

Tax Aggressiveness and Accounting and Financial Irregularities in Brazil

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Received 15 July 2020

Accepted 23 November 2020

ABSTRACT

This paper aimed to analyse whether tax aggressiveness increases the Company probability to incur in accounting and financial irregularities. It was used as a quantitative and descriptive methodology. To measure the aggressiveness level, it used General and Current Effective Tax Rate (ETR) and to estimate the results, Logit Regression. The population of this research were the Companies with shares on Stock Exchanges. The sample was the Brazilian Companies listed on B3 during the period 1999-2017, which corresponded to 4332 observations. It was divided into two groups: one for treatment, and another for control. In the first one, some Companies committed irregularities which were object of an Administrative Processes Judged by the Security and Exchange Commission (SEC); the second, comprising the Companies that did not commit irregularities. The Companies data were taken from Economatica. The results showed evidence that the lower the tax aggressiveness, the less likely it is to committing irregularities. In other words, the more aggressive the company, the more likely it is to commit irregularities. Additionally, for the surveyed sample, the financial irregularities are influenced most by tax aggressiveness.

Keywords: Tax Aggressiveness, Accounting and Financial Irregularities, Administrative Prosecutions Judged by the CVM

Introduction

Since the revelations of accounting fraud and aggressive tax incentives to Enron in 2001, regulators, academics and journalists investigated reports of increased aggressiveness in financial and tax statements, throughout the American corporate environment (Frank, Lynch & Rego, 2009). Balakrishnan, Blouin and Guay (2019), present in their research that the financial statements can be compromised when the company practices tax aggressiveness. In the international literature, studies that include Dechow, Sloan and Sweeney (1996) indicate that the intention of obtaining low-cost financing represents a predisposition for companies to manipulate profits. Phillips, Pincus and Rego (2003) and (Frank et al., 2009) conclude that the aggressiveness in the financial statements has a

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Doi: 10.32038/NCAF.2021.05.04

positive relationship with the tax aggressiveness, which suggests that companies start to manage the accounting profit upwards simultaneously and the taxable profit downwards.

Tax aggressiveness can be defined as decreasing taxable income management, based on tax planning actions (Chen, Chen, Cheng & Shevlin, 2010). The focus of inspection by the Federal Revenue Service in 2014, was based on the identification of aggressive tax planning at all business levels (Barreto, 2013). In this scenario, Brazil's participation with the Organization for Economic Cooperation and Development stands out (OCDE), committed to implementing the action plan to combat abusive tax planning (Receita Federal, 2018).

In this line, Ramos and Martinez (2017) indicate that tax aggressiveness impacts the presentation of the financial statements of Brazilian companies listed on B3. In this context, we have the following research problem: are tax-aggressive companies more likely to commit accounting and financial irregularities? This research aims to analyse whether tax aggressiveness increases the likelihood that a company will commit accounting and financial irregularities. Additionally, it is intended to verify which types of irregularities are influenced by tax aggressiveness.

Dantas, Chaves, Silva and Carvalho (2011) and Ramos and Martinez (2017), identified the most recurring accounting improprieties, contained in the deliberations to redo the financial statements issued by the Brazilian Securities and Exchange Commission (CVM - *Comissão de Valores Mobiliários*): Goodwill Recognition, Asset Valuation Criterion, Recognition of Contingent Assets, Recognition and Classification of Financial Instruments, Classification of Concession Contracts, Errors and Changes in Estimates, Presentation of Financial Statements, Recognition of Passive Contingencies and Disclosure in Explanatory Notes.

Considering that authors such as Lennox, Lisowsky, and Pittman (2013) and Hashim, Ariffa, and Mohamad (2016), emphasise the importance of examining the relationship between tax aggressiveness and fraudulent financial reporting, this study is justified by not being found in the Brazilian literature, research that pointed to empirical evidence of the relationship between tax aggressiveness and accounting and financial irregularities.

This study intends to contribute to the existing literature, indicating the tax aggressiveness related to the probability that the companies listed in B3 are committing accounting and financial irregularities. These results may serve as a reference for regulatory bodies to control and/or eliminate corporate misconduct; for investors, reducing their exposure to risks arising from tax aggressiveness (Frank et al., 2009), and still improving the quality of information for their decision making, by pointing out the types of irregularities that are suggestive of tax aggressiveness (General ETR and Current ETR).

In the international literature, studies have examined accounting irregularities to detect systematic manipulation behaviour (Henselmann, Ditter & Scherr, 2015). Hennes, Leone and Miller (2008), demonstrate the importance of separating errors and accounting irregularities, based on the causes and consequences of the financial statements' reformulations over time.

The survey results showed evidence that the lower the tax aggressiveness, the lower the probability of committing irregularities; in other words, the more aggressive the company, the more likely it is to commit irregularities. Additionally, we found that, for the sample surveyed, financial irregularities are the most influenced by tax aggressiveness.

The research structure was organised as follows: In the first section, we have the study introduction. The second section provides a theoretical basis for the research. The third section is composed of the population, sample, variables: dependent, independent and control. In the fourth and last section, data analysis and research results are presented, culminating in the conclusion, exposure of work limitations, if any, in addition to proposals for future research.

Theoretical framework

Accounting and financial irregularities

Henselmann et al. (2015), examined irregularities in accounting numbers to detect systematic manipulation behaviour. Xu, Najand and Ziegenfuss (2006), used the Government Accountability Office (GAO), to define accounting irregularities, as a case, in which a company restates its financial statements because these have not been presented in accordance with the Generally Accepted Accounting Principles (GAAP).

Armstrong, Jagolinzer and Larcker (2010), report on the difficulty of constructing an appropriate empirical measure for the incidence of accounting manipulation, to reduce this risk of misclassification, three different types of accounting irregularities were considered, the first is the financial correction related to accounting manipulation; the second refers to cases in which the company was accused of accounting manipulation in a class action, and the third if the company was accused of accounting manipulation in an Accounting and Auditing Enforcement Releases (AAER) of the Securities and Exchange Commission (SEC).

In this context, Hennes et al. (2008), propose a simple procedure to distinguish errors from irregularities, where three criteria are used to identify possible irregularities. The first classifies any reformulations using variants of the word fraud or irregularity, in reference to the distortion as irregularities. As a second criterion, reformulations with investigations related to the SEC or the Department of Justice (DOJ) are classified as irregularities, and finally, the presence or absence of other investigations in the accounting subject is considered. Price, Sharp and Wood (2011) compared the Accounting and Governance Risk measures (AGR) and Accounting Risk (AR), with academic risk measures, in order to determine which measure has the greatest capacity to detect and predict accounting irregularities. In this line, Lennox et al. (2013), examined the evidence of tax aggressiveness on a sample universe, in the specific context of accounting fraud committed by US public companies, where, in addition to previous evidence, the other reason to analyse that question, is whether companies that commit financial fraud are more or less aggressive in taxation. Conceptually, aggressive financial reports are defined, such as earnings management, which may or may not be within the limits of the Generally Accepted Accounting Principles (GAAP) and aggressive tax reporting, as handling taxable profit down, which may or may not be considered tax fraud (Frank et al., 2009).

There may be benefits for financial fraud that motivate managers to engage in such actions, as in cases of better performance disclosure or increase in compensation, however, financial fraud harms investors, and mainly those who have company shares for long periods (Shi, Connelly & Hoskisson, 2017).

In the United States, the SEC issues the AAER, which indicates the processes associated with accounting misconduct, and the impact on the financial statements, while in China, the

China Stock Market and Accounting Research Database (CSMAR) brings the processes related to the acquisition of illegal shares, manipulation of share prices, fraud in financial statements, among other irregularities (Borges & Andrade, 2017).

The Brazilian Securities and Exchange Commission (CVM - *Comissão de Valores Mobiliários*) can impose violations of the Brazilian Corporate Law (Law nº 6.404/76), of the other resolutions and other legal norms, the penalties outlined in its Art. 11, among which stand out: Warnings, Fines, Suspensions, Disqualifications, Nullification and Prohibitions. CVM, through its Circular Letters, shares the understanding of the technical areas listed above, regarding the adequate representation of the companies' financial statements, basing its topics on deviations identified by this body (CVM, 2018).

In a recent study, (Borges & Andrade, 2017) analysed the typology of CVM sanctioning administrative processes, from 1989 to 2016, where the following irregularities were identified as Table 1:

Table 1. Types of prosecutions by CVM

<i>Types of proceedings by CVM</i>
Abuse of control power
Embarrassment to CVM inspection
Privileged information
Irregularities with shareholders
Irregularities involving auditing
Irregularities in the financial statements/Accounting
Irregularities in the securities financial market
Operational irregularities
Failure to fulfill due diligence and loyalty
Failure to maintain updated publicly-held company registration
Failure to hold the Annual General Meeting (AGM)
Obtaining undue advantage/conflict of interest
Concealment of information / incomplete or incorrect information/non-disclosure or delay in disclosing a material fact
Fraudulent operation
Unfair practices

Source: Adapted from (Borges & Andrade, 2017).

For this study, we considered the information contained in the Administrative Proceedings Report Judged by CVM, corresponding to the period from 1999 to 2017, obtained through Law No. 12,527/2011 (regulates access to public information) with the Coordination of Control of Administrative Proceedings (CAP), enabling the analysis of the database made up of 1,122 Sanctioning Administrative Proceedings (Prosecuted).

Accordingly, irregularities were classified according to the nature of the matters and menus of each Administrative Proceeding Judged in the CVM Report, even considering the cases in which the same process has more than one irregularity, thus, divided into Accounting Irregularities, Financial Irregularities and Other types of Irregularities. It should be noted that for this analysis, only the irregularities committed by companies listed in B3 were used, as shown in the table 2:

Table 2. Distribution of Irregularities by period

<i>Year of Irregularity</i>	<i>Number of Accounting Irregularities</i>	<i>Number of Financial Irregularities</i>	<i>Number of other types of irregularities</i>	<i>Relative Frequency</i>
1999	2	7	2	2.47%
2000	5	17	4	5.83%
2001	1	2	4	1.57%
2002	2	4	4	2.24%
2003	1	7	1	2.02%
2004	1	6	5	2.69%
2005	13	10	13	8.07%
2006	11	30	4	10.09%
2007	3	15	1	4.26%
2008	5	30	4	8.74%
2009	9	16	0	5.61%
2010	7	35	0	9.42%
2011	5	34	7	10.31%
2012	7	17	7	6.95%
2013	5	12	8	5.61%
2014	4	18	3	5.61%
2015	5	7	6	4.04%
2016	9	4	2	3.36%
2017	1	3	1	1.12%
Total	96	274	76	100.00%

Source: Research data. Author's own elaboration

Tax aggressiveness and accounting and financial irregularities

The increase in tax evasion is characterised by the US Department of the Treasury, which can be the most serious legal compliance issue, which threatens the American tax system. Such assessments typically point to aggregate measures of tax evasion, including the growing difference between revenue reported to tax authorities and the capital markets, drop in effective rates on public financial statements and the growing participation of companies without tax obligations (Desai & Dharmapala, 2004).

Tax aggressiveness can be defined as decreasing taxable income management, based on tax planning actions, where it encompasses legal activities, those framed in the gray area, that is, partially defined, as well as illegal activities (Chen et al., 2010). In this line, Blouin (2014) provides that tax aggressiveness is used to contextualise the level of tax planning in a company, where the definitions already published do not make it clear, the moment when legal tax planning becomes aggressive.

While there may be many definitions of corporate tax aggressiveness, the practical definition, used in the corporate environment, it is generally based on the degree of fiscal risk that a corporation believes it is absorbing, where the two main components are: technical tax risk and reputation risk, considering that, historically, corporations were concerned about the challenges that a fiscal position could result in paying taxes, interest and penalties in the audit, however, hearings and complaints, have caused many corporations to be more concerned with reputation risk (Harvey & Richard, 2014).

The financial statements can be compromised when the company practices tax aggressiveness, making financial transparency part of the cost of aggressively taxing (Balakrishnan et al., 2019). In Brazil, Rodrigues and Martinez (2017) verified the existence of a relationship between tax aggressiveness and the delay in publishing more aggressive

companies' financial statements. Tax aggressiveness also impacts the re-presentation of financial statements, conclude Ramos and Martinez (2017).

In this context, the market may suspect the accuracy of a company's financial statements, where to the extent that this happens, the market's reaction to the news that a company is tax-aggressive may be negative (Hanlon & Slemrod, 2009).

Frank et al. (2009), define aggressive tax reporting as downward taxable profit manipulation, based on tax planning actions that may or may not be considered tax evasion and aggressive financial reporting, such as earnings management, that may or may not be within GAAP limits.

Tax Aggressiveness can be measured based on the tax risk and reputation risk to which your operations are subjected, in other words, companies that practice fiscal aggressiveness are those that assume the greatest technical fiscal risk, as well as the highest reputation risk (Harvey & Richard, 2014). Desai and Dharmapala (2006) demonstrate that, once profit manipulation is discovered, most executives face board and labour market discipline, where it can be said that greater awareness of the penalties imposed, together with recent regulatory and legal actions, has the potential to influence ex-ante managerial actions, thereby reducing the incidence of aggressive accounting or direct fraud. Frank et al. (2009) found consistent results, of a positive and significant relationship, between companies that simultaneously manipulated the accounting profit upwards and tax aggressiveness. The following, table 3, is a summary table containing results published in the international and national literature related to this subject:

Table 3. Summary of research results

<i>Authors</i>	<i>Results</i>
Balakrishnan, Blouin and Guay (2019).	In their results, they show that tax-aggressive companies have less financial transparency.
Ramos and Martinez (2017).	Indicate that tax aggressiveness has an impact on the re-presentation of companies' financial statements.
Phillips, Pincus and Rego (2003).	Consistent results from the use of deferred tax expense, in the detection of earnings management.
Rodrigues and Martinez (2017).	Present evidence of a relationship between tax aggressiveness and the delay in publishing more aggressive companies' financial statements.
Dechow, Sloan and Sweeney (1996).	They conclude that the intention of obtaining low-cost financing represents an economic motivation for companies to manipulate profits.
Desai and Dharmapala (2006).	Demonstrate that once profit manipulation is discovered, most executives face board and labour market discipline, thus reducing the incidence of aggressive accounting or direct fraud.
Frank, Lynch and Rego (2009).	They conclude that there is a positive and significant relationship between companies that simultaneously manipulated the accounting profit upwards and tax aggressiveness.

Source: Research data. Authors' own elaboration

The search for a higher level of tax aggressiveness does not mean tax abuse; however, there is a risk that when seeking to reduce tax obligations in a planned manner, the entity may violate any law or legal form (Martinez, 2017).

The effective tax rate can represent the metric of tax aggressiveness for accounting purposes: ETR – Effective Tax Rate, calculated as Total Tax Expense divided by Accounting Profit before Taxes (Hanlon & Heitzman, 2010), in addition to Current ETR, which represents Current Tax Expenses divided by Accounting Profit before Income Tax and reflects differences in permanent and temporary accounting tax (Chen et al., 2010).

Given the above and to verify the relationship between tax aggressiveness and accounting and financial irregularities, the following hypothesis was formulated:

H₁: Companies with greater aggressiveness are more likely to commit accounting and financial irregularities.

Research methodology

Population and sample

The research adopted a quantitative methodology due to the analysis of the relationship between the variables. The study's objective was descriptive, concerning the data to be collected, from 1999 to 2017, it was longitudinal research. The choice of the period from 1999 to 2017 is justified, considering the date of the oldest administrative proceeding judged by CVM, contained in the Administrative Proceedings Judged Report, granted by the Coordination of Control of Administrative Proceedings (CCP), via Law No. 12,527/2011, which regulates access to public information.

The population of this analysis was divided into two groups, the first, called the treatment group, was composed of companies that have committed accounting, financial or other irregularities, the object of administrative proceeding(s) judged by the CVM, in the period 1999 and 2017, while the group of companies that have not committed irregularities, was called a control group.

The initial sample population was composed of all publicly traded Brazilian companies listed on B3, covering 1999 to 2017, totaling 660 companies. Thus, the data collection of these companies was carried out using the Economatica[®] software. For the treatment of the studied sample data, companies from the financial sector were excluded, due to their accounting and tax peculiarities and companies with negative pre-tax results, totaling 4,232 observations used.

It is important to highlight that the variation in the number of constant observations for the independent and control variables is because companies that did not disclose information necessary for calculating the variables in the surveyed period were excluded. For the application and calculation of control variables ROA, LEV and SIZE, the period from 1998 to 2017 was used. Table 4 details the composition of the sample:

Table 4. Sample composition

<i>Description</i>	<i>Quantity</i>
Total companies in the study	660
Researched period (years)	19
(=)Total observations in the period	12,540
(-)Exclusion of companies without the information necessary to calculate the variables	(4,635)
(-)Exclusion of companies with negative pre-tax results	(2,533)
(-)Exclusion of companies from the finance and insurance sector	(1,140)
(=)Number of observations used	4,232

Source: Research data. Authors' own elaboration

Empirical model

Quantitative analysis was performed using the estimated logit regression. The logit model's use is the best option for cases where independent variables are not normally distributed (Maddala, 1991). Thus, in order to be able to respond to H₁, through which it is intended to

examine whether more aggressive companies are more likely to commit accounting and financial irregularities, the following equation was modelled (1):

$$Irregularities_{it}(Irreg_generalit) = \beta_0 + \beta_1 Agresstribit + \sum \beta_k Controls_{it} + \varepsilon_{it} \quad (1)$$

Where: the dependent variable, $Irregularities_{it}$, is equal to 1 if the company has committed an accounting, financial or other irregularity, which is the subject of an administrative proceeding(s) judged by the CVM, and 0, in other cases. Thus, it is interpreted that equation (1) has the coefficient β_1 , which allows verifying the effect of tax aggressiveness on irregularities, if it is positive, means that companies that are more aggressive are more likely to commit accounting, financial or other irregularities.

Additionally, in order to verify which types of irregularities are influenced by tax aggressiveness, we model 3 equations derived from the main equation (1), modifying only the dependent variable, for individual estimation of Accounting Irregularities (2), Financial Irregularities (3) and other types of Irregularities (4), as follows:

$$Irreg_ctb_{it} = \beta_0 + \beta_1 Agresstrib_{it} + \sum \beta_k Controls_{it} + \varepsilon_{it} \quad (2)$$

$$Irreg_fin_{it} = \beta_0 + \beta_1 Agresstrib_{it} + \sum \beta_k Controls_{it} + \varepsilon_{it} \quad (3)$$

$$Out_irreg_{it} = \beta_0 + \beta_1 Agresstrib_{it} + \sum \beta_k Controls_{it} + \varepsilon_{it} \quad (4)$$

The independent variables will be based on the metrics of tax aggressiveness, where two ETR proxies will be used in this research – Effective Tax Rate (effective tax rate for accounting purposes), where the first, will be the General ETR (ETR), which reflects the effective rate of traditional tax, represented by the Total Tax Expense divided by Profit Before Income Tax (Lennox et al., 2013). The second will be the Current ETR (CETR), which represents Current Tax Expenses divided by Accounting Profit before Income Tax and reflects the differences in permanent and temporary accounting tax (Chen et al., 2010).

The control variables used in this research are similar to recent research on incorrect company reports (Lennox et al., 2013). Burns and Kedia (2006), suggest controlling Company Size (SIZE) and Leverage (LEV) because these variables can affect the magnitude of the market reaction. Erickson, Hanlon and Maydew (2006), used the control variable (ROA), to explain the effects of companies' financial performance. Lennox and Pittman (2010) and Maksimovic and Titman (1991), suggest the control of Negative Equity (Negative EQT) because companies that have financial difficulties are more likely to commit fraud. Lennox et al. (2013), used the control variable (BIG4) because fraudulent companies are more likely to hire low-quality audit companies. Moreover, finally, for the Market Value (MV) variable, Kedia and Philippon (2005) indicate that companies are dedicated to manipulating their profits to delay an expected fall in market value.

Results and discussions

Analysis of descriptive statistics

In the table below, we report the descriptive analysis between the variables (winsorised at 1%) constant in the proposed model, in addition to presenting the number of observations (company-year) for each variable, the mean, the standard deviation, the minimum, maximum, median and first and third quartiles of the sample:

Table 5. Descriptive statistics

<i>Variables</i>	<i>Obs.</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Minimum</i>	<i>Q1</i>	<i>Median</i>	<i>Q3</i>	<i>Maximum</i>
<i>IRREG_GENERAL</i>	4232	0.04	0.20	0.00	0.00	0.00	0.00	1.00
<i>GENERAL_ETR</i>	4188	0.33	0.45	0.00	0.18	0.28	0.34	3.85
<i>CETR</i>	4056	0.30	0.36	-0.02	0.13	0.25	0.34	2.83
<i>BIG4</i>	3632	0.55	0.50	0.00	0.00	1.00	1.00	1.00
<i>ROA</i>	4045	0.11	0.14	-0.10	0.04	0.08	0.14	0.99
<i>LEV</i>	4043	0.19	0.18	0.00	0.02	0.15	0.29	0.89
<i>NEGATIVE_EQT</i>	4232	0.02	0.15	0.00	0.00	0.00	0.00	1.00
<i>SIZE</i>	4067	13.92	2.02	7.99	12.59	14.13	15.26	18.47
<i>MV</i>	3147	2.09	2.57	-0.54	0.72	1.37	2.45	16.84

Source: Research data. Authors' own elaboration

Given the results of descriptive statistics shown in Table 5, we can infer that the variable explained: Irregularities (*IRREG_GENERAL*) presented an average of 0.04, indicating that 4% of the companies in the surveyed sample, in the period from 1999 to 2017, committed irregularities (objects of Administrative Proceeding(s) Judged by the CVM). On the analysis of independent variables: General ETR (*ETR*) and Current ETR (*CETR*), it is observed that the metric of tax aggressiveness ETR General reached an average of 33%, while the Current ETR (*CETR*) resulted in an average of 30%, given this analysis, the companies in the studied sample have, on average, a tax burden below 34%, corresponding to the sum of the IRPJ (corporate income tax) + CSLL (Social Contribution on Net Income) rates. Still, in relation to the independent variables, it is noted that 50% of the companies in this sample, presented ETR and *CETR* below 28% and 25%, respectively.

Analysing the control variables, it is observed that the variable (*BIG4*), resulted in an average of 0.55, indicating that Big4 audited 55% of the observations. For Lennox et al. (2013), fraudulent companies are more likely to hire low-quality audit firms. Regarding the return on asset variable (*ROA*), which explains the effects of companies' financial performance (Erickson et al., 2006), there was an average result of 0.11, ranging from a minimum of -0.10 to a maximum of 0.99. The leverage variable (*LEV*) resulted in an average of 0.19, and a median of 0.15. Regarding the variable (*NEGATIVE_EQT*), an average of 0.02 was found, that is, 2% of the observations had negative *EQT*. Regarding the variable (*SIZE*), used to control the effect of company size (Lanis& Richardson, 2012), reached an average of 13.92, and a median of 14.13. For the Market Value variable (*MV*), an average of 2.09 was found, with values ranging from a minimum of -0.54 to a maximum of 16.84.

Mean difference test

Table 5 shows the difference test between the mean values in two studied samples (Fisher, 1938), where the comparative descriptive statistics between the means of the independent and control variables will be evidenced, in relation to the dependent variable: Irregularities (*IRREG_GENERAL*). This test will be applied to two groups: the treatment group is formed by companies that have committed accounting, financial or other irregularities, subject to Administrative Proceedings(s) Judged by the CVM, while the control group is

composed of companies that have not committed irregularities. The analysis period ranged from 1999 to 2017, as follows in Table 6:

Table 6. Mean difference test

<i>Irreg_general</i>	<i>Control Group (Companies that did not commit irregularities)</i>		<i>Treatment Group (Companies that committed irregularities)</i>		<i>Difference of Means</i>	<i>P-value</i>
	<i>Mean</i>	<i>Standard Deviation</i>	<i>Mean</i>	<i>Standard Deviation</i>		
<i>GENERAL ETR</i>	0.337	0.444	0.220	0.555	0.116***	0.003
<i>CETR</i>	0.304	0.365	0.121	0.299	0.182***	0.000
<i>BIG4</i>	0.559	0.496	0.307	0.463	0.251***	0.000
<i>ROA</i>	0.116	0.133	0.002	0.139	0.113***	0.000
<i>LEV</i>	0.187	0.181	0.188	0.249	-0.000	0.973
<i>NEGATIVE_EQT</i>	0.015	0.122	0.221	0.416	-2.063***	0.000
<i>SIZE</i>	1.396	1.999	1.286	2.121	1.102***	0.000
<i>MV</i>	2.117	2.563	1.450	2.798	0.666***	0.008

Note: The symbol *** indicates that the difference between the means is significant at the 1% level.

Source: Research data. Authors' own elaboration

In Table 6, the results showed 99% confidence ($p\text{-value} < 1\%$), that there is evidence that the group of companies that did not commit irregularities and the group of companies that committed irregularities differ on average concerning the independent variables: GENERAL ETR and CETR, and control: we used BIG4, ROA, NEGATIVE_EQT, SIZE and MV, therefore, the null hypothesis for the variables mentioned was rejected. Still based on the results presented, it appears that the $p\text{-value}$ of the control variable: LEV was greater than 10%, that is, the null hypothesis of the average of the two groups mentioned above cannot be rejected.

The results show that the companies that committed irregularities have lower averages for the Tax Aggressiveness metrics (ETR and CETR), signalling a greater level of aggressiveness (tax burden below 34%, corresponding to the sum of the rates of IRPJ + CSLL), that companies that did not commit irregularities. It is important to highlight that among the $p\text{-values}$ that showed significance at a level of confidence in the statistical analysis of 99%, the companies that committed irregularities, showed lower average values for the variables BIG4, ROA, SIZE and MV, for the variable NEGATIVE_EQT, the companies that committed irregularities presented a higher average value than the companies that did not commit irregularities.

Regression model analysis

This research used the logit regression analysis to test the hypothesis. Maddala (1991) argues that in cases where independent variables are not normally distributed, the discriminant analysis provides inconsistent estimates, being the best use of the logit model. Table 6 presents the results of the main research estimate, based on the dependent variable: Irregularities ($\text{Irreg_General}_{it}$) and explanatory variables: ETR GENERAL and Current ETR (CETR), as follows:

Table 7. Logit regression of the dependent variable = irregularities (irreg_geral)

The following table presents the coefficients and the p-value of the explanatory variables: ETR GENERAL and Current ETR (CETR) and control variables, as predicted in the equation model (1): Irregularities ($\text{Irreg_General}_{it}$) = $\beta_0 + \beta_1 \text{Taxagress}_{it} + \sum \beta_k \text{Controls}_{it} + \varepsilon_{it}$.

Panel A. Results of the coefficients and p-value of the explanatory variable (etr general)

Variables	Irregularities (IRREG_GENERAL)	
	Coef.	$P > z $
ETR GENERAL	-1.000	0.011**
LEV	-1.142	0.105
ROA	-1.807	0.000***
BIG4	-0.295	0.267
SIZE	-0.081	0.273
NEGATIVE_EQT	2.632	0.000***
MV	0.088	0.042**
CONS	-0.672	0.530

Panel B. Results of the coefficients and p-value of the explanatory variable (current etr)

Variáveis	Irregularities (IRREG_GENERAL)	
	Coef.	$P > z $
CETR	-2.289	0.000***
LEV	-1.600	0.033**
ROA	-1.804	0.000***
BIG4	-0.292	0.287
SIZE	-0.050	0.521
NEGATIVE_EQT	2.493	0.000***
MV	0.102	0.023**
CONS	-0.858	0.438

Source: Research data. Authors' own elaboration

According to the results shown in Table 7, it was identified that the tax aggressiveness coefficients of the companies that committed irregularities, calculated by the general ETR metrics (total tax expense divided by pre-tax accounting profit) according to Hanlon and Heitzman (2010), and Current ETR (current tax expense divided by book income before income tax), according to Chen et al. (2010), were negative and significant at 95% and 99% confidence, respectively.

Thus, it can be inferred that the lower the tax aggressiveness, the lower the probability of committing irregularities, in other words, the more aggressive the company is, the greater the probability of committing irregularities. These results are in line with the studies by Phillips et al. (2003) e (Frank et al., 2009), where they conclude that the aggressiveness of the financial statements has a positive relationship with the tax aggressiveness, and with the study by Balakrishnan et al. (2019), that show in their results that tax-aggressive companies have less financial transparency.

In the national context, these results are compatible with Rodrigues and Martinez (2017). They verified the existence of a relationship between tax aggressiveness and the delay in publishing the financial statements of more aggressive companies and with the study by Ramos and Martinez (2017), where they concluded that tax aggressiveness also impacts the re-presentation of companies' financial statements because in both cases, they are configured as some of the irregularities contained in the Report of Administrative Proceedings Judged by CVM used in this research.

It is also noted the relevance of including control variables in the model, where two of them (ROA and NEGATIVE_EQT), used in research by (Shi et al., 2017) and Lennox and Pittman (2010), respectively, presented a 99% confidence level, which shows that the lower the profitability on the company's assets, the less likely they are to commit irregularities. Manurung and Niki (2013) present the positive effect of the variable ROA on fraud in the financial statements.

Regarding the variables (LEV and MV), applied in studies by Johnson, Ryan and Tian (2006) and Kedia and Philippon (2005), reached the 95% confidence level, which shows that the lower the company's leverage, the less likely it is to commit irregularities. Regarding variable (LEV), Aghghaleh, Iskandar and Mohamed (2013) found evidence of a positive relationship between leverage and the likelihood of fraud in financial statements. Table 8 shows the marginal effect of the independent variables ETR GENERAL and Current ETR (CETR), calculated using the margins function in STATA, having as a dependent variable, Irregularities (IRREG_GENERAL) - model (1).

Table 8. Calculation of the marginal effect - model (1)

This table shows the marginal effect of the independent variables: ETR GENERAL and Current ETR (CETR) as a function of the dependent variable: Irregularities (Irreg_General_{it}).

Variables	Irregularities (IRREG_GENERAL)	
	dy/dx	P> z
ETR GENERAL	-0.012	0.017
CETR	-0.025	0.001

Source: Research data. Authors' own elaboration

Based on Table 8, it was inferred that, for the researched sample, the probability of committing Irregularities would be reduced, on average, between 1.21% and 2.52%, the lower the tax aggressiveness measured by the ETR GENERAL and CETR indices, respectively. Therefore, the more aggressive the company, the likelihood of committing irregularities will increase, on average, by the same proportion - Table 9.

Table 9. Logit regression of dependent variables = accounting irregularities (irreg_act), financial (irreg_fin) and other types of irregularities (oth_irreg)

The following table presents the coefficients and p-value of the explanatory variables: ETR GENERAL and Current ETR (CETR) and control variables, as predicted in the equation models (2), (3) and (4): Irreg_act_{it} = $\beta_0 + \beta_1 \text{Taxagress}_{it} + \sum \beta_k \text{Controls}_{it} + \varepsilon_{it}$, Irreg_fin_{it} = $\beta_0 + \beta_1 \text{Taxagress}_{it} + \sum \beta_k \text{Controls}_{it} + \varepsilon_{it}$ and Oth_Irreg_{it} = $\beta_0 + \beta_1 \text{Taxagress}_{it} + \sum \beta_k \text{Controls}_{it} + \varepsilon_{it}$, respectively.

Panel A. Results of the coefficients and p-value of the explanatory variable (etr general)

Variables	Accounting Irregularities		Financial Irregularities		Other types of Irregularities	
	Coef.	P> z	Coef.	P> z	Coef.	P> z
ETR GERAL	0.223	0.933	-2.389	0.001***	-6.489	0.001***
LEV	0.074	0.933	-1.639	0.031**	-0.847	0.538
ROA	-1.530	0.000	-1.346	0.000***	-1.194	0.000***
BIG4	-0.794	0.098	-0.402	0.200	-1.183	0.811
SIZE	-0.203	0.087	-0.093	0.276	0.040	0.977
NEGATIVE_EQT	0.964	0.134	2.805	0.000***	-0.515	0.601
MV	-0.055	0.611	0.128	0.004***	0.110	0.103

CONS	-0.646	0.696	-0.708	0.565	-2.655	0.180
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Panel B. Results of the coefficients and p-value of the explanatory variable (current etr)

Variables	Accounting Irregularities		Financial Irregularities		Other types of Irregularities	
	Coef.	$P > z $	Coef.	$P > z $	Coef.	$P > z $
CETR	-0.428	0.411	-3.295	0.000***	-6.688	0.003***
LEV	-0.483	0.621	-1.667	0.032**	-0.927	0.510
ROA	-1.797	0.000	-1.257	0.000***	-1.137	0.001***
BIG4	-0.857	0.092	-0.434	0.178	-0.191	0.716
SIZE	-0.199	0.121	-0.075	0.408	0.057	0.710
NEGATIVE_EQT	0.520	0.459	2.759	0.000***	-0.027	0.978
MV	-0.054	0.615	0.141	0.002***	0.135	0.047**
CONS	-0.436	0.804	-0.965	0.450	-3.705	0.091

Source: Research data. Authors' own elaboration

The results of Table 9 found that the tax aggressiveness coefficients of the companies that committed Accounting Irregularities, represented by the metrics ETR GENERAL and Current ETR (CETR), were not significant. As for Financial Irregularities, we found that the ETR GENERAL and ETR Current (CETR) results were negative and significant at 99% confidence. It was also observed, the relevance of the inclusion of control variables - three of them, (ROA, NEGATIVE_EQT and MV) were significant with 99% confidence level. This result allows us to infer that the higher the company's NEGATIVE_EQT, the greater the probability of committing irregularities. Maksimovic and Titman (1991), indicate that companies with financial difficulties are more likely to commit fraud.

Regarding Other Types of Irregularities - Table 9 - showed a statistically significant and negative relationship with 99% confidence. Table 9 - showed a statistically significant and negative relationship with 99% confidence.

The results presented after estimation of the models (3) and (4), corresponding to the variables explained: Financial Irregularities: (Irreg_Fin) and Other Types of Irregularities (Oth_Irreg) were similar to those shown in Table 6, confirming the statements by Phillips et al. (2003), Frank et al., (2009) and Balakrishnan et al. (2019), where they conclude that the aggressiveness of the financial statements has a positive relationship with the tax aggressiveness. Consequently, they present less financial transparency – Table 10.

Table 10. Calculation of the marginal effect - models (3) and (4)

This table shows the marginal effect of the independent variables: GENERAL ETR and Current ETR (CETR) as a function of the dependent variables: Irreg_fin_{it} and Out_Irreg_{it}.

Variable	Financial Irregularities		Other types of Irregularities	
	dy/dx	$P > z $	dy/dx	$P > z $
GENERAL ETR	-0.022	0.001	-0.014	0.001
CETR	-0.028	0.000	-0.013	0.003

Source: Research data. Authors' own elaboration

In view of the results presented in Table 7, it was found for the studied sample that the probability of committing Financial Irregularities will be reduced by an average of 2.24% (GENERAL ETR) and 2.89% (CETR), in relation to the probability of committing Other Types of Irregularities, the reduction will be on average 1.40% (GENERAL ETR) and

1.32% (CETR), the lower the tax aggressiveness, therefore, for both cases, the more aggressive the company, their likelihood of committing these types of irregularities will increase on average by the same percentages.

Conclusion

The present study's objective was to analyse whether tax aggressiveness increases the likelihood that a company will commit accounting and financial irregularities. To develop this hypothesis, a relationship was established between tax aggressiveness and accounting and financial irregularities, where additionally it was verified the tax aggressiveness influences which types of irregularities. In the composition of the database, Brazilian companies listed in B3, from 1999 to 2017 were used, resulting in a sample of 4,232 observations.

In view of the results presented, it was possible to identify that the tax aggressiveness coefficients of companies that committed irregularities, measured by the explanatory variables: General ETR and Current ETR (CETR), were negative and significant at 95% and 99% confidence, respectively. Thus, it can be inferred that the lower the tax aggressiveness, the lower the probability of committing irregularities, in other words, the more aggressive the company, the more likely it is to commit irregularities.

In view of the results presented in Table 9, hypothesis H₁ is supported, where it is concluded that the more aggressive companies are more likely to commit accounting and financial irregularities for the studied sample. Additionally, based on the results shown in Table 9, we found that for the sample surveyed, financial irregularities are the most influenced by tax aggressiveness. The results obtained in this study are in line with the results in the international literature, which include Phillips et al. (2003) and (Frank et al., 2009), where they conclude that the aggressiveness of the financial statements has a positive relationship with the tax aggressiveness and Balakrishnan et al. (2019), that indicate that aggressive tax companies have less financial transparency.

He contributed to the national literature presenting evidence that tax aggressiveness is related to a greater likelihood that listed companies, end up committing accounting, financial or other irregularities. Additionally, it was found that financial irregularities are the most influenced by tax aggressiveness for the studied sample. Thus, these results may serve as a reference for regulatory bodies to control and/or eliminate corporate misconduct; for investors, reducing their exposure to risks arising from tax aggressiveness. This study's limitations are associated with the reduced number of irregularities, object of Administrative Proceeding(s) Judged by the CVM, and from companies listed on B3 - in the Judged Administrative Proceedings Report made available by CVM, there are also proceedings belonging to unlisted companies. This research leaves as a gap, the use of the year of the judgment of the irregularity, to investigate the occurrence or not of variation in the level of tax aggressiveness of these companies, in years after the judgment of an Administrative Proceeding by the CVM.

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Acknowledgments

Not applicable.

Funding

Not applicable.

Conflict of Interests

No, there are no conflicting interests.

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