


Market power and tax aggressiveness


Poder de mercado e agressividade tributária

Poder de mercado y agresividad fiscal


Jose Valdir Marcolino Gomes

Mestre em Contabilidade na Fucape Business School,
Vitória/ES, Brasil
valdirmarcolino@hotmail.com
<https://orcid.org/0000-0002-8824-9227> 


Silvania Neris Nossa

Doutora em Ciências Contábeis e Administração na
Fucape Business School
Professora da FUCAPE Business School, Vitória/ES, Brasil
silvanianossa@fucape.br
<https://orcid.org/0000-0001-8087-109X> 

Nadia Cardoso Moreira*

Doutora em Ciências Contábeis e Administração na
Fucape Business School
Professora da FUCAPE Business School, Vitória/ES, Brasil
nadiacmoreira@fucape.br
<https://orcid.org/0000-0002-9085-6595> 

Aridelmo Teixeira

Doutor em Controladoria e Contabilidade na
Universidade de São Paulo (USP)
Professor da FUCAPE Business School, Vitória/ES, Brasil
aridelmo@fucape.br
<https://orcid.org/0000-0002-4909-1025> 

Address of the primary contact for correspondence *

Av. Fernando Ferrari, 1358, Bairro Boa Vista, CEP: 29075-505 – Vitória/ES, Brasil

Abstract

The aim of this study is to analyze whether Brazilian companies listed on the Brasil, Bolsa and Balcão (B3) with greater market power are more tax aggressive. The gap in this research arose from the absence of empirical evidence on the relations between the market power of companies and their tax aggressiveness, when operating in a developing market, and in a country with a code law legal structure. This paper contributes to filling this gap by studying this relation through multiple linear regression and quantile regression analysis. The results indicate that, in Brazil, the greater the company's market power, the more aggressive its tax planning is, when compared to the industry median.

Keywords: Market Power; Tax Aggressiveness; Tax Planning

Resumo

O objetivo deste estudo é analisar se as empresas brasileiras listadas na Brasil, Bolsa and Balcão (B3) com maior poder de mercado são mais agressivas tributariamente. A lacuna desta pesquisa surgiu pela ausência de evidências empíricas sobre a relação do poder de mercado das empresas e a agressividade tributária das empresas instaladas em mercado em desenvolvimento e em um país de estrutura legal *code law*. Esta pesquisa contribui ao preencher esta lacuna e a relação é estudada por meio da análise de regressão linear múltipla e regressão quantílica. Os resultados indicam que no Brasil quanto maior o poder de mercado da empresa, mais agressivo é o seu planejamento tributário, em comparação com a mediana do setor.

Palavras-chave: Poder de Mercado; Agressividade Tributária; Planejamento Tributário

Resumen

El objetivo de este estudio es analizar si los brasileños que cotizan en Brasil, Bolsa and Balcão (B3) con mayor poder de mercado son más agresivos en impuestos. La brecha en esta investigación surgió por la ausencia de evidencia empírica sobre las relaciones entre el poder de mercado de las empresas y la agresividad fiscal de las empresas que operan en un mercado en desarrollo y en un país con una estructura legal de código de derecho. Esta investigación contribuye a llenar este vacío y las relaciones se estudian a través del regresión lineal múltiple e análisis de regresión cuantílica. Los resultados indican que, en Brasil, cuanto mayor es el poder de mercado de la empresa, más agresiva es su planificación fiscal, comparativamente con el mediana de la industria.

Palabras clave: Poder de Mercado; Agresividad fiscal; Planificación fiscal

1 Introduction

The objective of this study is to analyze whether publicly traded Brazilian companies listed on the Brasil, Bolsa and Balcão (B3) with greater market power are more tax aggressive. This study was developed in line with the research by Kubick et al. (2015), who conjectured that the market power held by some companies offers them some degree of isolation from competitive threats and this offers them broader opportunities. greater incentives for them to engage in more aggressive tax planning practices than companies that do not have strong market power.

The tax burden imposed on companies represents a major factor in terms of competition in the global market, as the results are directly affected by taxes, which alter profitability and liquidity (Guimarães et al., 2016; Araújo & Leite Filho, 2018). Among the alternatives to ensuring a reduction of the tax burden, to obtain a competitive advantage, and to leverage results, tax aggressiveness stands out (Chen et al., 2010; Hanlon & Heitzman, 2010; França et al., 2015; Kurnia et al., 2019), which can be evidenced by tax actions, such as investment in favored assets with tax reduction or exemption benefits; choosing a specific method of depreciation or amortization; qualifying for state tax exemption incentives on account of legislation aimed at promoting development; income transfers between different tax jurisdictions; becoming eligible for tax incentives and benefits granted by regional development superintendencies; among others (Lietz, 2013). In addition, the authors claim that managers are encouraged to engage in more aggressive tax planning in order to hit their targets and ensure their remuneration and success in analyzing their performance (Guenther et al., 2017; Khan et al., 2017; Kurnia et al., 2019).

The Publication of the Brazilian Federal Revenue (Receita Federal do Brasil - RFB) in the month of July 2021, states that Brazil has the highest tax burden in Latin America and one of the largest in the world, at about 32.45% of Gross Domestic Product (GNP) in 2019 and 31.58% of GNP in 2020 (RFB, 2021). This information suggests that companies established in Brazil are subject to a high tax burden, which has caused concern, thus stimulating the search for strategies and planning in order to find tools capable of mitigating this high tax burden (Araújo et al., 2018).

The literature suggests that market power is positively related to profitability, generating greater and more persistent results. profitability (Hou & Robinson, 2006; Irvine & Pontiff, 2009; Peress, 2010; Hodones & Sanvicente, 2020). On the other hand, companies with higher and more persistent results are those that can benefit most from tax aggressiveness. Thus, companies with greater market power have a greater incentive to engage in higher levels of tax aggressiveness. In addition to more incentives, the holders of market power are those who are in a more comfortable position to engage in higher levels of tax aggressiveness, since they have a natural hedge against adverse outcomes (Peress, 2010). In view of the above, this study proposes to answer the following question: Does market power have a positive influence on tax aggressiveness?

Kubick et al. (2015) investigated the relationship between market power and tax aggressiveness in a sample of US companies from 1993 to 2010. The authors presented results that demonstrate that market-leading companies with greater market power are more tax aggressive.

However, given the high tax burden (Araújo et al., 2018; Martinez et al., 2019) and the fact that the Brazilian market appears to be a code law legal environment, unlike in the USA, where the subject has already been studied by Kubick et al. (2015) and holds a common law structure, the Brazilian market can be an environment in which the results can take different directions from that found in the study by Kubick et al. (2015). In a code law structure, in which administrative punishment processes take years to unfold, company managers may behave more aggressively from a fiscal point of view in view of the perception of slowness in the punishment process. Thus, a contribution of this study is to bring empirical evidence not yet known by the national and international market on the behavior of market power and tax aggressiveness in a developing market with a code law legal structure (La Porta et al., 2013; Martinez, 2017).

Market power is measured through the abnormal operating margin, which measures the performance of the companies' main activity (Kubick et al., 2015). The metrics used to measure tax aggressiveness were: the Effective Tax Rate (ETR), as proposed by Hanlon and Heitzman (2010), the Book-Tax Differences (BTD) used by Frank et al. (2009) and the Value Added Tax Rate (VATR) suggested by (Martinez & Silva, 2018; Martinez & Motta, 2020).

Data collected from the financial statements of companies listed on the Stock Exchange: B3 were analyzed, from 2010 to 2019, through the Economatica® database and the Structured Reports of the companies on the website of the Securities and Exchange Commission (SEC).

To estimate the linear regression model and the quantile regression model, a sample of 1,367 observations was used in the estimation with ETR and BTD, and 749 observations in the estimation with VATR. The results found in this research indicate that there is a positive relationship between market power and tax aggressiveness in the Brazilian market.

This research sought to fill a gap in academic research, analyzed the relationship between market power and tax aggressiveness in a market located in a developing country, on which there is no empirical evidence on the market power of companies in the face of competition and its relationship with tax aggressiveness. Another goal of this research is given to the market in order to actively study, for the

national and international market, the performance of companies in relation to the competition, which can currently give new investments in the Brazilian market; a market with low competition, in comparison with a developed one, as is the case of the American market. Empirically, another contribution of this research is the use of TTVA, which provides insight into the main tax aggressiveness in all taxes, as well as the federal, state, and municipal levels, as related to the tax aggressiveness of companies. The results, in addition to contributing to future work in the academic community, can also help to understand the behavior of companies in Brazil, which are more competitive in the segment of the community in which they operate, which is important to be understood when making strategic decisions.

2 Theoretical Framework

2.1 Tax Aggressivity

This research is dedicated to the empirical study of tax aggressiveness and market power of companies that is a contemporary theme (Dyreg et al., 2008; Hanlon & Heitzman, 2010; Lietz, 2013; Eichner & Pethig, 2019; Cui, 2019; Lai, 2019; Garella & Trentinaglia, 2019; Yenipazarli, 2019; Yu et al., 2019; Morita, et al., 2020; Pian et al., 2020; Anand & Giraud-Carrier, 2020; Ahmadi & Ghezavati, 2020; Wu, 2021). In fact, Lietz (2013) conceptualized tax aggressiveness as explicit income tax reductions. It can be seen that in the definitions made by the authors, all are unanimous in stating that tax aggressiveness promotes tax reduction.

In his work, Lietz (2013) provides examples of actions that can be classified as aggressive practices, among them: investment in favored assets with tax reduction or exemption benefits; choosing a specific method of depreciation or amortization; the option to defer taxable income to future valuation periods; and participation in tax-relevant transfer pricing. However, it is observed that these practices move from “tax avoidance” to “tax evasion”, that is, from legality to illegality, as the practice of such actions are subject to the interpretation of the tax authorities as there is no legal framework clarity in the definition of what can be considered tax planning (Chen et al., 2010; Martinez, 2017).

Hanlon and Heitzman (2010) state that most tax planning strategies involve transactions that are considered legal, which can be anywhere along the continuum and depend on the aggressiveness of the transaction in reducing taxes.

Lanis and Richardson (2011) show that the development of actions to reduce taxes paid by corporations, through fiscal aggressiveness, which has become increasingly common in the organizational scope, all over the world. However, due to this reduction in the tax base, aggressive actions may come to be understood as illegal practices (Chen et al., 2010). However, this research work is based on the statement by Lisowsky et al. (2013), who report that tax aggressiveness does not lead to illegality, because the estimated measurement through metrics, which have been used in research projects, do not demonstrate the involvement of companies in tax evasion.

Tax aggressiveness arouses great interest in the corporate world, as it is undeniable that it has become indispensable for corporations in an attempt to reduce costs and make strategic decisions (Klassen et al., 2016; Martinez, 2017). Since there is a consensus in the literature that the high tax burden represents a significant cost for business, hinders competitiveness, reduces the results, and compromises business development (Guimarães et al., 2016; Klassen et al., 2016; Araújo & Leite Filho, 2018).

Brazil's tax burden, according to RFB (2021), was about 31.58% of GNP in 2020, which makes Brazil the largest tax burden in Latin America. This fact is considered an incentive to adopt tax planning practices (Tang, 2005; Guimarães et al., 2016). The purpose of which is to reduce taxes and the degree of tax aggressiveness will depend on the practices adopted, with regard to their legality and their level of intensity, generating a significant decrease in explicit taxes (Martinez, 2017).

Given this scenario, companies are encouraged to promote the management of the tax burden, in order to increase the return for shareholders, and reduce the political cost and risk of fiscal control (Tang, 2005; Guimarães et al., 2016). In addition to establishing a reference model to compensate managers after taxes and meet market requirements and perspectives, since the tax burden is a determining factor when pricing assets (Tang, 2005; Guimarães et al., 2016). However, it was found that the tax planning to which companies are subjected is related to the high tax burden (Chen et al., 2010; Hanlon & Heitzman, 2010; França et al., 2015; Kurnia et al., 2019).

In recent years, studies on tax aggressiveness have intensified and some of them have highlighted the characteristics of companies as determinants, namely: the delay in publication and the predisposition to redo the financial statements (Ramos & Martinez, 2018; Rodrigues & Martinez, 2018); financial constraints (Law & Mills, 2015; Martinez & Silva, 2018); and quality of the company's information environment (Gallemore & Labro, 2015). However, this study differs by examining how the market power of companies in relation to competitors in the same sector can affect the tax aggressiveness of firms (Kubick et al., 2015).

There is evidence in the literature that better company performance can be achieved by adopting efficient tax planning, because the smaller the amount of taxes paid, the greater the profit, which can be

distributed and/or reinvested by shareholders, and will result in share appreciation (Frank et al., 2009; Chen et al., 2010).

In Brazil, the tax savings obtained through tax planning is a subject much discussed in large companies (Martinez, 2017), becoming, increasingly, a determining factor in terms of competitiveness between companies at a global level (Araújo et al., 2018). In this way, this work contributes to this discussion, as it shows that, in the Brazilian market, the interaction between one of the most important indicators in the performance evaluation of the operational activity of companies, which is the abnormal operating margin, and tax aggressiveness.

2.2 Market Power and Tax Aggressivity

According to Gbegnin and Gürbüz (2014), a company's competitive advantage can be measured by the product's market power. The Brazilian banking sector is an example of a high concentration of market power, Hodones and Sanvicente (2020) state that, in Brazil, there is a great debate about the relationship between market power and high levels of bank profitability, since the Brazilian banking sector is an example of high concentration.

The market power held by some companies in certain sectors can generate higher and more persistent levels of profitability (Hou & Robinson, 2006; Irvine & Pontiff, 2009; Peress, 2010; Hodones & Sanvicente, 2020). According to the literature, companies with smoother and more persistent profits, such as companies with greater market power, are those that can benefit most from more aggressive tax planning (Mayberry et al., 2013).

In addition, companies with greater market power have a natural hedge against adverse results (Peress, 2010), which allows companies with greater market power to engage in riskier decision-making such as much more aggressive tax planning than companies with greater market power. There are also companies that do not have market power.

Kubick et al. (2015) investigated the relationship between the product market power of companies and their tax aggressiveness, showing that the product market power has a positive relationship with the tax aggressiveness of American companies. Thus, companies with greater market power present, on average, higher levels of tax aggressiveness. Therefore, an increase in a company's market power vis-à-vis its competitors may encourage a more aggressive tax planning practice.

Regarding the Brazilian market, it has peculiar characteristics, among them, a highly complex tax system (Martinez et al., 2019), one of the highest tax burdens in the world (Araújo, et al., 2018), highest amount of taxes and taxes in the world (Araújo et al., 2018), tax wars between states, and constant changes in legislation (Colombo, 2017). These characteristics tend to motivate companies to engage in more aggressive tax planning (Silva, 2016) in order to seek tax reductions. This tax planning may also be influenced by the market power held by the company (Kubick et al., 2015).

Given the complexity of the Brazilian tax system and its high tax burden, which can reduce the profitability of companies (Martinez et al., 2019), companies with greater market power can adopt more aggressive tax planning practices in the search for a reduction of taxes. Thus, we established the hypothesis of this research:

H - There is a positive relationship between market power and the tax aggressiveness of companies.

3 Research Methodology

The data for the research consists of all non-financial companies listed on the B3 Stock Exchange, from 2011 to 2019, contained in the Economatica® database and in the structured reports of the companies on the website of the Securities and Exchange Commission (SEC) for the Value Added Statement (VAS) data. The collected data were distributed in a panel format and transferred to the STATA® software for the necessary statistical treatments to meet the model proposed in this study.

3.1 Sample

Table 1 contains a summary of the criteria used to create the database. We started with 4,120 observations of companies listed on B3, from 2010 to 2019. We excluded the financial companies, the observations that were missing some variable necessary for the calculation of the proxies of abnormal ETR tax aggressiveness and abnormal BTM, later, we excluded the observations that were missing some variable necessary for the calculation of the market power proxy, and finally, we excluded the observations that were missing some variable necessary for the calculation of the model's control variables. In the end, there was a sample of 1,367 observations, from 2011 to 2019. The year 2010 does not appear in the final sample, because some variables used are lagged.

As the abnormal VATR tax aggressiveness proxy presented few observations, we chose to create a second sample to estimate the model that uses this proxy. We excluded the observations that were missing

any variable necessary for the calculation of the abnormal VATR tax aggressiveness proxy, which resulted in a sample of 749 observations, from 2011 to 2019.

Table 1
Sample

	Resultant Note No.	Note No. lost
Companies based on Economatica® (2010-2019)	4.120	
(-) Exclusion of financial companies	3.750	(370)
(-) Exclusion of observations with insufficient data to perform the calculation of tax aggressiveness measures (abnormal ETR and abnormal BTD).	2.487	(1.263)
(-) Exclusion of observations with insufficient data to perform the calculation of the product's market power measure.	2.300	(187)
(-) Exclusion of observations with insufficient data to perform the calculation of control variables.	1.367	(933)
Sample 1 (2011-2019)		1367
(-) Exclusion of observations with insufficient data to carry out the calculation of tax aggressiveness measures, abnormal VATR.	749	(618)
Sample 1 (2011-2019)		749

Source: Prepared by authors

3.2 Variables and Econometric Mode

3.2.1 Econometric Model

To test the hypothesis of this work, we used the regression model presented in Equation (1):

$$TAX\ AGG_{it} = \beta_0 + \beta_1 PM_{it} + \beta_K \sum_{k=2}^{10} Controls_{it} + \varepsilon_{it} \quad (1)$$

Where TAX AGG represents tax aggressiveness measured by the two proxies: abnormal ETR, BTD and VATR. PM represents market power which was measured by the company's operating margin adjusted by sector, MO_adjust. The β_1 coefficient responds to the hypothesis of this research by evaluating whether there is a positive relationship between market power and tax aggressiveness. This coefficient is expected to be statistically significant, and its expected sign varies according to the proxy used for tax aggressiveness.

3.2.2 Tax Aggressiveness

The measurement of tax aggressiveness will take place through the use of three proxies: abnormal ETR, BTB, and VATR. These metrics were used in this study to identify the relationship between market power and tax aggressiveness.

The effective tax rate (ETR) is often used in the literature as a proxy for tax aggressiveness (Mills et al., 2002; Shackelford & Shevlin, 2001; Minnick & Noga, 2010; Huseynov & Klam, 2012). The abnormal ETR (aETR_it) was measured by the difference between the ETR of company i in year t and the median ETR in the sector in year t. The ETR of company i in year t is measured by the ratio between the expense with Income Tax (IT) and Social Contribution on Profit (SCP) and the Profit Before Taxes (PBT), according to Hanlon and Heitzman (2010). According to Shackelford and Shevlin (2001) the ETR is an adequate measure for the effectiveness of tax planning, because, if it is effective, it will imply a lower ETR. Thus, the lower the abnormal ETR, the greater the aggressiveness of the company in its tax planning.

Book-Tax Differences (BTD) is frequently found in the accounting literature as a proxy for measuring tax aggressiveness (Frank et al., 2009; Formigoni et al., 2009; Hanlon & Heitzman, 2010; Chen et al., 2010; Dhaliwal et al., 2011; Lietz, 2013; Martinez & Ramalho, 2014; Araújo et al., 2018; Shin & Park, 2019; Martinez & Motta, 2020).

The abnormal BTD (aBTD_it) was measured by the difference between the BTD of company i in year t and the median BTD of the sector in year t. Company i's BTD in year t was measured by the difference between PBT and Real Profit, divided by the company's total assets in the previous year. Where the Real Profit calculated by dividing the Provision for Income Taxes (IT and SCP) by the rate of 34%, according to Ferreira et al. (2012). It should be noted that the calculation of the Actual Profit is an approximation, given that this information is not included in the accounting reports. The higher the abnormal BTD, the more aggressive the company is in its tax planning policy.

The Value Added Tax Rate (VATR) is a genuinely Brazilian metric that was also used in this study, unlike the other metrics that propose to measure tax aggressiveness in taxes levied on income, for this, most of the data from the Statement of Income for the Year (SIY) and the Statement of Cash Flows (SCF). The VATR proposes to measure the tax aggressiveness in all taxes, at the federal, state, and municipal levels, and for that, data from the Value Added Statement (VAS) were used. With VATR, tax aggressiveness can be measured across the entire tax burden borne by companies.

Abnormal ATT (aVATR_it) was measured by the difference between the VATR of company *i* in year *t* and the median VATR of the sector in year *t*, where the ATTTT of company *i* in year *t* is measured by the total tax burden of the VAS divided by the Total Value Added a To distribute. The lower the abnormal VATR, the more tax aggressive the company.

3.2.3 Market Power

For Gbegnin and Gürbüz (2014), operating margin is an important measure of profitability in measuring market power, as it measures the efficiency of the company's core business. The abnormal operating margin represents the firm's market power against its competitors and also indicates how competitive the firm is in relation to the sector in which it operates (Kubick et al., 2015).

Following Peress (2010), market power was measured by the company's operating margin, adjusted by the sector (MO_adjust). MO_adjust_it was calculated as the difference between the operating margin of company *i* in year *t* and the weighted average (by the percentage of the company's Net Operating Revenue in relation to the total Net Operating Revenue of the sector) of the operating margin of companies in the same sector in year *t*. Operating margin was obtained by dividing operating income (net operating income minus cost of goods sold minus operating expenses) by net operating income.

According to Kubick et al. (2015), companies with higher sector-adjusted operating margins have greater market power, since these companies do not operate in a purely competitive market, where economic profits are zero and prices are driven at marginal cost.

3.2.4 Control Variables

The Herfindahl-Hirschman Index (HHI) is a measure of market concentration that captures the differences between sectors in market competition (Kubick et al., 2015). In the work of Shin and Park (2019) and Silva (2019), the authors found a negative association between market leadership and fiscal aggressiveness, when they measured market leadership with HHI. In this work, this proxy was used as a control and its calculation was made by the sum of the squares of the ratio between the company's net operating revenue and the total net operating revenue of the sector in which the company is inserted.

Return On Assets (ROA) is a profitability indicator that has become a proxy widely used by researchers who study tax planning, so we used ROA as a control variable, calculated by the ratio between pre-tax earnings and total assets. from the previous year (Khan et al., 2017; Kubick et al., 2015; Martinez & Silva, 2018).

Concerning discretionary accruals before performance taxes (ACC), these have been used in research as a metric to measure the aggressiveness of financial reports (Frank et al., 2009; Kubick et al., 2015). In this paper, the variable ACC was used as a control and for its calculation using the modified Jones model (Dechow et al., 1995).

Company size (TAM) has not been a consensus among researchers about its influence on tax planning capacity, however, several authors consider company size as an adequate metric for studies inherent to tax aggressiveness (Chen et al., 2010; Ayers et al., 2011; Kubick et al., 2015; Khan et al., 2017; Martinez & Silva, 2018; Araújo et al., 2018). In this work, the SIZE variable was used as a control and, for its measurement, the natural logarithm of total assets was used.

With regard to leverage (LEV), it is a control variable that seeks to reduce the tax burden with tax incentives for the deduction of interest on debt with third parties, in the expectation of increasing the company's profitability. Research has already used leverage as a control variable (Chen et al., 2010; Dhaliwal et al., 2011; Khan et al., 2017; Kubick et al., 2015; Martinez & Silva, 2018; Araújo et al., 2018). In turn, profitability is the result of the combination of liquidity, indebtedness over operating results and asset management. Therefore, the measurement of the LEV variable is made by dividing the long-term debt by the previous year's total assets.

With regard to free cash flow (FCF), it can be said that companies with high levels of cash may be encouraged to engage in tax aggressiveness (Dhaliwal et al., 2011). Research has found a negative association between a company's cash flow and tax aggressiveness (Dhaliwal et al., 2011; Kubick et al., 2015). In this work, the FCF proxy was used as a control and for its calculation we divided the free cash flow by the total assets of the previous year.

Equity equivalence (EQINC), when recognized in the accounting writing of companies, can impact on their profitability, and in turn, on tax aggressiveness. Previous research found a negative association between equity and fiscal aggressiveness when using this proxy as a control (Chen et al., 2010; Kubick et

al., 2015). In this work, this proxy was used as a control variable and its calculation was obtained with the division between the equity income and the total assets of the previous year.

The intangible (INTAN) has been used as a control in studies dedicated to tax aggressiveness (Chen et al., 2010; Dyreng et al., 2008; Kubick et al., 2015; Martinez & Silva, 2018; Martinez & Motta, 2020), since the investments that companies make in intangible assets can promote a reduction in tax expenditures due to the benefits that the tax rule grants. Thus, both the deductibility of normal amortization charges and the accelerated amortization of intangible assets can reduce tax costs and impact tax aggressiveness. This study used the intangible asset as a control variable, measured by the ratio between the intangible asset and the total assets of the previous year.

Regarding the intensity of fixed capital (PPE), it is possible to say that companies, by investing in Fixed Assets, can impact the amount of taxes to be collected and, consequently, the operating margin. According to Chen et al. (2010), the increase in investment in depreciable assets causes a reduction in tax costs, and thus, the aggressiveness will be greater. The degree of immobilization is negatively related to the metrics of tax aggressiveness, since the benefits that the tax legislation grants allow depreciation to be deducted (Guimarães et al., 2016). To this end, the measurement of the PPE variable is calculated, taking the fixed assets and dividing by the total assets of the previous year.

With regard to market value (MB), research has shown that tax planning increases the value of a company, by reducing the tax burden and increasing profitability, which enhances performance. Given this context, and mirroring previous research that used the firm's market value as a metric for the possibility of growth of companies with tax aggressiveness (Frank et al., 2009; Chen et al., 2010; Martinez & Ramalho, 2014; Araújo et al., 2018; Martinez & Silva, 2018; Martinez et al., 2019; Martinez & Motta, 2020), this research used market value as a control variable. To calculate this variable, the company's market value is divided by its equity.

4 Data Analysis

4.1 Descriptive Statistics

The descriptive statistics of the variables used in this study, from 2011 to 2019, are shown in Table 2. All variables were winsorized at 1% in both tails. Regarding the average of the aBTD variable, the information contained in Table 2 suggests that the companies surveyed have been presenting, on average, a BTD below the median BTD of their sector. This indicates that the companies in this sample are taxingly less aggressive than the median tax aggressiveness of their industry, on average. However, the median of the aBTD variable is positive, which indicates that in 50% of the analyzed cases the companies presented a BTD above the median BTD of their sector. This difference between the median and the mean of the aBTD variable may be due to extreme positive values, even after the variable has been winsorized.

Regarding the aVATR variable, its positive mean indicates that the companies in this sample have an ATTW above the sector median, on average. This suggests that companies in this sample are less tax aggressive than the median aggressiveness of their sector, on average (Table 2).

Table 2

Descriptive statistics

	N	Min	Q1	Mean	Median	SD	Q3	Max
<i>aETR</i>	1367	-3.136	-0.137	-0.016	0	0.560	0.109	2.688
<i>aBTD</i>	1367	-0.575	-0.045	-0.018	0.001	0.111	0.032	0.249
<i>aVATR</i>	749	-0.295	-0.081	0.033	0.001	0.216	0.094	1.274
<i>MO_ajust</i>	1367	-7.437	-0.133	0.178	-0.022	3.392	0.066	31.777
<i>HHI</i>	1367	0.043	0.057	0.192	0.113	0.183	0.258	0.784
<i>ROA</i>	1367	-0.548	-0.026	0.022	0.038	0.132	0.094	0.38
<i>ACC</i>	1367	-0.394	-0.02	0.033	0.038	0.133	0.093	0.5
<i>TAM</i>	1367	10.218	13.933	15.12	15.258	1.726	16.229	19.092
<i>EQINC</i>	1367	-0.028	0	0.002	0	0.01	0	0.062
<i>INTANG</i>	1367	0	0.003	0.118	0.025	0.182	0.164	0.806
<i>PPE</i>	1367	0	0.017	0.228	0.192	0.22	0.36	0.877
<i>MTB</i>	1367	-24.356	0.208	4.758	0.61	25.374	1.455	216.135
<i>LEV</i>	1367	0.008	0.177	0.407	0.325	0.477	0.476	3.905
<i>FCF</i>	1367	-0.323	-0.025	0.015	0.019	0.087	0.06	0.246

Source: Prepared by the authors.

However, from the point of view of abnormal ETR, companies have a lower ETR than the median ETR of their sector, on average. Since the mean of the variable aETR is negative. On average, companies are more aggressive than the industry median aggressiveness. However, looking at the median of the aETR variable, we see that half of the companies in the sample had a positive aETR. Therefore, half of the companies presented ETR above the median ETR of their sector. The difference between the mean and the median of the variable aETR may be due to negative extreme values.

Regarding market power, MO_adjust, its positive average indicates that the companies in this sample have an operating margin above the weighted average of their sector, with an average difference of 17.8%. The maximum value of the variable MO_adjust of 31.77 (3177%) shows that some companies have high levels of market power in this sample (Table 2).

Table 3 contains the average of the main variables (aETR, aBTD, aVATR, MO_adjust) per year. According to the information presented, we see that the amount of observations per year is well distributed. The means of the aBTD and aVATR tax aggressiveness proxies do not seem to vary much over the years, in which the mean of the aBTD variable is always negative and the mean of the aVATR variable is always positive, which suggests that companies, on average, have levels of tax aggressiveness lower than the median of their respective sectors.

The average of the aETR tax aggressiveness proxy varies in sign over the years, indicating that, on average, the companies in this sample were more tax aggressive than the median of their sector in the years 2011, 2012, 2017, 2018 and 2019. This may be due to the influence of extreme negative values, as in the sample mean of the aETR seen in Table 2.

The variable MO_adjust, presents a positive average until the year 2017, and becomes negative in the following years, that is, from 2018 onwards, companies presented an operating margin lower than the average operating margin of the sector, on average. This indicates that market power has declined after 2017.

Table 3

Descriptive statistics by year

Year	aETR		aBTD		aVATR		MO_adjust	
	N	Mean	N	Mean	N	Mean	N	Mean
2011	144	-0.047	144	-0.013	79	0.027	144	0.157
2012	151	-0.039	151	-0.014	84	0.021	151	0.451
2013	155	0.006	155	-0.019	86	0.04	155	0.258
2014	154	0.048	154	-0.017	85	0.019	154	0.088
2015	151	0.026	151	-0.025	82	0.02	151	0.107
2016	148	0.044	148	-0.012	81	0.012	148	0.364
2017	152	-0.075	152	-0.02	85	0.041	152	0.246
2018	152	-0.038	152	-0.027	83	0.073	152	-0.036
2019	160	-0.064	160	-0.019	84	0.044	160	-0.021

Source: Prepared by the authors.

In Table 4 we have information on the number of observations and the averages of the main variables by sector. We can see that in sample 1 there is a predominance of the electric energy, construction, and other sectors. In sample 2, with the loss of observations due to the lack of information for the calculation of the variable aVATR, sectors were also lost completely, such as the construction and electric energy sectors, which are the majority in sample 1.

According to the average of the aBTD variable, companies in the food and beverage, electric energy, industrial machinery, chemical, and software and data sectors have a BTD above the average BTD of the sector, which indicates greater tax aggressiveness in these sectors. The average of the variable aVATR indicates a greater tax aggressiveness in the sectors of software and data, transport and services, and vehicles and parts, where it presented a negative average.

As for the market power proxy, MO_adjust, we observed that its average is positive in the commerce, electronics, electric energy, chemical, and software and data sectors, which indicates greater market power in these sectors.

Pearson's correlation between the model variables was estimated. The variable MO_adjust showed a positive correlation, statistically different from zero, with the variable aBTD and a positive correlation, statistically different from zero, with the variable aVATR. This suggests that companies with greater market power have higher levels of tax aggressiveness. In addition, no strong correlation was observed between the independent variables of the model that would indicate any problem with collinearity.

Table 4
Descriptive statistics by sector

Sector	aETR		aBTD		aVATR		MO_ajust	
	N	Mean	N	Mean	N	Mean	N	Mean
<i>Agro and Fishing</i>	17	0.112	17	-0.023	17	0.029	17	-0.235
<i>Food and baby</i>	75	0.068	75	0.009	75	0.057	75	-0.007
<i>Business</i>	72	-0.005	72	-0.009	71	0.045	72	0.005
<i>Construction</i>	134	-0.029	134	-0.023	0		134	-0.196
<i>Electronics</i>	8	-0.050	8	-0.14	8	0.123	8	2.837
<i>Electricity</i>	208	-0.030	208	0.005	0		208	0.044
<i>Non met minerals</i>	9	-0.472	9	-0.047	0		9	-0.072
<i>Mining</i>	4	0.255	4	-0.139	0		4	-2.189
<i>Indust machines</i>	11	0.272	11	0.043	11	0.025	11	-0.008
<i>Others</i>	323	0.025	323	-0.018	311	0.057	323	0.881
<i>Paper And Cellulose</i>	17	-0.111	17	-0.007	0		17	-0.113
<i>Oil and Gas</i>	40	-0.057	40	-0.089	0		40	-0.313
<i>Chemistry</i>	41	-0.099	41	0.002	0		41	0.043
<i>Siderur & Metalur</i>	98	-0.097	98	-0.039	0		98	-0.007
<i>Software and Data</i>	25	-0.087	25	0.006	18	-0.03	25	2.385
<i>Telecommunications</i>	28	-0.006	28	-0.007	0		28	-0.878
<i>Textile</i>	95	-0.010	95	-0.018	95	0.014	95	-0.021
<i>Transport and Services</i>	59	-0.047	59	-0.021	40	-0.015	59	-0.025
<i>Vehicles and Parts</i>	103	-0.015	103	-0.046	103	-0.021	103	-0.503

Source: Prepared by the authors.

4.2 Results

To estimate the model presented in equation 1, a linear regression model with robust errors and a quantile regression model with robust errors were used, the latter being estimated with non-winsorized variables. The results of the estimations are presented in Table 5. Columns 1 and 2 present the results of the estimated model using aETR as a proxy for tax aggressiveness, columns 3 and 4 present the results of the estimated model using aBTD, and columns 5 and 6 present the results of the estimated model using aVATR as a proxy for tax aggressiveness.

According to the results shown in Table 5, columns 1 and 2, the estimated coefficients of the variable MO_adjust were not statistically significant. This indicates that MO_adjust has no association with aETR. Therefore, we have no evidence that market power influences the abnormal percentage of IT and SCP expenses in relation to total profit before taxes, in relation to the sector's median percentage. An explanation for the lack of significance may be the poor specification of the model, as we see that both R² and Pseudo R², in columns 1 and 2 of Table 5, are very low at 2.98% and 1.47%, respectively. This indicates that this model explains very little of the abnormal ETR variation.

According to the results shown in Table 5, columns 3 and 4, the estimated coefficients of the variable MO_adjust were positive and statistically significant at 1%. It indicates that higher levels of MO_adjust are associated with higher levels of the aBTD variable, which means that the greater the market power, the more tax aggressive the company is, on average and median. Furthermore, according to the estimated coefficient of the variable HHI, when aBTD was used as a proxy for tax aggressiveness, it presented a positive and statistically significant sign at 10% and 1% in columns 3 and 4, respectively, which indicates that, differently from what was found by Kubick et al. (2015), in the Brazilian market, the relationship between market power and tax aggressiveness does not only occur at the company level, but also at the sector level.

The result presented in column 5 of table 5 shows that the coefficient of the variable MO_adjust is negative and statistically significant at 1%. It indicates that higher levels of MO_adjust are associated with lower levels of aVATR, on average. Which means that the greater the market power, the more tax aggressive the company, on average.

Table 5
Results

Dependent Variable: Model:	(1)		(2)		(3)		(4)		(5)		(6)	
	<i>aETR</i>		<i>aETR</i>		<i>aBTD</i>		<i>aBTD</i>		<i>aTTVA</i>		<i>aTTVA</i>	
	Linear Regression		Quantile Regression		Linear Regression		Quantile Regression		Linear Regression		Quantile Regression	
	Coef.	Estat. t	Coef.	Estat. t	Coef.	Estat. T	Coef.	Estat. t	Coef.	Estat. t	Coef.	Estat. t
<i>MO_ajust</i>	-0.002	(-1.40)	0.000	(-1.07)	0.001	(3.82)***	0.00008	(3.03)***	-0.002	(-4.21)***	-0.00015	(-1.17)
<i>HHI</i>	0.006	(0.06)	-0.029	(-1.25)	0.015	(1.67)*	0.024	(3.82)***	-0.041	(-0.72)	0.015	(0.34)
<i>ROA</i>	0.290	(2.82)**	0.149	(5.43)***	0.739	(40.16)***	0.841	(113.09)***	-0.299	(-2.85)***	-0.011	(-0.16)
<i>ACC</i>	0.003	(0.03)	0.006	(0.24)	0.042	(2.63)***	0.043	(6.41)***	-0.183	(-1.98)**	-0.06	(-1.08)
<i>TAM_(t-1)</i>	-0.010	(-1.00)	0.011	(4.20)***	0.004	(5.23)***	0.001	(0.92)***	-0.027	(-4.95)***	-0.014	(-3.43)***
<i>EQINC</i>	-1.993	(-1.41)	-1.337	(-9.05)***	0.065	(0.47)	0.047	(1.17)	-0.914	(-1.63)	-0.832	(-1.91)*
<i>INTANG</i>	0.220	(2.48)**	0.095	(4.04)***	-0.027	(-3.55)***	-0.019	(-2.91)***	-0.003	(-0.07)	0.029	(0.77)
<i>PPE</i>	-0.014	(-0.32)	0.018	-0.93	0.006	(1.22)	0.012	(2.17)**	0.008	(0.21)	0.049	(1.44)
<i>MB_(t-1)</i>	-0.00049	(-1.01)	5.04E-08	-0.96	-2E-05	(-0.89)	-1E-08	(-0.85)	0.0002	(0.26)	-0.00005	(-0.69)
<i>LEV</i>	-0.080	(-1.61)	-0.020	(-11.86)***	-0.013	(-3.67)***	-0.0005	(-1.11)	-0.111	(-3.29)***	-0.061	(-3.52)***
<i>FCF</i>	0.184	(1.14)	-0.115	(-3.99)***	-0.058	(-3.02)***	0.002	(0.29)	-0.044	(-0.40)	0.102	(1.41)
Year Fixed Effect	Yes		Yes		Yes		Yes		Yes		Yes	
N	1.367		1.367		1.367		1.367		749		749	
R2	2.98%		-		85.4%		-		13.58%		-	
Pseudo-R2	-		1.47%		-		62.59%		-		4.12%	

Source: Prepared by the author.

Notes: The asterisks ***, ** and * represent significance at the 1%, 5% and 10% levels respectively.

The coefficient of the variable *MO_adjust* did not show statistical significance when the Quantile Regression model was estimated with the dependent variable *aVATR*.

Therefore, according to the results presented here, we can conclude that the greater the company's market power, the more aggressive its tax planning is, which is in line with the finding in the work by Kubick et al. (2015).

The results found in relation to the variable *ACC* in Table 5 are in agreement with the literature (Frank et al., 2009; Ferreira et al., 2012; Kubick et al., 2015). In the results of columns 1 and 2, using the *aBTD* variable as a proxy for tax aggressiveness, the estimated coefficient of the *ACC* variable was positive and statistically significant at 1% (Table 5). In column 3, using the variable *aVATR* as a proxy for tax aggressiveness, the estimated coefficient of the variable *ACC* was negative and statistically significant at 5%. These results indicate that higher levels of earnings management are related to higher levels of tax aggressiveness, on average and median (Table 5). Estimation 4 does not find a statistically significant relationship and this result may have occurred due to the loss in the number of observations, including the most tax-aggressive sectors.

The estimated coefficient of the variable *ROA*, presented in columns 1 and 2, was positive and statistically significant at 1% (Table 5). In column 3, using the variable *aVATR* as a proxy for tax aggressiveness, the coefficient of the variable *ROA* was negative and statistically significant at 1% (Table 5). The results are consistent in pointing out that companies with better performances are related to higher levels of tax aggressiveness, on average and median. In addition, the results shown in table 6 suggest that larger companies, with a lower percentage of intangibles, greater leverage, and lower cash flow are related to higher levels of tax aggressiveness, on average and median.

5 Final Considerations

This study aimed to investigate whether companies with greater market power have more aggressive tax planning. To achieve this objective, we tested the hypothesis that there is a positive relationship between market power and tax aggressiveness. To test this, two samples were used that contained non-financial companies listed on B3, from 2011 to 2019. For the test using the variables *aETR* and *aBTD* as proxies of tax aggressiveness, the final sample contains 1,367 company observations /year. For the test using the *aVATR* variable as a proxy for tax aggressiveness, a smaller sample of 749 company/year observations that are characteristic of companies was used, due to the lack of information for calculating the *aVATR* proxy.

According to Shepherd (1970), companies with greater market power can determine their prices and the quality of their products. Thus, companies with greater market power find themselves in a competitive position, with smooth and consistent profits (Hou & Robinson, 2006; Irvine & Pontiff, 2009; Peress 2010) and are far from competitive threats, which allow them to take risks additional (Hoberg et al., 2014; MacKay & Phillips, 2005). Thus, we found evidence that companies with greater market power are more aggressive in their tax planning.

Using a multiple linear regression model and a quantile regression model, we tested the relationship between market power (*MO_adjust*) and tax aggressiveness (*aETR*, *aBTD*, *aVATR*). According to the hypothesis of this research, a positive sign is expected for the variable *MO_adjust* when using the dependent variable *aBTD*, since the higher *aBTD*, the more aggressive the company is in terms of taxation compared to the industry average. When using the variables *aETR* and *aVATR* as dependent variables, the expected sign was negative, since the lower the *aETR* and *aVATR*, the more taxingly aggressive the company.

The results found were consistent in indicating that the greater the company's market power, the more aggressive its tax planning is, compared to the industry median. In addition, the results indicate that not only the market power of the company, but also of the sector, positively affects the tax aggressiveness of the company, which indicates that companies inserted in sectors with greater market concentration (HHI) are more aggressive in their tax planning.

Limitations of this study include the limited number of companies and sectors in the Brazilian market, the limited amount of information on the added value of companies, possible deficiencies in the metrics used, and poor specification of the model when using *aETR* as a proxy for tax aggressiveness. As a suggestion for future research, the use of different metrics for fiscal aggressiveness and market power, as well as other estimation models, is presented. It is also recommended that, in future research, it is verified if the market power affects the risk of the companies, the occurrence of environmental accidents, the indicators that involve ESG (Environmental, Social and Governance).

This study seeks to contribute to the literature by presenting evidence in the Brazilian market of the relationship between the market power of companies and tax aggressiveness in a developing country with a legal code law culture, and thus fills the gap left by previous research. Next, it examines how market power affects tax aggressiveness and shows that, even in a developing country with a legal code law culture, the results are in the same direction as previous studies. These results can contribute to both public managers and new investors since there was still no empirical evidence in this direction in the Brazilian market.

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AUTHORSHIP CONTRIBUTION

Conception and elaboration of the manuscript: A. Teixeira, J. Valdir, S. N. Nossa

Data Collection: J. Valdir, N. C. Moreira, S. N. Nossa

Data analysis: N. C. Moreira

Discussion of results: J. Valdir, N. C. Moreira

Review and approval: A. Teixeira

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