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Tax aggressiveness and business risk: how does firm performance affect their relationship?

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Abstract

Objective: To analyze the relationship between tax aggressiveness and business risk and determine whether firm performance moderates this relationship.

Method: The study analyzed Brazilian companies listed on B3 (Brasil, Bolsa, Balcão) between 2010 and 2023, using a nonprobabilistic sample comprising companies with available data that met the selection criteria. The final sample comprised 215 companies and 1,267 observations in an unbalanced panel. Statistical analysis was performed using multiple linear regression models estimated by ordinary least squares (OLS) with panel fixed effects and Driscoll-Kraay robust standard errors.

Results and contributions: The results indicate that lower ETR and Cash ETR values, interpreted as indicating greater tax aggressiveness, are associated with higher levels of business risk. Evidence that firm performance moderates this relationship depending on the tax aggressiveness proxy used: in regressions using ETR, ROA strengthens the association between lower effective tax rates and greater risk, while BTM weakens this association, however, in regressions using Cash ETR, the terms were not statistically significant. An additional analysis of the pre-pandemic period revealed a reversal in coefficient signs, a finding that should be interpreted as exploratory evidence of temporal sensitivity. This analysis does not constitute an event study. The study contributes by showing, in the Brazilian context, that the relationship between tax aggressiveness and business risk depends on the tax aggressiveness proxy and firm performance measure used.

Keywords: Tax aggressiveness; Business risk; Firm performance.

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1 Introduction

Given the complexity of tax laws and the differing approaches and interests of organizations, tax aggressiveness has been examined in the literature and continues to attract researchers' interest (Bougacha & Guedrib, 2024). Studies such as those by Hanlon and Heitzman (2010) and Yuan, Li, and Hu (2022) show that tax aggressiveness is viewed as a set of actions aimed at reducing tax costs. These actions can be considered morally acceptable and legally permissible (Bougacha & Guedrib, 2024; Guenther, Matsunaga, & Williams, 2017). In this context, this study excludes acts of tax evasion, which constitute criminal offenses under Brazilian law (Rangel & Figueiredo Júnior, 2022; Sanca, 2023).

In this article, tax aggressiveness is treated as an unobservable construct and is operationalized using two proxies based on effective tax rates: ETR and Cash ETR. As these proxies represent the level of effective taxation, they are interpreted inversely in relation to the construct: lower ETR and Cash ETR values indicate greater tax aggressiveness, whereas higher values indicate lower aggressiveness. This distinction is important because it avoids ambiguity in interpreting the signs of the coefficients. It is also acknowledged that these measures do not fully capture other factors that influence the tax burden, such as incentives, tax benefits, and temporary differences permitted under law (Chen et al., 2010; Hanlon & Heitzman, 2010; Hoopes et al., 2024).

Tax aggressiveness can provide companies with benefits such as increased cash flow and improved financial returns for investors (Badertscher et al., 2019; Tran et al., 2023). It can also entail costs that diminish these benefits and generate business risks though (Guenther et al., 2017). Previous empirical research (Bougacha & Guedrib, 2024; Cao et al., 2021; Guedrib & Bougacha, 2024; Guenther et al., 2017; Tran et al., 2023) has examined the effects of tax aggressiveness on business risk, but the findings remain inconclusive. These inconsistent findings may be associated with firm-specific characteristics, such as performance. Therefore, the research problem addressed in this study stems from the lack of empirical evidence to establish whether, and to what extent, firm performance is associated with practices related to tax aggressiveness and business risk. In this study, business risk specifically refers to market risk measured by stock return volatility and does not directly encompass other types of risk, such as operational, financial, tax, or insolvency risk (Guedrib & Bougacha, 2024).

Accordingly, the following research question was formulated to address the identified problem: **How does firm performance moderate the relationship between tax aggressiveness and business risk among publicly traded Brazilian companies?** The objective is to examine the effect of tax aggressiveness on business risk and determine whether firm performance moderates this relationship.

In Brazil, the literature on tax aggressiveness and business risk remains limited, particularly regarding how firm-specific characteristics may affect this relationship. Previous Brazilian studies have examined aspects related to risk and performance (Arpini, Ritter & Piccoli, 2020; Bergamann et al., 2022; Martinez & Martins, 2020), but have focused on direct effects, leaving a gap in the evidence regarding moderation. Consequently, the divergent findings across Brazilian studies remain unexplained. Because none of these studies examines whether the relationship varies with firm's economic characteristics, it is not possible to distinguish substantive differences from unmodeled heterogeneity, an issue documented in recent international research that identifies latent classes of firms with associations between tax aggressiveness and risk that differ in direction (Hutchens, Rego, & Williams, 2024). This study therefore addresses a specific research gap by examining whether accounting-based and market-based measures of firm performance moderate the association between tax aggressiveness proxies and business risk among publicly traded Brazilian companies.

This study's contributions span three areas. The theoretical contribution lies in bringing together three elements that have rarely been examined jointly in Brazil: tax aggressiveness, business risk measured by stock return volatility, and firm performance as a moderating variable. This synthesis advances the literature beyond predominantly descriptive studies and those focused solely on the direct relationship between effective taxation and risk. For investors, the study offers evidence on how different levels of effective taxation may signal exposure to risk, especially when considered alongside performance indicators. For government authorities and policymakers, the findings help clarify how tax planning practices are associated with business risk, informing regulatory discussions aimed at balancing tax revenue, legal certainty, and the functioning of the capital market.

In summary, the article contributes to the literature by examining the relationship between tax aggressiveness and business risk in Brazil, distinguishing the construct of tax aggressiveness from its empirical proxies, and incorporating firm performance as a moderator. As the sample period includes the years of the COVID-19 pandemic, the study also presents an additional temporal sensitivity analysis, which complements but does not replace an event-study design.

2 Literature Review and Hypothesis Development

Tax aggressiveness is widely discussed in the literature in relation to various aspects of organizations in both international and Brazilian contexts (Dantas et al., 2022; Amri et al., 2023; Bispo, Barbosa & Cerqueira, 2024; Guedrib & Bougacha, 2024). It is therefore a relevant research topic that attracts the interest of researchers, investors, and policymakers, given its relationship with firm performance and sustainability (Chen et al., 2010; Tran et al., 2023).

Some studies (Hartmann & Martinez, 2020; Yahya et al., 2021; Amri et al., 2023; Bispo, Barbosa & Cerqueira, 2024) treat tax aggressiveness as the outcome of monitoring arrangements, whereas others (Dantas et al., 2022; Cao et al., 2021; Guedrib & Bougacha, 2024; Guenther et al., 2017) treat it as a cause of economic consequences. What links these two approaches—and constitutes their main limitation—is not the subject matter but their model specification: in both cases, the models assume homogeneous effects across firms, without allowing specific economic attributes to conditions the relationship. This assumption of homogeneity is challenged by Hutchens, Rego, and Williams (2024), who demonstrate that the association between tax aggressiveness and business risk varies across latent classes of firms, with relationships differing in both sign and magnitude. Consequently, average effect estimates may mask opposing relationships coexisting within the same sample. This gap in model specification, rather than merely the lack of studies on the topic, justifies introducing firm performance as a moderator of the relationship, rather than as an additional control variable.

Previous studies consistently characterize tax aggressiveness as a set of actions, including the exploitation of legal loopholes, aimed at reducing the financial impact of taxes on companies (Adela, Agyei & Peprah, 2023; Chen et al., 2010). In this context, empirical studies indicate that, across different settings, shareholders encourage managers to adopt more aggressive tax practices with the aim of increasing their financial returns through the tax savings generated by these practices (Bauer, Kourouxous & Krenn, 2018; Chen et al., 2010; Tran et al., 2023).

These behaviors can be understood in light of agency theory, which examines the relationship between two parties: shareholders (principals) and managers (agents). From this perspective, decision-making is delegated by shareholders to agents, who carry out these decisions, potentially giving rise to conflicts of interest. Investors may favor certain actions that managers do not necessarily support. These conflicts impose costs on shareholders, who must devote resources to aligning agents' interests with their own. Such alignment can occur, for example, through financial incentives (Jensen & Meckling, 1976).

In the tax context, the interplay of interests is also evident, since tax aggressiveness can generate benefits, such as tax savings, which can, in turn, increase shareholder returns. Thus, alignment between the parties may seem advantageous, as it contributes to protecting and maximizing investors' interests (Badertscher et al., 2019; Tran et al., 2023). However, alongside these benefits, aggressive tax practices can also entail costs and exposure to risk, since tax authorities may challenge the actions adopted, potentially resulting in additional tax liabilities. These costs may adversely affect the firm's market value, particularly in light of investors' and analysts' assessments, as reflected, for example, in fluctuations in its share price—an indicator frequently used in the literature to measure business risk (Bougacha & Guedrib, 2024; Guenther et al., 2017; Krupa, 2024).

Accordingly, several studies have examined the relationship between tax aggressiveness and business risk. Guenther, Matsunaga, and Williams (2017) found that, among U.S. firms, stock return volatility was not significantly associated with measures of tax aggressiveness, indicating no significant relationship between the variables. Cao et al. (2021), in turn, extended this analysis by examining two contexts: the United States and China. In the United States, they found a negative relationship between effective tax rates and stock return volatility; that is, firms with lower effective tax rates, indicating greater tax aggressiveness, exhibited higher stock return volatility, suggesting greater business risk. In China, however, the findings were reversed: they identified a positive relationship between effective tax rates and business risk, suggesting that in that context, more tax-aggressive firms (that is, those with lower effective tax rates) did not face higher levels of risk.

Hutchens, Rego, and Williams (2024) investigated the U.S. context and showed that, although tax aggressiveness can provide financial benefits, such as tax savings that improve cash flow, it may also entail costs that outweigh these benefits, increasing uncertainty surrounding the tax strategies adopted and, consequently, business risk. Guedrib and Bougacha (2024), in their analysis of French firms, found that those with lower effective tax rates (indicating greater tax aggressiveness) faced higher levels of business risk. Thus, although the studies report mixed findings, they provide a basis for formulating the first hypothesis of this study, which examines whether the relationships observed in the United States, France, China, and other contexts also hold in Brazil.

Taken together, these studies indicate that the relationship between tax aggressiveness and business risk varies across countries, markets, and measurement approaches. In the Brazilian context, the remaining research gap concerns not only whether this association exists but also whether it changes when firm performance is taken into account. Accordingly, this study moves beyond examining a general, direct relationship to an analysis that considers the selected tax aggressiveness proxies and measures of firm performance. The first hypothesis is therefore formulated as follows:

H1. The ETR and Cash ETR proxies are negatively associated with business risk among publicly traded Brazilian companies.

Although numerous studies have examined the relationship between tax aggressiveness and business risk, few have explored the role of accounting and market characteristics, such as firm performance. Accordingly, there is a need to determine whether firm performance influences this relationship and, if so, to what extent. Previous studies (Burman et al., 2023; Steijvers & Niskanen, 2014) indicate that more profitable firms tend to have higher tax rates, which may indicate less aggressive tax behavior. Conversely, other analyses suggest that highly profitable firms are more inclined to adopt aggressive tax practices than those with weaker financial performance (Amri et al., 2023; Lanis & Richardson, 2011).

In a more recent study, Bougacha and Guedrib (2024) investigated the relationship between tax aggressiveness and business risk among French firms, considering firm performance as a moderating variable. The results indicated that firm performance moderated this relationship. Specifically, accounting-based performance, when interacting with tax aggressiveness, tends to reduce business risk, whereas market-based performance has the opposite effect, increasing risk.

Accordingly, firm performance is expected to affect the strength and, possibly, the direction of the relationship between tax aggressiveness and business risk. In firms with stronger accounting-based performance, aggressive tax practices may be perceived by investors as part of more efficient resource management, which tends to mitigate perceived risk. Conversely, when performance is assessed from a market perspective, tax aggressiveness may be interpreted as an additional source of reputational and regulatory uncertainty, increasing business risk. Based on these arguments, the second research hypothesis is formulated as follows:

H2. Firm performance, measured by ROA and BTM, moderates the relationship between the tax aggressiveness proxies (ETR and Cash ETR) and business risk among publicly traded Brazilian companies.

Thus, if H2 is supported, this will provide evidence that the association between tax aggressiveness proxies and business risk varies with firm performance. When interpreting the signs of the coefficients, it is important to consider that ETR and Cash ETR are inverse proxies for tax aggressiveness.

3 Research Methods

This section describes the main methodological aspects of the study, including the population, sample, data sources, data processing procedures, study variables, and limitations.

3.1 Sample definition and data collection

The population comprised Brazilian companies listed on B3 (Brasil, Bolsa, Balcão), excluding financial-sector companies because of their specific regulatory, accounting, and tax characteristics, which could compromise data analysis and comparability (Marchesi & Zanoteli, 2020; Richardson & Lanis, 2007). The sample was nonprobabilistic and determined by data availability and the selection criteria presented in Table 1. Because data were not available for all companies in every year, the dataset constitutes an unbalanced panel comprising 215 companies and 1,267 observations. To minimize distortions in the data and improve the estimation of econometric models, following Bougacha and Guedrib (2024), observations with ETR (effective tax rate) and Cash ETR values below zero or above one were excluded.

Data were collected from the Refinitiv Eikon® database for the period from 2010 to 2023. This period was chosen because it includes events relevant to the Brazilian accounting and tax environment, such as the end of the Transitory Tax Regime (*Regime Tributário de Transição – RTT*), the mandatory adoption of International Financial Reporting Standards (IFRS), and the economic crisis caused by the COVID-19 pandemic. The pandemic is considered only in an additional temporal sensitivity analysis, rather than as the central focus of the research or the basis for an event-study design. Data were analyzed using R® software (version 4.4.3). Outlier detection and treatment were performed using the Blocked Adaptive Computationally Efficient Outlier Nominators (BACON) method, developed by Billor, Hadi, and Velleman (2000). The procedure excluded values identified at the 1% and 99% levels. The sample distribution and selection criteria are presented in Table 1.

Table 1
Sample Selection Procedures

Companies listed on B3 with data available on Refinitiv Eikon	713
(-) Financial-sector companies	-90
(-) Investment funds, insurance companies, supplementary pension funds, and public or private foundations	-238
(-) Companies with insufficient data to calculate the study variables	-170
Final number of companies	*215*
Initial number of observations after outlier removal	*1.957*
Observations excluded based ETR and Cash ETR values:	
(-) Negative ETR and Cash ETR values	-585
(-) ETR and Cash ETR values greater than 1	-105
Final number of observations	*1.267*

Distribution of observations by year

Year	Nº of observations	%
2010	38	3.00
2011	63	4.97
2012	83	6.55
2013	91	7.18
2014	82	6.47
2015	71	5.60
2016	71	5.60
2017	93	7.34
2018	99	7.81
2019	101	7.97
2020	99	7.81
2021	122	9.63
2022	128	10.10
2023	126	9.94
Total	*1.267*	*100.00*

Source: Study data

3.2 Variable definitions

The dependent variable was business risk (RISCO), defined in this study as market risk and measured by stock return volatility. This measure was calculated as the standard deviation of monthly stock returns for each year (Bougacha & Guedrib, 2024). This measure is widely used in the literature to assess business risk associated with stock price fluctuations, as greater volatility indicates higher levels of risk perceived by the market (Bougacha & Guedrib, 2024; Guedrib & Bougacha, 2024; Rosa, Ribeiro & Carvalho, 2023).

The independent variables were measured using two proxies: the Effective Tax Rate (ETR), calculated as the ratio of income tax to pretax income (LAIR), and Cash ETR, calculated as current taxes paid divided by pretax income. The statutory tax rate was set at 34% (KPMG, 2020). These metrics are widely used in the literature as proxies for tax aggressiveness. Because these measures represent effective tax rates, their relationship with tax aggressiveness is inverse: lower ETR and Cash ETR values tend to indicate greater firm tax aggressiveness (Athira & Ramesh, 2023; Chen et al., 2010).

Firm performance, used as a moderating variable, was measured using two proxies: Return on Assets (ROA), calculated as pretax income divided by Total Assets, and book-to-market (BTM), measured as the book value of equity divided by the firm's market capitalization. In the econometric models, the variable DESEMP alternately represents these two metrics, ROA and BTM, which capture the accounting-based and market-based dimensions of firm performance, respectively (Bougacha & Guedrib, 2024).

The control variables were firm size (TAM), measured by the natural logarithm of total assets; financial leverage (ALAV), calculated as the ratio of total debt to total assets; common shares outstanding (CSHO), measured as the natural logarithm of the number of common shares outstanding; and operating cash flow volatility (FCO), measured as the three-year standard deviation of operating cash flow scaled by total assets to capture short-term variations (Bougacha & Guedrib, 2024; Guedrib & Bougacha, 2024; Imhof & Seavey, 2014). The definitions of the variables are presented in Table 2.

Table 2

Definitions of the variables used in the econometric models

Variables	Abbreviations	Descriptions		Sources
		Independent variable		
Business risk	*RISCO*	Stock return volatility: standard deviation of monthly stock returns for each year.		(Bougacha & Guedrib, 2024; Guedrib & Bougacha, 2024; Tran et al., 2023)
Independent variable				
			Expected value	(Adela et al., 2023; Bougacha & Guedrib, 2024; Guedrib & Bougacha, 2024; Hanlon & Heitzman, 2010)
Tax aggressive (AT)	*ETR*	Effective tax rate (ETR): total income tax expense scaled by pretax income.	(-)	
	CASHETR	Cash ETR: cash taxes paid divided by pretax income.	(-)	
Moderating variable				
Firm performance (DESEMP)	*ROA*	Pretax income divided by total assets.	(+)	
	BTM	Book value of equity scaled by market capitalization.	(+)	
Control variables				
Firm size	*TAM*	Natural logarithm of total assets	(-)	(Adela et al., 2023; Bougacha & Guedrib, 2024; Cao et al., 2021; Gil et al., 2023; Guedrib & Bougacha, 2024; Guenther et al., 2017; Hoopes et al., 2024; Hutchens & Rego, 2015; Martinez & Motta, 2020; Ojala et al., 2023; Padhan & Prabheesh, 2021; Pierk, 2016; Ramos et al., 2022; Rodrigues & Galdi, 2020)
Financial leverage	*ALAV*	Total debt divided by total assets.	(+)	
Common share outstanding	*CSHO*	Natural logarithm of common shares outstanding.	(+)	
Cash flow volatility	*FCO*	Standard deviation of operating cash flow scaled by total assets, calculated over a three-year period.	(+)	

Source: Study data.

3.3 Econometric model

To test the study's hypotheses and examine the relationship between tax aggressiveness and business risk, as well as whether firm performance moderates this relationship, the following econometric models were estimated:

$$RISCO_{it} = \alpha_0 + \beta_1\ AT_{it} + \beta_2\ TAM_{it} + \beta_3\ ALAV_{it} + \beta_4\ CSHO_{it} + \beta_5\ FCO_{it} + \varepsilon_{it} \quad \text{Model 1}$$

$$RISCO_{it} = \alpha_0 + \beta_1\ AT_{it} + \beta_2\ DESEMP_{it} + \beta_3\ DESEMP_{it}x\ AT_{it} + \beta_4\ TAM_{it} + \beta_5 + \beta_6\ CSHO_{it} + \beta_7\ FCO_{it} + \varepsilon_{it} \quad \text{Model 2}$$

In the equations, AT_{it} represents the tax aggressiveness proxy, operationalized alternately using ETR and Cash ETR. Similarly, $DESEMP_{it}$ represents firm performance, operationalized alternately using ROA and BTM. Therefore, Tables 5, 6, and 7 present separate estimates using ETR, Cash ETR, ROA, and BTM, although the equations use the generic notation AT and DESEMP.

Model 1 tests the first hypothesis, according to which the ETR and Cash ETR proxies are negatively associated with business risk among publicly traded Brazilian companies. Model 2 tests the second hypothesis, according to which firm performance, measured by ROA and BTM, moderates the relationship between the tax aggressiveness proxies (ETR and Cash ETR) and business risk among publicly traded Brazilian companies.

Multiple regression analysis was conducted using unbalanced panel data and Ordinary Least Squares (OLS) estimation. A significance level of 5% was adopted. The fixed-effects specification was selected after applying standard tests to compare pooled OLS, fixed-effects, and random-effects models. The models were also assessed for multicollinearity, heteroskedasticity, autocorrelation, and cross-sectional dependence. Cross-sectional dependence, heteroskedasticity, and autocorrelation were identified in all models. Accordingly, robust standard errors were calculated using the Driscoll-Kraay estimator (Driscoll & Kraay, 1998), which was developed to address such conditions.

3.4 Methodological limitations

An important limitation arises from the truncation criterion applied to effective tax rates. As shown in Table 1, observations with ETR and Cash ETR values below zero or above one were excluded following outlier treatment. This exclusion is not random, as negative effective tax rates generally result from negative pretax income or the recognition of deferred tax assets, while values above one result from denominators close to zero, the offsetting of accumulated tax losses, and the recognition of provisions for the non-recovery of tax credits (Hanlon & Heitzman, 2010; Henry & Sansing, 2018). These are therefore firms with unstable earnings, recurring losses, or signs of financial distress, precisely the subset for which greater stock return volatility would be expected. The selection bias is therefore directional rather than merely a matter of sample composition, as the final sample is concentrated among profitable and taxable firms, excluding the higher-risk tail of the dependent variable. Henry and Sansing (2018) demonstrate that inferences about tax aggressiveness drawn from profitable subsamples may be reversed when the full population is considered, warranting caution when generalizing the findings reported here.

There are also concerns regarding endogeneity, including omitted variables correlated with both tax aggressiveness and business risk, such as management's risk propensity, the quality of the internal control environment, and exposure to tax litigation (Brühne & Schanz, 2022), as well as measurement error in the proxies, which, as accounting-based effective rates, only partially capture the construct of interest (Hanlon & Heitzman, 2010). Furthermore, the specification with firm and year fixed effects absorbs time-invariant unobserved heterogeneity and common macroeconomic shocks, and the Driscoll-Kraay estimator provides robust standard errors in the presence of cross-sectional dependence, heteroskedasticity, and autocorrelation (Driscoll & Kraay, 1998); however, neither procedure resolves simultaneity or reverse causality.

Finally, another limitation concerns the distribution of the moderating variables and their actual effects on the estimated coefficients. Some firms exhibit particularly high BTM values, which may distort the analyses and make the results less stable and reliable. The statistical model estimates effects relative to a reference point that, in practice, is not representative of most firms in the sample, making it difficult to interpret the magnitude of the estimated effect. In addition, some firms reported negative book equity, which complicates the conventional interpretation of the indicators and may help explain why two similar analyses yielded results in opposite directions.

4 Results

4.1 Descriptive statistics and correlations

The RISCO variable has a mean of 0.1090 and a standard deviation of 0.0536, indicating moderate variation in stock return volatility in the sample. The ETR and Cash ETR proxies have means of 0.2428 and 0.1283, respectively, with minimum values of zero and maximum values close to one, consistent with the selection criteria applied to effective tax rates. The ROA variable has a mean of 0.4110, a median of 0.5768, and a standard deviation of 2.1619, suggesting skewness and the presence of extreme values. BTM also exhibits considerable dispersion, with a mean of 2.5943, a standard deviation of 8.4471, a minimum value of -13.7573, and a maximum value of 140.9700.

Among the control variables, TAM has a more concentrated distribution, with a standard deviation of 1.8247, while ALAV exhibits considerable dispersion, with a standard deviation of 2.1597 and an extremely high maximum value. CSHO has a mean of 19.0795 and a standard deviation of 2.1600. Finally, FCO has a mean of 0.0211 and a skewed distribution, with a maximum value of 0.4560. Taken together, the descriptive statistics indicate skewness and extreme values in several key variables, which should be considered when interpreting the econometric results and assessing the limitations of the study. These statistics are presented in Table 3.

Table 3

Descriptive statistics of the variables

	Mean	Standard deviation	Minimum	Maximum	1st quartile	Median	3rd quartile
RISCO	0,1090	0,0536	0,0205	0,3290	0,0732	0,0954	0,1319
ETR	0,2428	0,1505	0,0000	0,9780	0,1419	0,2399	0,3081
CASHETR	0,1283	0,1571	0,0000	0,9740	0,0000	0,0754	0,2127
ROA	0,4110	2,1619	0,0484	52,3980	0,4359	0,5768	0,7112
BTM	2,5943	8,4471	-13,7573	140,9700	0,6149	1,2211	2,3264
TAM	22,2613	1,8247	15,7258	27,6810	21,0221	22,2132	23,4997
ALAV	0,7239	2,1597	0,0484	52,3980	0,4372	0,5758	0,7104
CSHO	19,0795	2,1600	9,9759	25,5830	17,9821	19,5488	20,5424
FCO	0,0211	0,0244	0,0001	0,4560	0,0086	0,0150	0,0257

Note: The descriptive statistics are reported for all variables included in the study.

Source: Study data.

As shown in Table 4, the RISCO variable is negatively correlated with ETR (-0.038), Cash ETR (-0.113), ROA (-0.017), BTM (-0.016), TAM (-0.222) and CSHO (-0.269), and positively correlated with ALAV (0.197) and FCO (0.159). The tax aggressiveness proxies ETR and Cash ETR are positively correlated (0.184). Cash ETR is positively correlated with ROA (0.042), TAM (0.141) and CSHO (0.189), negatively correlated with BTM (-0.051) and ALAV (-0.057), and shows a negligible correlation with FCO (-0.003). ROA shows a strong positive correlation with ALAV (0.816), as well as positive correlations with TAM (0.120), CSHO (0.133), BTM (0.038) and FCO (0.042). BTM is negatively correlated with TAM (-0.088) and ALAV (-0.023), and positively correlated with CSHO (0.023) and FCO (0.061). TAM is positively correlated with CSHO (0.762) and negatively correlated with ALAV (-0.166) and FCO (-0.201). ALAV is negatively correlated with CSHO (-0.169) and positively correlated with FCO (0.162), while CSHO is negatively correlated with FCO (-0.117). Although some correlations are strong, especially between ROA and ALAV and between TAM and CSHO, the Variance Inflation Factor (VIF) analysis indicated no severe multicollinearity, as all values were below 4 (Fávero & Belfour, 2017).

Table 4
Pearson correlation matrix

	1		2		3		4		5		6		7		8		9
1. RISCO	—																
2. ETR	-0,038		—														
3. CASHETR	-0,113	***	0,184	***	—												
4. ROA	-0,017	***	0,048		0,042	*	—										
5. BTM	-0,016		-0,056	*	-0,051		0,038		—								
6. TAM	-0,222	***	0,048		0,141	***	0,120	***	-0,088	**	—						
7. ALAV	0,197	***	-0,070	*	-0,057	*	0,816	***	-0,023		-0,166	***	—				
8. CSHO	-0,269	***	0,003		0,189	***	0,133	***	0,023		0,762	***	-0,169	***	—		
9. FCO	0,159	***	-0,014		-0,003		0,042		0,061	*	-0,201	***	0,162	***	-0,117	***	—

Note: the table reports Pearson correlation coefficients for all variables included in the study.
Source: Study data.

4.2 Regression results

Table 5 presents the results of the fixed-effects panel regressions used to test the first hypothesis of this study.

Table 5
Regression results for Model 1

VARIABLES	Dependent variable – RISCO	
	Fixed effect	
	Model 1	
ETR	-8,0072*** (1,3052)	
CASHETR		-12,2507*** (2,1065)
TAM	-2,1737* (1,0696)	-2,1775** (1,0315)
ALAV	-0,8062*** (0,2691)	-0,7432** (0,2604)
CSHO	0,3465 (0,4108)	0,2155 (0,3735)
FCO	3,8234 (8,7541)	8,2138 (9,0326)
Constant	54,7204* (29,2930)	56,7939* (27,7010)
Observations	1267	1267
No. of groups	215	215
Hausman test	0,0378	0,0000
Pesaran CD test	0,0000	0,0000
Wooldridge test	0,0202	0,0261
Breusch-Pagan test	0,1280	0,1720
Year fixed effects	Sim	Sim
Firm fixed effects	Sim	Sim
Within R^2	0,21	0,28
Mean VIF	1,60	1,61

Note: Coefficient estimates are presented with Driscoll-Kraay robust standard errors in parentheses.
All models include year and firm fixed effects. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.
Source: study data.

The coefficients for the ETR and Cash ETR variables are negative and statistically significant. Since these variables serve as inverse proxies for tax aggressiveness, this result indicates that lower effective tax rates—indicating greater tax aggressiveness—are associated with higher levels of business risk. Thus, the correct interpretation is not that the proxies themselves increase risk, but rather that lower ETR and Cash ETR values, indicating greater tax aggressiveness, are associated with higher stock return volatility. These results align with the literature on tax aggressiveness and risk (Hanlon & Heitzman, 2010; Martinez, 2017) and corroborate prior evidence (Cao et al., 2021; Guedrib & Bougacha, 2024; Krapl, Salyer & White, 2020; Rego & Wilson, 2012).

A possible explanation for these findings is that actions taken with the aim of reducing the tax burden and, consequently, increasing financial resources may entail business risks that adversely affect firms. Examples of these risks include additional future costs arising from tax audits, as well as reputational damage that can affect the firm's value and its market performance, thus increasing business risk (Brühne & Schanz, 2022; Kovermann, 2018; Salehi, Khazaei & Tarighi, 2019).

With regard to the control variables, firm size and financial leverage had statistically significant negative coefficients, indicating that larger and more leveraged firms tend to have lower business risk. A possible explanation is that these firms have more robust financial and managerial structures, which facilitate better resource management and a greater capacity to control risk, further enhanced by investments in assets financed through third-party funding (Cao et al., 2021; Tran et al., 2023; Yuwono & Mustikasari, 2022).

Therefore, the empirical results support H1, which predicts a negative association between the ETR and Cash ETR proxies and business risk among publicly traded Brazilian companies. This finding suggests a positive association between greater tax aggressiveness and greater business risk.

Table 6 presents the results of fixed-effects panel regressions testing the second hypothesis of this study, with firm performance included as a moderating variable.

Table 6

Regression results for model 2

VARIABLES	Dependent variable - RISCO			
	Fixed effect			
	Model 2			
	ROA	BTM	ROA	BTM
ETR	-5,8417***	-8,1339***		
	(1,8779)	(1,3370)		
CASHETR			-11,7982***	-13,1244***
			(2,2876)	(2,4952)
ROA	6,6746**		1,2648***	
	(2,3042)		(0,3526)	
BTM		-0,0198		0,0146
		(0,0172)		(0,0139)
*ETR*ROA*	-5,0365*			
	(2,7151)			
*CASHETR*ROA*			-0,8792	
			(1,5943)	
*ETR*BTM*		0,1978**		
		(0,0701)		
*CASHETR*BTM*				0,9735
				(0,7575)
TAM	-2,0665*	-2,1546*	-2,1698*	-2,1681*
	(1,0827)	(1,0687)	(1,0357)	(1,0183)
ALAV	-8,0797***	-0,8011**	-2,0023***	-0,7466**
	(2,5919)	(0,2685)	(0,2798)	(0,2572)
CSHO	0,3254	0,3489	0,2115	0,276
	(0,3871)	(0,4095)	(0,3704)	(0,4240)
FCO	3,582	3,0464	8,3315	7,9292
	(8,7305)	(9,0195)	(9,1620)	(9,0743)
Constant	53,4276*	54,2252*	56,6958*	55,2560*
	(29,0034)	(29,2856)	(27,7459)	(28,0430)
Observations	1267	1267	1267	1267
No. of groups	215	215	215	215
Hausman test	0,0000	0,0000	0,0000	0,0000
Pesaran CD test	0,0000	0,0000	0,0000	0,0000
Wooldridge test	0,7930	0,9430	0,7990	0,8340
Breusch-Pagan test	0,0000	0,0000	0,0000	0,0000
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Within R^2	0,25	0,22	0,29	0,31
Mean VIF	1,27	1,25	1,22	1,25

Note: Driscoll-Kraay robust standard errors are reported in parentheses. All models include year and firm fixed effects. *, **, *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Source: Study data

The results show that, with the inclusion of firm performance, the coefficients of the tax aggressiveness proxies remain negative and statistically significant, as observed in the previous analysis. When tax aggressiveness is measured by ETR, the interaction terms with ROA and BTM are statistically significance, although with opposite signs. On the other hand, when Cash ETR is used as a proxy, the interactions with ROA and BTM are not statistically significant. Therefore, the evidence of moderation is concentrated in the models estimated using ETR.

The interpretation of the moderating effects should account for the inverse relationship between ETR and tax aggressiveness. The negative coefficient for the ETR*ROA interaction indicates that, as ROA increases, the negative relationship between ETR and risk becomes stronger. This suggests that accounting-based firm performance strengthens the association between greater tax aggressiveness and greater business risk. The positive coefficient for the ETR*BTM interaction indicates that higher BTM values weaken the negative relationship between ETR and risk. This result suggests that the association between tax aggressiveness and business risk is attenuated when this market-based measure is considered. As the interactions with Cash ETR were not statistically significant, there is insufficient evidence to conclude that firm performance moderates this relationship when this proxy is used.

These findings reinforce that the view that the relationship between tax aggressiveness and business risk depends on the measures used to assess both tax aggressiveness and firm performance. The differences between ROA and BTM suggest that accounting-based and market-based information can be interpreted differently by investors when considered alongside tax practices. Accordingly, tax aggressiveness should not be analyzed in isolation from how firm performance is assessed, as the same reduction in the effective tax rate can signal different risks depending on the firm's economic and market profile (Bai, Zhang & Wang, 2024; Bougacha & Guedrib, 2024; Kanagaretnam et al., 2018).

Therefore, the second hypothesis is partially supported. There is evidence that firm performance moderates the relationship between tax aggressiveness and risk when ETR is used as the proxy, but such evidence was not found for Cash ETR, since the corresponding interaction terms were not statistically significant.

4.3 Additional analysis

Since the study period includes the COVID-19 pandemic, an event with the potential to affect economic conditions, business decisions, and risk perceptions, an additional temporal sensitivity test was conducted. This test consisted of re-estimating the models using only data from the pre-pandemic period (2010–2019). This analysis does not constitute an event study, as it defines neither ex ante nor ex post windows and does not adopt a specific causal strategy to isolate the effects of the pandemic.

The results reveal that, during the pre-pandemic period (2010–2019), the coefficients of the tax aggressiveness proxies reverse sign compared with those estimated for the full period (2010–2023), becoming positive and statistically significant. This finding is relevant because it indicates that the association between effective tax rates and business risk is sensitive to the period analyzed. Furthermore, the moderating effect of firm performance is no longer statistically significance in this period, except for the interaction between Cash ETR and ROA, which was positive and statistically significant.

This evidence should be interpreted with caution. The reversal of coefficient signs in the pre-pandemic period suggests that the broader economic context may affect how the market perceives the relationship between effective tax rates and business risk. However, as the additional test consists only of re-estimating the models for a restricted period, it is not possible to attribute the observed differences causally to the pandemic. Therefore, the results in Table 7 should be regarded as an exploratory assessment of robustness and temporal sensitivity, rather than as conclusive evidence of the effects of COVID-19 (Gil et al., 2023; Kobbi-Fakhfakh & Bougacha, 2023; Padhan & Prabheesh, 2021).

Table 7

Results of the additional test for the pre-pandemic period

VARIABLES	Dependent variable - RISCO					
	Fixed Effect					
	Model 1		Model 2			
			ROA	BTM	ROA	BTM
ETR	10,0101***		14,3426***	10,0991***		
	(1,4261)		(4,3303)	(1,5806)		
CASHETR		15,0756***			26,9512***	16,9885***
		(2,6674)			(5,3619)	(2,2632)
ROA			1,8033		0,4358	
			(4,5620)		(0,3241)	
BTM				0,0122		0,0192
				(0,0364)		(0,0115)
*ETR*ROA*			5,5179			
			(5,4751)			
*CASHETR*ROA*					19,5731**	
					(6,1495)	
*ETR*BTM*				0,0999		
				(0,1155)		
*CASHETR*BTM*						1,9264
						(1,1119)
TAM	3,7877***	3,7267***	3,9742***	3,7949***	3,9596***	3,7333***
	(0,6817)	(0,5950)	(0,6005)	(0,7113)	(0,5995)	(0,6273)
ALAV	6,4119***	4,9214***	5,1868	6,4222***	5,9158***	4,9412***
	(1,3782)	(1,3273)	(5,2179)	(1,3843)	(1,6244)	(1,3200)
CSHO	0,3343	0,1296	0,3527	0,3258	0,1247	0,1127
	(0,4292)	(0,4207)	(0,4349)	(0,4269)	(0,4201)	(0,4207)
FCO	4,2358	8,7921	3,6352	4,7364	10,4531	6,1038
	(23,4616)	(22,0099)	(24,0123)	(23,8280)	(22,5008)	(21,5232)
Constant	95,0149***	95,7431***	99,3996***	95,3491***	101,4126***	96,0062***
	(21.0511)	(18,8473)	(20,1125)	(21,8108)	(19,0243)	(19,4034)
Observations	792	792	792	792	792	792
No. of groups	166	166	166	166	166	166
Hausman test	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Pesaran CD test	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Wooldridge test	0,7470	0,8601	0,8414	0,7945	0,8560	0,9412
Breusch-Pagan test	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0,38	0,49	0,40	0,38	0,52	0,52
Mean VIF	1,60	1,61	1,27	1,25	1,22	1,25

Note: Driscoll-Kraay robust standard errors are reported in parentheses. All models include year and firm fixed effects. *, **, *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Source: study data.

Final Considerations

The objective of this study was to examine the relationship between tax aggressiveness and business risk, as well as determine whether firm performance moderates this relationship. The analysis covered publicly traded Brazilian companies listed on B3 (Brasil, Bolsa, Balcão), between 2010 and 2023.

The findings indicate that publicly traded Brazilian companies with lower ETR and Cash ETR values, interpreted as indicating greater tax aggressiveness, tend to exhibit higher levels of business risk. When firm performance is incorporated as a moderator, the results show that moderation depends on the tax aggressiveness proxy and performance measure: the ETR*ROA interaction accentuates the association between tax aggressiveness and risk, while the ETR*BTM interaction attenuates it; however, the interactions involving Cash ETR were not statistically significant. The additional analysis of the pre-pandemic period revealed a reversal in the signs of the coefficients, suggesting that the results are sensitive to the period analyzed, but does not allow causal inferences about the effects of COVID-19.

These results have practical implications. For investors, considering ETR or Cash ETR in isolation may be insufficient, as the interpretation of the risk associated with tax aggressiveness also depends on the firm's accounting-based and market-based performance. For regulators and policymakers, the findings indicate that aggressive tax practices may be associated with greater stock return volatility, which reinforces the importance of mechanisms for transparency, regulatory oversight, and effective communication of the tax strategies adopted by companies.

The main theoretical contribution of this research is to highlight, in the Brazilian context, that the relationship between tax aggressiveness and business risk is not homogeneous. By incorporating firm performance as a moderator, the study shows that the effects vary depending on the tax aggressiveness proxy and performance measure used, thereby contributing to a more nuanced understanding of the literature on tax planning, risk, and capital markets.

As is common in empirical research, this investigation has limitations with methodological implications, including the directional selection bias resulting from the truncation of effective tax rates to the interval between zero and one, endogeneity arising from reverse causality and simultaneity between risk and tax aggressiveness, as well as the effect of skewness in ROA and BTM on the stability of the interaction coefficients. The results are limited to the sample analyzed, the period from 2010 to 2023, and the proxies used to measure tax aggressiveness, business risk, and firm performance.

It is also acknowledged that the pandemic-related analysis is exploratory and does not constitute an event study with ex ante and ex post windows. Future research could build on this study by using specifications with lagged variables, alternative winsorization strategies, logarithmic transformations when methodologically appropriate, additional robustness tests, and models designed to address potential endogeneity issues.

References

Adela, V., Agyei, S. K., & Peprah, J. A. (2023). Antecedents of tax aggressiveness of listed non-financial firms: evidence from an emerging economy. *Scientific African, 20*, e01654, 1–14. https://doi.org/10.1016/j.sciaf.2023.e01654

Amri, K., Ben Mrad Douagi, F. W., & Guedrib, M. (2023). The impact of internal and external corporate governance mechanisms on tax aggressiveness: evidence from Tunisia. *Journal of Accounting in Emerging Economies, 13*(1), 43–68. https://doi.org/10.1108/JAEE-01-2021-0019

Arpini, P. C., Ritter, P. C., & Piccoli, M. R. (2020). *Influência da agressividade tributária no desempenho das empresas listadas na B3.* In Anais do *20º USP International Conference in Accounting. São Paulo, SP, Brasil.* https://congressousp.fipecafi.org/anais/20UspInternational/ArtigosDownload/1959.pdf

Athira, A., & Ramesh, V. K. (2023). Covid-19 and corporate tax avoidance: international evidence. *International Business Review, 32*(4), 1–21. https://doi.org/10.1016/j.ibusrev.2023.102143

Badertscher, B. A., Katz, S. P., Rego, S. O., & Wilson, R. J. (2019). Conforming tax avoidance and capital market pressure. *The Accounting Review, 94*(6), 1–30. https://doi.org/10.2308/accr-52359

Bai, Y., Zhang, L. Y., & Wang, L. (2024). The moral licensing effects of corporate reputation on tax planning. *Review of Pacific Basin Financial Markets and Policies, 27*(2), 2450016. https://doi.org/10.1142/S0219091524500164

Bauer, T., Kourouxous, T., & Krenn, P. (2018). Taxation and agency conflicts between firm owners and managers: a review. *Business Research, 11*(1), 33–76. https://doi.org/10.1007/s40685-017-0054-y

Bergamann, D. R., Bertocchi, L. P., Silva, R. F. da, Fully, R. M. P., & Martins, V. F. (2022). Agressividade tributária e o risco de mercado das firmas no Brasil. *Gestión Joven Revista de la Agrupación Joven Iberoamericana de Contabilidad y Administración de Empresas (AJOICA),* 23(1), 46–57. https://gestionjoven.org/revista/contenidos_23_1/Vol23_num1_3.pdf

Billor, N., Hadi, A. S., & Velleman, P. F. (2000). BACON: blocked adaptive computationally efficient outlier nominators. *Computational Statistics & Data Analysis, 34*(3), 279–298. https://doi.org/10.1016/S0167-9473(99)00101-2

Bispo, J., Barbosa, T. A., & Cerqueira, A. J. F. de. (2024). Relação entre estrutura de capital e agressividade tributária em empresas de capital aberto do Brasil. *Revista de Contabilidade e Organizações, 18*, e227036. https://doi.org/10.11606/issn.1982-6486.rco.2024.227036

Bougacha, F., & Guedrib, M. (2024). Corporate tax avoidance and firm risk: what role does firm performance play? *Journal of Accounting and Management Information Systems, 23*(2), 381–411. https://doi.org/10.24818/jamis.2024.02005

Brühne, A. I., & Schanz, D. (2022). Defining and managing corporate tax risk: perceptions of tax risk experts. *Contemporary Accounting Research, 39*(4), 2861–2902. https://doi.org/10.1111/1911-3846.12785

Burman, V. L., Mättö, M., Niskanen, M., & Ojala, H. (2023). How does corporate governance affect tax aggressiveness? Evidence from Finland. *Nordic Journal of Business, 72*(2), 89–106. https://njb.fi/wp-content/uploads/2023/11/1_Burman_et_al.pdf

Cao, Y., Feng, Z., Lu, M., & Shan, Y. (2021). Tax avoidance and firm risk: evidence from China. *Accounting & Finance, 61*(3), 4967–5000. https://doi.org/10.1111/acfi.12769

Chen, S., Chen, X., Cheng, Q., & Shevlin, T. (2010). Are family firms more tax aggressive than non-family firms? *Journal of Financial Economics, 95*(1), 41–61. https://doi.org/10.1016/j.jfineco.2009.02.003

Dantas, R. F., Anjos, L. C. M. dos, Rêgo, C. J. F. N., & Lagioia, U. C. T. (2022). As implicações do risco tributário e da agressividade tributária sobre o custo de capital de terceiros nas empresas listadas na B3. *Qualitas Revista Eletrônica, 22*(2), 16–34. https://doi.org/10.18391/req.v22i2.5925

Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics, 80*(4), 549–560. https://doi.org/10.1162/003465398557825

Fávero, L. P., & Belfiore, P. (2017). *Manual de análise de dados: estatística e modelagem multivariada com Excel, SPSS e Stata*. Elsevier.

Gil, N. dos S., Theiss, V., & Dalcero, K. (2023, September 18–20). *Efeito da Covid-19 na relação da agressividade tributária e desempenho futuro das empresas listadas da B3 S/A*. In *13º Congresso UFSC de Controladoria e Finanças, 6º UFSC International Accounting Conference & 13º Congresso UFSC de Iniciação Científica em Contabilidade. Florianópolis, SC, Brasil.* https://repositorio.ufsc.br/bitstream/handle/123456789/253450/Artigo_BU_Nathalia_dos_Santos_Gil.pdf?sequence=1

Guedrib, M., & Bougacha, F. (2024). The moderating effect of tax risk on the relationship between tax avoidance and firm risk: empirical evidence in the French context. *International Journal of Law and Management, 66*(4), 468–495. https://doi.org/10.1108/IJLMA-06-2023-0140

Guenther, D. A., Matsunaga, S. R., & Williams, B. M. (2017). Is tax avoidance related to firm risk? *The Accounting Review, 92*(1), 115–136. https://doi.org/10.2308/accr-51408

Hanlon, M., & Heitzman, S. (2010). A review of tax research. *Journal of Accounting and Economics, 50*(2–3), 127–178. https://doi.org/10.1016/j.jacceco.2010.09.002

Hartmann, C. F., & Martinez, A. L. (2020). Tax aggressiveness and Big4 audit firms. *REUNIR Revista de Administração, Contabilidade e Sustentabilidade, 10*(3), 37–46. https://doi.org/10.18696/reunir.v10i3.843

Henry, E., & Sansing, R. (2018). Corporate tax avoidance: data truncation and loss firms. *Review of* Accounting Studies*, 23(3)*, 1042–1070. https://doi.org/10.1007/s11142-018-9448-0

Hoopes, J. L., Langetieg, P. T., Maydew, E. L., & Mullaney, M. S. (2024). Are private firms more aggressive tax planners? *The Accounting Review, 99*(4), 197–223. https://doi.org/10.2308/TAR-2020-0499

Hutchens, M., & Rego, S. O. (2015). Does greater tax risk lead to increased firm risk? (SSRN Working Paper No. 2186564). Social Science Research Network. https://doi.org/10.2139/ssrn.2186564

Hutchens, M., Rego, S. O., & Williams, B. (2024). Tax avoidance and firm risk: new insights from a latent class mixture model. *The Accounting Review, 99*(1), 285–313. https://doi.org/10.2308/TAR-2020-0343

Imhof, M. J., & Seavey, S. E. (2014). Corporate risk-taking, firm value and high levels of managerial earnings forecasts. *Advances in Accounting, 30*(2), 328–337. https://doi.org/10.1016/j.adiac.2014.09.004

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Kanagaretnam, K., Lee, J., Lim, C. Y., & Lobo, G. J. (2018). Cross-country evidence on the role of independent media in constraining corporate tax aggressiveness. *Journal of Business Ethics, 150*(3), 879–902. https://doi.org/10.1007/s10551-016-3168-9

Kobbi-Fakhfakh, S., & Bougacha, F. (2023). The impact of the Covid-19 pandemic on corporate tax avoidance: evidence from S&P 500 firms. *Journal of Financial Reporting and Accounting, 21*(4), 847–866. https://doi.org/10.1108/JFRA-06-2022-0216

Kovermann, J. H. (2018). Tax avoidance, tax risk and the cost of debt in a bank-dominated economy. *Managerial Auditing Journal, 33*(8/9), 683–699. https://doi.org/10.1108/MAJ-12-2017-1734

KPMG. (2020, November 25). *Corporate tax rates table*. https://kpmg.com/sg/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html

Krapl, A. A., Salyer, R., & White, R. S. (2020). Tax avoidance, tax risk, and the volatility of stock returns. (SSRN Working Paper No. 3613038). Social Science Research Network. https://doi.org/10.2139/ssrn.3613038

Krupa, T. J. (2024). Do enterprise risk assessments affect tax aggressiveness? Evidence from U.S. ORSA regulation. *The Accounting Review, 99*(2), 307–339. https://doi.org/10.2308/TAR-2022-0639

Lanis, R., & Richardson, G. (2011). The effect of board of director composition on corporate tax aggressiveness. *Journal of Accounting and Public Policy, 30*(1), 50–70. https://doi.org/10.1016/j.jaccpubpol.2010.09.003

Marchesi, R. F., & Zanoteli, E. J. (2020). Agressividade fiscal e investimentos no mercado acionário brasileiro. *Advances in Scientific and Applied Accounting, 13*(3), 65–83. https://doi.org/10.14392/asaa.2020130304

Martinez, A. L. (2017). Agressividade tributária: um survey da literatura. *Revista de Educação e Pesquisa em Contabilidade (REPeC)*, 11(Edição Especial), 106–124. https://doi.org/10.17524/repec.v11i0.1724

Martinez, A. L., & Martins, W. B. (2020). Tax aggressiveness, market and idiosyncratic risks in Brazil. *Cuadernos de Contabilidad, 21*, 1–14. https://doi.org/10.11144/Javeriana.cc21.amir

Martinez, A. L., & Motta, F. P. (2020). Agressividade fiscal em sociedades de economia mista no Brasil. *Revista Contemporânea de Contabilidade, 17*(43), 136–148. https://doi.org/10.5007/2175-8069.2020V17N43P136

Ojala, H., Malo, P., & Penttinen, E. (2023). Private firms' tax aggressiveness and lightweight pre-tax-audit interventions by the tax administration. *Journal of International Accounting, Auditing and Taxation, 51*, 100550. https://doi.org/10.1016/j.intaccaudtax.2023.100550

Padhan, R., & Prabheesh, K. P. (2021). The economics of COVID-19 pandemic: a survey. *Economic Analysis and Policy, 70*, 220–237. https://doi.org/10.1016/j.eap.2021.02.012

Pierk, J. (2016). *Are private firms really more tax aggressive than public firms?* (WU International Taxation Research Paper Series No. 2016-02). WU Vienna University of Economics and Business. https://doi.org/10.2139/ssrn.2758756

Ramos, P. N. F., Silveira, O. R. da, & Maia, J. C. de S. (2022). Determinação da análise de regressão linear simples para explicar a influência dos atributos físicos do solo na produção do algodão. *Research, Society and Development, 11*(8), e30591. https://doi.org/10.33448/rsd-v11i8.30591

Rangel, G. A., & Figueiredo Júnior, M. da S. (2022). O crime de sonegação fiscal e seus impactos no estado brasileiro. *Facit Business and Technology Journal, 1*(34), 166–182. https://revistas.faculdadefacit.edu.br/index.php/JNT/article/view/1456

Rego, S. O., & Wilson, R. (2012). Equity risk incentives and corporate tax aggressiveness. *Journal of Accounting Research, 50*(3), 775–810. https://doi.org/10.1111/j.1475-679X.2012.00438.x

Richardson, G., & Lanis, R. (2007). Determinants of the variability in corporate effective tax rates and tax reform: evidence from Australia. *Journal of Accounting and Public Policy, 26*(6), 689–704. https://doi.org/10.1016/j.jaccpubpol.2007.10.003

Rodrigues, D. V., & Galdi, F. C. (2020). Taxa de imposto efetiva nas empresas brasileiras: uma comparação entre as companhias abertas e fechadas. *Revista Contemporânea de Contabilidade, 17*(42), 57–69. https://doi.org/10.5007/2175-8069.2020v17n42p57

Rosa, A. A. S., Ribeiro, K. C. de S., & Carvalho, L. F. (2023). Volatilidade e alavancagem: uma análise das empresas da América Latina. *Contabilidade, Gestão e Governança, 26*(1), 32–62. https://doi.org/10.51341/cgg.v26i1.2992

Salehi, M., Khazaei, S., & Tarighi, H. (2019). Tax avoidance and corporate risk: Evidence from a market facing economic sanction country. *The Journal of Asian Finance, Economics and Business, 6*(4), 45–52. https://doi.org/10.13106/jafeb.2019.vol6.no4.45

Sanca, V. M. P. (2023). *Crime de sonegação fiscal: estudo comparado entre Guiné-Bissau e Brasil* [Dissertação de mestrado, Universidade Federal da Bahia]. https://repositorio.ufba.br/handle/ri/40571

Steijvers, T., & Niskanen, M. (2014). Tax aggressiveness in private family firms: an agency perspective. *Journal of Family Business Strategy, 5*(4), 347–357. https://doi.org/10.1016/j.jfbs.2014.06.001

Tran, T. K., Truong, M. T., Bui, K. T., Duong, P. D., Huynh, M. V., & Nguyen, T. T. H. (2023). Firm risk and tax avoidance in Vietnam: do good board characteristics interfere effectively? *Risks, 11*(2), 39. https://doi.org/10.3390/risks11020039

Yahya, F., Manan, A., Jan Khan, M. W., & Hashmi, M. S. (2021). The moderating role of board gender diversity between power-based corporate governance and tax aggressiveness. *Economics and Business Letters, 10*(2), 104–147. https://doi.org/10.17811/ebl.10.2.2021.104-147

Yuan, C., Li, Y., & Hu, T. (2022). Does corporate donation lead to more tax aggressiveness? *China Economic Quarterly International, 2*(1), 29–41. https://doi.org/10.1016/j.ceqi.2022.02.002

Yuwono, A., & Mustikasari, E. (2022). The effect of tax avoidance and tax risk on firm risk. *The Indonesian Accounting Review, 12*(2), 223–230. https://doi.org/10.14414/tiar.v12i2.2875