_RATE	Observations	QUANTILE 25		QUANTILE 50		QUANTILE 75	
		Coefficient	Pseudo R <sup>2</sup>	Coefficient	Pseudo R <sup>2</sup>	Coefficient	Pseudo R <sup>2</sup>
RATE_CASHETR	687	-0.0104	0.0016	-0.0195**	0.0010	-0.0301	0.0010
INTERCEPT		-0.0679		-0.0001		0.1094*	
RATE_GAAPETR	685	-0.0117	0.0032	-0.0214***	0.0026	-0.0378**	0.0025
INTERCEPT		-0.0453		0.0052		0.1024*	
RATE_VATR	687	0.0480*	0.0028	-0.0058	0.0003	-0.0738**	0.0027
INTERCEPT		-0.0585		-0.0045		0.0883	

Note: \*\*\*, \*\*, and \* indicate statistical significance at levels 1%, 5%, and 10%, respectively.

Source: Elaborated by the authors using Software Stata<sup>®</sup>

As documented in the OLS estimates, the results did not offer significant evidence of an association between effective tax rates and job creation rates. In other words, any reduction in the effective tax rate does not imply, on average, an increase in the job creation rate.

When analyzing the results of the quantile regressions, it is possible to observe that some of the companies presented effective tax rates that are negatively (inversely) correlated with the job creation rate; that is, when the effective tax rates decrease, the job creation rate increases. There is also a group of companies, however, that present effective tax rates that are positively (directly) correlated with the job creation rate (when effective tax rates decrease, the job creation rate decreases).

Examining the variable that represents the cash effective tax rate (RATE\_CASHETR), only quantile 50 shows a negative association (-0,0195) with statistical significance at the level of 5% ( $p$ -value = 0.022). This result suggests that the companies that are grouped around this quantile maintain an inverse relationship between the cash effective tax rate and the job creation rate. Thus, a decrease in the effective tax rate would induce an increase in the job creation rate, or an increase in the effective tax rate would reduce the job creation rate.

For the effective income tax rate (RATE\_GAAPETR), quantile 50 exhibits a negative association (-0,0214) with statistical significance at the level of 1% ( $p$ -value = 0.012). Therefore, the companies in this quantile have an inverse relationship between the effective income tax rate and the job creation rate. The RATE\_GAAPETR also presents a negative association (-0.0378) with a statistical significance of 5% in quantile 75.

Lastly, for the effective tax rate on value added (RATE\_VATR), quantile 25 shows a positive association between the ETR and the job creation rate of 0.0480, with statistical significance at the level of 10% ( $p$ -value = 0.091). This result suggests that companies in this quantile are reducing the effective tax rate on value added and reducing their job creation rate at a level of 4.8% per annum. This rate on value added also presents a negative association (-0.0738), with statistical significance at the level of 5% ( $p$ -value = 0.030) in quantile 75.

When taken together, only part of the result is consistent with Leigh's (2018) research, which documented a positive relationship, suggesting that a higher effective tax rate is associated with a higher job creation rate. This consistency is verified for quantile 25, regarding the effective tax rate on value added (RATE\_VATR). In this case, it was observed that the firms that have an effective tax rate equal to or inferior to 14.07% exhibit a positive relationship between job creation rates and tax rates. For this group of firms that appear to be more tax aggressive, a reduction in the effective tax rate would engender a reduction in the job growth rate, contrary to the general belief that reducing the tax burden results in more jobs.

For the other results, there was a negative relation between the effective tax rates and job creation rates. These results occurred in quantiles 50 and 75, and they were repeated for all proxies of tax aggressiveness applied in this research, namely, CASHETR, GAAPETR, and VATR. For these firms, the results show an inverse relationship between the effective tax rate and the

generation of jobs; consequently, in these subgroups, a reduction in the effective tax rate could be effective in inducing an increase in job creation.

In terms of this paper's hypothesis, it can not be affirmed that there is a significative relation between effective tax rate (or the level of tax burden) and job creation. Therefore, the simple reduction of taxes does not guarantee that there will be an increment in jobs. The quantile regression for levels of effective tax rate indicates that for companies with average and low tax aggressiveness, the reduction of taxes may stimulate job creation given the negative relation between the effective tax rate and jobs created in the firm on these regressions. Nevertheless, among the companies with a high level of tax aggressiveness, this relation is positive, at least in one of the metrics for tax aggressiveness, the one that represents all taxes paid by a company.

The results suggest that the degree of tax aggressiveness of a company can be a determinant of its job creation rate. Particular attention should be directed to those companies that present more aggressive behavior because, for them, contrary to popular belief, tax reduction is not followed by job creation.

## **5 CONCLUSION**

The multidisciplinary nature of tax research leads the tax accounting researcher to embrace and develop tax-related theories and evidence that are relevant to accounting but produced in the fields of economics and finance. Based on the tax accounting perspective, this study was conducted to identify, using statistical tests, the relationship between the job creation rate and the effective rate of value-added and income taxes in Brazilian publicly traded companies.

The companies of the sample were separated into groups during the application of the tests conducted to identify the mean by using ordinary least squares (OLS). In addition, quantile regression was used to determine the results of the companies that make up quantiles 25, 50 (median), and 75.

The results of the tests performed using ordinary least squares (OLS), using the model of fixed effects in panel data, did not present significant evidence of an association between job creation rate and effective tax rates. In the analysis of the results obtained from the quantile regression, when considered together, only some of the findings were consistent with the results of Leigh's (2018) study. The consistency was verified in quantile 25 regarding the effective tax rate on value added, where a positive relation was found between effective tax rates and job creation rates with significance at the level of 10%. In these companies, when the effective tax rate on value added is reduced, the job growth rate is therefore also reduced. For the other quantile regressions, quantiles 50 and 75, there was a negative relation between effective tax rates and job creation.

The results suggest that the profile of corporate tax aggressiveness may influence the relationship between effective tax rate and job creation rate. While in less tax-aggressive companies reducing the tax burden would potentially stimulate job creation, in companies with a more aggressive profile, the measure may lead to a drop in the rate of job creation.

The findings documented are somewhat compatible with those reported by Anderson and Pizzigati (2017) for United States companies, considering that the focus of the authors was on companies characterized as very tax aggressive. For firms that avoid paying taxes, reducing the tax burden does not necessarily mean job creation but only an increase in executive compensation packages and, in some cases, a significant reduction in jobs.

In addition to being innovative in the Brazilian context and addressing a relevant social issue, this research is up to date because it raises questions about the effectiveness of a general reduction in corporate taxation. We are living in a scenario with several proposals regarding tax reform advocating for more favorable corporate taxation. These proposals are based on the belief that this measure would stimulate growth and the level of employment. Against this backdrop, the

findings of this research contribute to explaining the complex relationship between the tax burden borne by companies and job creation.

Finally, the literature review and the evidence documented in this research allow us to conclude that the relationship between effective tax rates and the job creation rate remains unclear. Therefore, it is crucial to promote new tax accounting research around this issue, analyzing in depth the effects of tax avoidance practices on this relationship.

As a limitation of the findings in economies such as Brazil and publicly traded companies, they cannot, for example, be generalized to other countries, such as Brazil, Russia, India, and China, or to closed companies. The particularities of each group, such as the ease of access to the financial markets, the tax deductibility of job-related expenses, and legal issues must be considered before generalizing prognostics.

Future research may conduct studies controlling economic sectors or factors such as the use of intangibles, fixed capital, or the level of education and qualifications required from employees.

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<sup>i</sup> IRPJ (*Imposto de Renda das Pessoas Jurídicas*) [Corporation tax]; CSLL (*Contribuição Social sobre o Lucro Líquido*) [Social contribution on net income].

<sup>ii</sup> Effective Tax Rates.