Tax Litigation's Impact on Auditor Fees: Multisectoral Analysis at B3

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Abstract

This study investigates the factors influencing auditor remuneration in a multisectoral context at B3, addressing a gap in the literature regarding the relationship between tax litigation and auditor fees in Brazil. Utilizing a descriptive methodology based on panel data analysis, data were collected from the Securities and Exchange Commission (CVM) website and the Comdinheiro database, covering 233 companies across various sectors from 2017 to 2022, resulting in 1,398 observations. Employing a fixed-effect econometric model, the study highlights tax litigation (LT) as a key variable. The results reveal that both tax litigation (LT) and its interaction with corporate governance (LT*CG) significantly impact auditor remuneration, confirming the hypotheses. Specifically, an increase in tax litigation is positively associated with higher auditor fees, suggesting that auditors charge more when dealing with companies involved in tax disputes. This study provides a critical empirical foundation for guiding strategic decisions by companies, particularly in selecting audit firms that enhance investor confidence. The findings underscore the importance of understanding the interplay between tax litigation, auditor fees, and corporate governance. It is recommended that future research further explore these variables to deepen insights into the dynamics between auditor remuneration, audit quality, financial performance, and investor confidence over time. The study's contributions are vital for regulators, managers, and investors seeking to navigate the complexities of the Brazilian market and improve corporate governance practices.

Keywords: Tax Litigation, Auditor Remuneration, Corporate Governance, Panel Data Analysis, Brazilian Capital Market.

1 INTRODUCTION

Auditor remuneration plays a crucial role in understanding the complex interconnection between auditing services and the reliability of financial information, especially within the relationship between accounting, corporate finance, and corporate governance. This research investigates how remuneration impacts the autonomy of auditors, internal controls, and corporate management procedures, aiming to clarify methods that contribute to maintaining reliability and transparency in the business environment.

The goal is to enhance company performance and value, emphasizing the importance of corporate governance for sustainability and access to favorable financing. Additionally, auditors are vital in ensuring the transparency and integrity of financial information, underscoring the need for detailed analysis of independent auditor remuneration to understand its impact on audit quality and reliability. This research analyzes a broad spectrum of sectors at B3, subdivided into 26 categories, from agribusiness to information technology, reflecting the complexity and diversity of the Brazilian Stock Exchange's business environment. The aim is to understand the challenges and opportunities faced by companies in each sector and their interactions with the broader economy.

The B3 context is crucial for the economy but faces challenges such as global instability, environmental regulations, and technological innovations. These obstacles highlight the strategic importance of each sub-sector for sustainable growth. Tax litigation exacerbates concerns, necessitating adjustments to corporate governance and auditing practices.

This research addresses the urgent need to understand the relationship between auditor remuneration and tax litigation in the multi-sector context of B3. The lack of research on this specific connection motivated its inclusion to fill an existing gap. Exploring this diversity of sectors can enrich academic knowledge and provide useful insights for various stakeholders. Understanding the influence of remuneration structures on transparency and financial sustainability is vital for regulators, managers, and investors in B3. Additionally, considering tax litigation as a factor in auditor remuneration underscores the importance of understanding the impact of tax issues on auditing and governance..

The research investigates 233 companies listed on B3 between 2017 and 2022, exploring the factors influencing auditor remuneration and its impact on corporate transparency. The research gap prompted the analysis of tax litigation. Two new variables, LT and LT*CG, significantly influence auditors' fees, confirming the research hypotheses. The increase in tax litigation is positively related to auditors' fees, highlighting the importance of service quality in mitigating the effects of tax litigation and investor confidence.

Furthermore, the study examines the impact of regulatory changes on the disclosure of audit fees, from CVM Instruction 480 to CVM Resolution 80. Our aim is to understand how these changes affect companies' ability to provide relevant information, crucial for increasing investor confidence and improving corporate governance. The article follows a logical structure, starting with a literature review, followed by the methodology and analysis of results. We conclude by emphasizing the study's importance in understanding the relationship between auditor remuneration and tax litigation, enriching academic debate, and providing valuable insights for business stakeholders.

2 LITERATURE REVIEW

This section explores the theoretical foundations of the determinants of independent auditor remuneration. The aim is to understand these fundamentals to develop robust and empirically testable research hypotheses, contributing to the advancement of knowledge in auditing and corporate governance. This critical analysis identifies the main forces shaping auditor remuneration.

2.1 Remuneration of Auditors

Auditing, as defined by Kajola et al. (2022) and MASOOD (2023), is a critical review of a company's financial documents by independent auditors to ensure the accuracy of financial statements. Carried out by specialized professionals, as highlighted by Yilmazcan (2023), auditing assesses the compliance of business transactions and the auditor's ability to detect and report accounting errors, as noted by DeAngelo (1981) and Putri and Bergmans (2021). Despite its importance, audit quality still lacks a precise definition, as noted by Soyemi (2021). Mansur (2022) points out that audit quality is influenced by several factors, including the auditor's workload and the quality of accounting information, as evidenced by Kim et al. (2024). Additionally, Andrade (2023) notes that audit quality is a subjective attribute important for the compliance of financial statements.

Auditor independence is crucial for audit quality and confidence in financial statements. As pointed out by Deyganto (2021), independence must be both in fact and in appearance, ensuring that auditors work freely and objectively without external influences. Malek and Saidin (2013) state that auditor independence is essential for the accuracy and compliance of financial statements and has long been a concern of regulators. Audit quality, as highlighted by Fernandez (2024), is fundamental to the accuracy of financial data and directly influences confidence in the information presented.

Castro, Peleias, and Silva (2015) emphasize that user confidence in financial statements depends on the competence and impartiality of the auditor, highlighting the interdependence between independence, perception, and confidence in the audit process. Studying organizational and operational independence together can broaden this understanding, according to Alander (2023). Maintaining high audit quality standards, according to Vu (2023), strengthens confidence in the profession and avoids financial and reporting problems. Ensuring the independence of auditors, as noted by Cărăușu (2022), helps improve company performance and the quality of financial reporting. This aspect is crucial, given ongoing research into the effects of audit quality on companies and auditors' fees, as noted by Saglar (2023) and Nguyen and Kend (2023). The latter highlight the concern of non-Big Four auditors with issues related to audit fees. Fernandez (2024) points out that auditor remuneration impacts audit quality, as mentioned by Tania and Tarmizi (2023). Malek and Saidin (2013) identified factors contributing to auditor remuneration, influenced by concerns about anti-competitive pricing. Hallak and Silva (2012) highlight the influence of auditor remuneration on the quality of audit services, underlining the need for independence and trust in the process to ensure accurate and reliable results. This underscores the fundamental importance of an independent and reliable auditor for securing accurate results.

2.2 Tax Litigation in Brazil

2.2.1 Factors contributing to tax litigation

Tax litigation in Brazil reflects the complexity of the tax system and disputes between taxpayers and tax authorities. Lopo Martinez et al. (2024) point out that this complexity influences business competition, as noted in the World Bank's Doing Business Report (2020), highlighting the prolonged time spent on tax compliance by Brazilian companies. These elements contribute to an environment conducive to controversy, affecting compliance and creating a scenario susceptible to tax litigation. Thus, tax litigation in Brazil addresses various issues, from tax disputes to legal and constitutional interpretations of tax laws.

Baldivieso (2022) highlights the habitual litigants in the Brazilian tax scenario, who benefit from advantages such as prior knowledge of the process and institutional connections, facilitating protracted tax disputes. These conflicts, which are often long-lasting, generate uncertainty and additional costs for companies. Divergent interpretations of tax laws are a major cause of litigation, resulting in extended disputes between companies and tax authorities (Machado, 2021). In response, a detailed analysis of tax provisions and tax avoidance and aggressiveness strategies is essential. Lopo Martinez et al. (2024) emphasize the complexity of the Brazilian legal landscape, characterized by constant changes in tax laws, posing a significant challenge for companies that must adapt to this continuous evolution.

However, despite these difficulties, tax litigation can also be seen as a quest for greater legal certainty and the need to ensure proper enforcement of tax laws. Thus, through tax litigation, taxpayers and tax authorities seek to clarify legal issues and promote a fairer and more efficient application of tax rules.

Companies operating in Brazil are concerned about tax litigation, which can lead to financial liabilities and consume significant resources. To address these complexities, Brazilian tax law proposes a multiport model (Machado, 2021). As noted by Lopo Martinez et al. (2024), the challenges arising from Brazil's complex tax system and associated tax litigation demand sophisticated tax planning and risk management practices from companies. This underscores the importance of a multidisciplinary approach that incorporates knowledge of legislation, accounting, and business strategy to effectively navigate the complexities of tax compliance and litigation.

The impact of tax litigation on a company's capital structure is complex and involves various factors that typically influence a company's financial decisions. Finally, tax litigation in Brazil is a multifaceted phenomenon reflecting the complexities and challenges of the national tax system. Developing policies and practices that promote tax justice, legal certainty, and economic growth depends on a thorough understanding of its causes and consequences.

2.2.2 Impacts of Tax Litigation on Companies

Tax litigation has a major impact on companies in Brazil, influencing both their financial transactions and their business tactics. In this context, it is essential that the tax strategy takes into account potential legal disputes, being crucial for strategic decisions aimed at minimizing costs and mitigating risks (Klassen, Lisowsky & Mescall, 2016).

The uncertainty generated by tax disputes can lead to an increase in compliance costs and a greater need for provisioning for tax contingencies. Companies facing extensive tax litigation can have their balance sheets negatively impacted, especially due to contingent liabilities, affecting investors' and creditors' perception of their financial health. Contingent liabilities are commitments that may arise from past events and may materialize according to uncertain future circumstances. Lopo Martinez et al. (2024). These commitments may indicate obligations that have not been accounted for. This may be due to the low probability of an expense being made or the difficulty of accurately calculating the amount of the debt.

The fact is that there is pressure to tackle abusive tax behavior, which results in tax litigation as a result of government demands for increased tax revenues (Martinez, 2017). As a result, the impact of tax litigation on the composition of a company's capital is complex and involves a variety of factors that generally influence its financial decisions.

According to Lopo Martinez et al. (2024), tax litigation has significant and multifaceted effects on Brazilian companies. Financially, it generates high costs for lawyers and consultants, as well as requiring the provisioning of resources for possible losses, affecting cash flow and the balance sheet. Operationally, it diverts administrative time and resources to managing disputes, hampering operational efficiency. These challenges highlight the need for effective tax management and well-designed legal strategies to mitigate adverse impacts and ensure the long-term sustainability and growth.

2.3 Determinants of Auditor Remuneration

The audit of financial statements results in an audit opinion based on evidence that considers results, risks, and material distortions, as mentioned by Ardianingsih and Setiawan (2022). Auditors' fees are determined by various factors, including cost, audit scope, and company size, as highlighted by the authors. Since the model established by Simunic (1980), additional research has sought to understand the pricing of audit fees, as evidenced by Moutinho et al. (2012). The current study adopts the approach proposed by Vasconcelos, Alves, and Oliveira (2018), modeling fees according to factors such as association with the Big4, company size, and corporate governance. A connection with one of the world's four largest auditing firms may indicate an audit carried out by trained professionals concerned about their reputation, as emphasized by Beatty (1989) and Lawal (2022).

The fees charged by auditing firms are directly linked to the size of the client company, as noted by Akinyomi (2022) and Hallak and Silva (2012). Larger companies tend to spend more on audit services due to the complexity and time required for analysis, as mentioned by Palmrose (1986). The ARINV variable, discussed by Whisenant et al. (2003) and Mitra & Hossain (2007), is useful in identifying financial and operational risks, helping auditors review accounting estimates. The amount of audit fees is influenced by several factors, including the complexity of the services and the time required to complete the tasks, as highlighted by Olowookere (2022) and Saleh (2023). The concept of "audit rotation" arises from discussions about service quality and auditor autonomy, with companies aiming to reduce operational and regulatory risks, as pointed out by Larbi (2024).

The period between the end of the fiscal year and the announcement of financial results, as highlighted by Kim (2024), can impact auditors' workload by reducing the time available to carry out the work. Flexible staffing arrangements can decrease audit quality by easing auditors' workload during busy seasons, as indicated by the author. Disclosure of information on service performance can make guarantees of audit quality and legitimacy necessary, as pointed out by Scott (2024). This statement is reinforced by Castro, Peleias, and Silva (2015), who highlight the importance of time as an additional element in the audit, which can impact auditors' remuneration. Additionally, the number of business segments also influences auditor remuneration, as noted by Moraes and Martinez (2024).

Companies with multiple segments face more complex operations, demanding a thorough analysis from auditors and consequently increasing audit fees. This operational complexity can be influenced by several factors, as highlighted by Larbi (2024) and Shakhatreh and Alsmadi (2021), who point out that audit fees are influenced by corporate characteristics such as company size, audit firm size, and client company age. Corporate governance also plays a crucial role in audits, aiming to increase the value and performance of the company, as highlighted by Moraes and Martinez (2014). Bortolon, Sarlo Neto, and Santos (2013) suggest that more robust corporate governance practices can improve audit costs, although they can reduce the risk of external audits, impacting service costs. Although governance quality and audit fees can be complementary, Vasconcelos, Alves, and Oliveira (2018) show that this relationship is not always true. On the other hand, Larbi (2024) notes that better governance is associated with more external auditors and, consequently, higher fees.

2.4 Tax Litigation as a Determinant of Auditor Remuneration

There are several determinants of auditor remuneration in the literature, and a new variable that can be tested to identify its influence is tax litigation (TL). Studies such as Lopo Martinez et al. (2024) have observed that the complexity and inflection of the Brazilian tax system are distinctive characteristics. Due to compliance requirements and the management of tax litigation, companies face a variety of challenges.

Despite the significant importance of tax litigation (TL) in the business context, there is a notable lack of studies exploring the relationship between TL and auditor remuneration. To date, the literature does not include a specific analysis of how tax litigation influences audit fees.

Growing tax litigation complicates companies' operations, affecting the extent and complexity of the audit procedures needed to ensure accurate financial statements. Auditors must invest more resources and time to understand how tax litigation can affect the finances and operations of audited companies. Additionally, Constantino (2021) points out that tax litigation can compromise the reliability of accounting estimates related to tax liabilities and contingency provisions. To ensure adequate financial disclosures, auditors may need to carry out more in-depth tests and reviews of companies' accounting policies.

Therefore, tax litigation is an important component that directly impacts the scope and complexity of audits, resulting in higher audit fees. It is essential to consider that tax litigation can play a significant role in auditor remuneration, especially in Brazil, with its ever-changing legal and regulatory system. The lack of specific studies on this relationship highlights the need for research to fill the gap in the literature.

Furthermore, it is important to emphasize that this research represents an unprecedented contribution to the Brazilian scenario. To date, there are no studies that specifically explore how tax litigation influences the remuneration of independent auditors in Brazil. Therefore, this research aims to fill this gap in the literature, providing valuable insights into a new variable determining auditor remuneration in the Brazilian context.

2.4.1 Formulation of the Hypothesis: Investigation of the Relationship Between Tax Litigation and Auditor Remuneration

Based on the literature review, there is a need to investigate the relationship between corporate tax litigation and the remuneration demanded by auditors, as no studies currently exist on this subject, making this research unprecedented.

In this context, research hypothesis 1 (H1) posits that: **H1 - The higher the tax litigation, the higher the remuneration demanded by auditors.** This hypothesis seeks to explore the possible influence of tax litigation on remuneration negotiations with auditors and to understand how tax litigation can influence companies' audit costs.

Additionally, research hypothesis 2 (H2) proposes: **H2 - Companies with higher tax litigation will tend to pay higher fees to auditors, especially when they have effective corporate governance practices.** This hypothesis seeks to examine the role of corporate governance in the relationship between tax litigation and auditor remuneration, and how governance structures can mitigate or accentuate the effects of litigation on auditor remuneration.

Given the gap in the literature and the practical relevance of the relationship between tax litigation and auditor remuneration, this research seeks to fill an important knowledge gap. By investigating the proposed hypotheses, we hope to contribute to a better understanding of the determinants of auditor remuneration and provide valuable insights for companies, auditors, and regulators. Additionally, the results of this study may have significant implications for the development of policies and practices related to corporate governance and tax risk management. Ultimately, this research aims to provide a sound basis for informed decision-making and to promote transparency and efficiency in financial markets.

3 METHODOLOGY

3.1 Method

The method used in this study is quantitative descriptive, as defined by Barros and Lehfeld (2000, p. 70), complemented by panel data analysis. This approach is appropriate for testing hypotheses and investigating causal relationships between variables using numerical data and statistics. Panel data analysis makes it possible to explore the relationship between audit fees and their determinants over time and across different companies. This methodology enables a detailed understanding of the characteristics and patterns present in the data and was applied in this study to describe and analyze the relationship between the remuneration of independent auditors and various variables in companies listed on B3.

To support the study, a comprehensive literature review on the subject was carried out, following the example of Putri and Bergmans (2021). This review aimed to identify relevant studies on the relationship between the remuneration of independent auditors and the financial variables of the sampled companies. Based on this review, the main concepts, theoretical model, and statistical methods used in this study were outlined.

3.2 Data Collection Procedures

The study began with a population of 386 companies listed on B3 between 2017 and 2022. After excluding 34 financial companies and 56 without information on tax contingencies, as well as removing 63 companies without other relevant data, the final sample totaled 233 companies. The quantitative description of the financial data, according to Soyemi's model (2021), resulted in 1,398 observations detailed in Table 1. The data was mainly obtained from the website of the Brazilian Securities and Exchange Commission (CVM) and the Comdinheiro platform.

The Securities and Exchange Commission (CVM) website provides information on the remuneration of independent auditors, which was extracted from the reference forms available on the CVM website. These forms detail the fees paid for accounting audit services, broken down by type of service. Data collection on auditor remuneration focused on fees related to accounting audit services performed by independent auditors. This information was extracted through documentary analysis of the reference form (FR), specifically section 2 (dedicated to independent auditors). This form details the total remuneration paid to independent auditors, broken down by type of service. Continuous efforts were made to ensure the consistency and reliability of the information collected.

The Comdinheiro platform has a database that provides access to detailed financial information on companies, including market value, assets, liabilities, and profit, among others. Additionally, it includes tax litigation data, representing the company's exposure to tax issues, calculated as the sum of the tax provision and the contingent tax liability.

From this database, various relevant pieces of information were obtained, such as the companies' market value, accounts receivable, inventories, and total assets. This data was essential for structuring the study's variables. The collection covered 233 companies over six years, from 2017 to 2022. After completing the data collection and transformation stages, the variables were organized into a panel format, facilitating the longitudinal monitoring of each company's information.

Table 1: Sample Selection: B3 Listed Companies		
Sub-sector	Company	Observations
Agribusiness 3		18
Water and Sanitation	4	24
Processed foods	11	66
Consumer Goods and Retail	13	78
Biofuels, Gas and Oil	10	60
Pulp, Paper and Wood	6	36
Trade	12	72
Construction and Real Estate	28	168
Energy and Basic Services	33	198
Holding	7	42
Industry	8	48
Industry - Machinery and Equipment	7	42
Industry - Construction Materials	2	12
Industry - Road Equipment	6	36
Computing	2	12
Metallurgy and Steel	11	66
Mining	2	12
Participation	1	6
Petrochemical	4	24
Health	14	84
Services	13	78
Educational Services	4	24
Fabrics, Clothing and Footwear	12	72
Information Technology	5	30
Transport	13	78
Household Utilities	2	12
Total	**233**	**1.398**

Source: B3

3.3 Data Analysis Procedures

The study adopted a quantitative approach to analyze the data collected, as proposed by Deyganto (2021). Initially, the data was organized into an electronic database using statistical software and subjected to descriptive analyses to examine basic characteristics, such as means and standard deviations. Correlation analyses were then carried out to investigate the relationships between the variables of interest. The multiple linear regression model was used to identify the main factors associated with the dependent variable. All statistical procedures were conducted at a 5% significance level.

3.4 Variables

This section provides definitions of the variables, most of which are derived from financial information obtained from the Comdinheiro database. To understand the determinants of auditor remuneration in the sample of companies listed on B3, a set of variables is presented for analysis:

- LN_AF: Represents the natural logarithm of audit fees.
- LT: Tax Litigation (LT) represents the reported amount of tax issues in administrative and judicial tax proceedings still pending a decision. It is calculated as the sum of the tax provision and the contingent tax liability, divided by the company's total assets.
- LT×CG: Aims to measure the moderating effect of corporate governance (CG) on the relationship between tax litigation (LT) and auditor remuneration.
- LN_NAF: Represents the natural logarithm of consultancy fees.
- BIG4: This is a dummy variable that takes the value of 1 for companies belonging to the four largest auditing firms in the world, known as the Big Four (PricewaterhouseCoopers, Deloitte, Ernst & Young, and KPMG), and the value of 0 for the other companies.
- LTA: Represents the natural logarithm of total assets at the end of the fiscal year.
- ARINV: This is a measure that combines the company's receivables and inventory, expressed as a proportion of total assets.
- TENURE: Denotes the period during which the auditor has been involved in auditing the company.
- REPLAG: This is the number of days between the end of the fiscal year and the announcement of the company's financial results.
- SEGMENT: Represents the number of different business segments the company has.
- AGE: Represents the age of the company in absolute terms.
- CG: This is a dummy variable that takes the value of 1 for cases of listing in one of BM&FBovespa's corporate governance segments and the value of 0 for the others.

3.5 Econometric Model

3.5.1 Relationship Between Audit Fees and their Determinants

To test the hypothesis, the following equation was estimated using panel data:

$$LN\_AF=\beta_0+\beta_1 LT_{it}+\beta_2(LT_{it}\times CG_{it})+\beta_3 LN\_NAF_{it}+\beta_4 BIG4_{it}+\beta_5 LTA_{it}+\beta_6 ARINV_{it}+ \beta_7 TENURE_{it}+\beta_8 REPLAG_{it}+\beta_9 SEGMENT_{it}+\beta_{10} AGE_{it}+\beta_{11} CG_{it}+\epsilon_{it} \quad (1)$$

Where β_0 indicates the intercept, ϵ_{it} represents the error term, and the remaining variables are defined in section 3.4. The estimation method is LS (Least Squares) or LS and AR (Autoregressive), as used by Cărăușu (2022). This model covers a wide range of variables potentially related to audit fees, to investigate the influence of various factors on the aforementioned dependent variable. In addition, the total assets variable is transformed using the natural logarithm to better fit the model's assumptions. The hypothesis is confirmed when the statistical analysis reveals a statistically significant relationship between audit fees (dependent variable) and at least one of the independent variables included in the model, such as tax litigation (LT) and its interaction with corporate governance (LT×CG). This significance is indicated by a p-value below 0.05, showing that the relationship is not a coincidence and that the independent variables influence audit fees.

4. ANALYSIS OF RESULTS

This section presents the study's results. Initially, the data were analyzed using descriptive statistics (Table 2), univariate analysis of mean differences (Table 3), and scatter plot and correlation matrix (Table 4). Table 2 provides an overview of the data, Table 3 examines the average distributions across quartiles to find trends, and Table 4 shows relationships between variables. Subsequently, the results of the model estimation are reported and analyzed, with significant relationships highlighted in Table 5.

4.1 Results

4.1.1 Descriptive Statistics

To conduct the econometric analysis provided for in the model developed exclusively for this study, 1,398 observations were collected. The descriptive statistics of the variables included in equation 1 are shown in Table 2.

Table 2: Descriptive Statistics

Variables	Minimum	1st Quar.	Median	Average	3rd Quar.	Maximum	Standard Deviation
LN_AF	1.386	5.684	6.524	6.572	7.388	10.595	1.417
LT	0.000	0.007	0.034	0.168	0.105	7.293	0.603
LT*CG	0.000	0.000	0.000	0.029	0.000	4.774	0.237
LN_NAF	0.000	0.000	0.000	2.104	5.063	9.785	2.968
BIG4	0.000	0.000	1.000	0.720	1.000	1.000	0.449
LTA	2.479	7008	8.277	8.274	9.580	13.803	1.838
ARINV	0.000	0.055	0.154	0.211	0.327	0.899	0.197
TENURE	1.000	1.000	3.000	2.969	4.000	19.000	2.130
REPLAG	22.000	58.000	75.000	76.619	86.00	606.000	38.434
SEGMENT	1.000	1.000	4.000	8.343	12.000	93.000	10.695
AGE	1.000	18.000	41.000	35.910	52.00	115.000	19.266
CG	0.000	0.000	0.000	0.132	0.000	1.000	0.339

Where: **LN_AF** represents the natural logarithm of audit fees; **LT** (Tax Litigation) represents the reported amount of tax issues in administrative and judicial proceedings, calculated as the sum of the tax provision and contingent tax liability divided by the company's total assets; **LT×CG** measures the moderating effect of corporate governance on the relationship between tax litigation and auditor remuneration; **LN_NAF** represents the natural logarithm of consulting fees; **Big4** is a dummy variable (1 for companies audited by the Big Four: PricewaterhouseCoopers, Deloitte, Ernst & Young, and KPMG; 0 for others); **LTA** represents the natural logarithm of total assets at the end of the fiscal year; **ARINV** is the proportion of the company's receivables and inventory to total assets; **TENURE** denotes the period the auditor has been auditing the company; **REPLAG** is the number of days between the end of the fiscal year and the announcement of financial results; **SEGMENT** represents the number of distinct business segments the company has; **AGE** represents the age of the company; **CG** is a dummy variable (1 for companies listed in one of BM&FBovespa's corporate governance segments; 0 for others).

In the statistical analysis, the average fees paid to audit firms (LN_AF) total 6.572, providing insight into the costs associated with auditor remuneration. This is crucial to understanding the cost structure of companies in the sector. The average size of the companies (LTA), calculated at 8.274, highlights the relevance of the fees in average terms, which are high compared to the amount of the companies' assets. Considering the results in Table 2, we note that the variable LT (Tax Litigiousness) has a median of 0.034 and a standard deviation of 0.603, indicating considerable variation in the levels of tax litigiousness among the companies in the sample. Additionally, the LT*CG variable, which measures the interaction between tax litigation and corporate governance, has a median of 0.000 and a standard deviation of 0.237, highlighting the variability in the way corporate governance influences this relationship among companies. These results underscore the complexity of the dynamics between tax litigation and corporate governance in the business context. The presence of considerable maximum values suggests that some companies may be facing significant tax litigation, which could have implications for their operations and financial strategies.

4.1.2 Univariate Analysis of Differences of Means

The following are the results of a univariate test of the difference in means between quartiles (Q1 and Q4) of our study for the variables "Auditor Remuneration" and "Tax Litigation." The aim of this analysis is to discover the average distributions of the variables across the quartiles and to identify trends or patterns in our data.

Table 3: Univariate Difference of Means Test

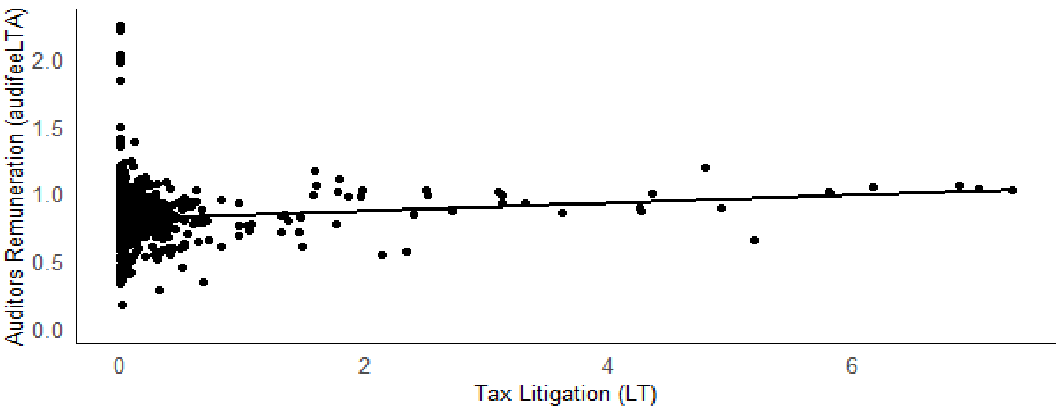
Variables	Q1 (25%)	Q2 (50%)	Q3 (75%)	Q4 (100%)
Average LN_AF	5.896	6.548	6.877	6.967
LT	0.007	0.034	0.105	7.293

The Welch Two Sample t-test shows a statistically significant difference between the means of the groups (group_Q1 and group_Q4); group_Q4 shows a higher mean than group_Q1. The estimated difference is -1.071.

The study reveals that the upper quartiles tend to pay higher fees to auditors and face more tax litigation than the lower quartiles. These results highlight the complexity of the market and the need for adaptable strategies to deal with the different demands of each segment. In short, the analysis suggests that companies with higher tax litigation tend to pay their auditors more.

4.1.3 Scatter Plot

The scatter plot below provides a visual representation of the relationship between tax litigation (LT) and auditor remuneration (audfeeLTA), complemented by a regression line. The analysis reveals a general upward trend in auditor remuneration as tax litigation intensifies. This finding indicates a positive correlation between these variables, suggesting that companies subject to tax litigation tend to pay their auditors more generously.



The analysis reveals scattered points in relation to the regression line, indicating variations in the data not fully explained by the linear relationship between the variables.

These variations can be attributed to complex dynamics in the business environment, including regulatory changes and specific corporate governance models not addressed in the initial analysis. Furthermore, the intrinsic complexity of the relationship between tax litigation and auditor remuneration suggests the influence of additional factors, such as regulatory complexity and management strategies, highlighting the need for more detailed analysis for a complete understanding. The graph presented serves as a valuable starting point for further investigation into this relationship, emphasizing the importance of a comprehensive approach to interpreting complex data and encouraging additional analysis for a broader understanding of the phenomenon.

4.1.4 Variable Correlation Matrix

In this section, we explore the correlation matrix of the variables, comparing the Pearson and Spearman coefficients. The robustness of the Shapiro-Wilk test in evaluating Spearman's correlation eliminates the need for data normality, accommodating atypical values. Analyzing the relationship between LN_AF (audit fees) and LT (tax litigation) using Spearman's correlation, we found a positive correlation of 0.258. This suggests that companies with higher levels of tax litigation tend to pay higher audit fees, highlighting the direct impact of tax challenges on compliance costs.

Furthermore, the correlation between LN_AF and LT*CG (interaction between tax litigation and corporate governance) revealed a positive association of 0.216. This indicates that the combination of tax litigation and robust corporate governance practices can lead to increased audit costs. The LN_AF variable also shows a strong positive correlation of 0.464 with consulting fees (LN_NAF), suggesting that higher consulting fees are associated with higher audit fees. Similarly, the correlation of 0.569 between LN_AF and the use of Big Four audit firms (BIG4) indicates that companies hiring these firms tend to incur higher audit fees.

However, correlations between LN_AF and other variables, such as ARINV (receivables and inventory), TENURE (auditor tenure), REPLAG (report lag), SEGMENT (number of business segments), AGE (company age), and CG (corporate governance), are weak or minimal. This indicates a limited association of these variables with audit fees. These findings emphasize the significant role of tax litigation and its interaction with corporate governance in determining audit costs, while other factors play a less substantial role.

Table 4: Correlation Matrix

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	LN_AF		0.258	0.216	0.464	0.569	0.700	0.015	0.113	-0.317	0.179	-0.129	0.210
(2)	LT	-0.026		0.152	0.042	0.083	0.188	0.028	-0.013	0.079	0.029	0.123	0.128
(3)	LT*CG	0.058	0.364		0.097	0.060	0.252	0.021	0.029	-0.091	-0.052	0.153	0.996
(4)	LN_NAF	0.485	-0.061	-0.034		0.325	0.438	-0.066	0.109	-0.245	0.132	-0.114	0.097
(5)	BIG4	0.545	-0.100	-0.072	0.321		0.433	0.005	0.083	-0.310	0.119	-0.193	0.065
(6)	LTA	0.693	-0.112	-0.011	0.443	0.436		-0.139	0.055	-0.388	0.096	-0.050	0.251
(7)	ARINV	-0.048	0.053	-0.055	-0.106	-0.039	-0.155		0.006	0.055	0.246	0.091	0.020
(8)	TENURE	0.131	-0.051	-0.025	0.128	0.118	0.056	0.001		-0.004	0.022	0.029	0.031
(9)	REPLAG	-0.167	0.083	0.052	-0.116	-0.113	-0.201	0.086	0.052		-0.006	0.012	-0.056
(10)	SEGMENT	0.175	-0.030	-0.018	0.159	0.130	0.129	0.142	0.043	0.020		0.012	-0.056
(11)	AGE	-0.129	0.011	-0.014	-0.116	-0.185	-0.064	0.095	-0.082	-0.061	0.117		0.155
(12)	CG	0.215	0.033	0.316	0.103	0.065	0.259	-0.017	0.027	-0.080	-0.071	0.163	

Spearman

Pearson

Where: LN_AF represents the natural logarithm of audit fees; LT (Tax Litigation) is the reported amount of tax issues in administrative and judicial tax proceedings still pending a decision, calculated as the sum of the tax provision and contingent tax liability divided by total assets; LT*CG measures the moderating effect of corporate governance on the relationship between tax litigation and auditor remuneration; LN_NAF represents the natural logarithm of consulting fees; BIG4 is a dummy variable for companies audited by the Big Four (PricewaterhouseCoopers, Deloitte, Ernst & Young, and KPMG); LTA is the natural logarithm of total assets at the end of the fiscal year; ARINV combines receivables and inventory as a proportion of total assets; TENURE denotes the period the auditor has been auditing the company; REPLAG is the number of days between the fiscal year-end and the announcement of financial results; SEGMENT represents the number of distinct business segments; AGE represents the company's age; CG is a dummy variable for companies listed in one of BM&FBovespa's corporate governance segments.

4.2 Discussion

The results elucidated in Table 5 provide us with an in-depth understanding of the factors that influence audit fees and tax litigation in a multi-sector context at B3. With an R-squared of 0.599, most of the variation in fees can be attributed to the independent variables chosen, which signals the robustness of the model in capturing the essential determinants of these costs. Furthermore, an F-Statistic of 188.780 confirms the significance of at least one independent variable in explaining the dependent variable (i.e. a variable with a p-value at a significance level of 0.05).

The intercept (C) in the regression reveals a coefficient of 2.602 and a t-statistic of 16.501, indicating statistical significance ($p < 0.01$). This emphasizes that there are inherent costs to auditing, regardless of the size or complexity of the company (Kajola et al., 2022). Hiring large, renowned auditing firms increases fees to guarantee the veracity of the information in the audited statements. These basic costs cover fixed expenses such as quality maintenance and regulatory compliance, which are essential to ensure the accuracy and integrity of financial information (Kajola et al., 2022). Therefore, fees must be adequate to support these complex processes and ensure compliance with regulations and quality standards.

The coefficient associated with the variable "Tax Litigation (LT)" indicates that an increase in tax litigiousness is positively related to the value of auditors' fees. Specifically, for each unit increase in tax litigation, an increase of approximately 0.103 units in auditors' fees is expected, holding all other variables constant. This suggests that companies with a greater number of tax issues pending decision may face higher costs associated with audit services. This relationship is statistically significant at a 5% significance level, with a p-value of 0.0181, implying that tax litigation has a statistically significant impact on auditors' fees. Therefore, this finding highlights the importance of considering tax litigation when analyzing the determinants of audit fees, as it reflects the additional complexity and risk faced by auditors when examining the financial statements of companies involved in tax disputes. In this context, research hypothesis 1 is confirmed.

Table 5: Relationship between Audit Fees and Their Determinants

Variables	Coef.	Std. Err.	t-Statistic	Prob.
C	2.602	0.157	16.501	0.000 ***
LT	0.103	0.043	2.366	0.018 **
LT*CG	0.406	0.117	3.465	0.000 ***
LN_NAF	0.079	0.009	8.543	0.000 ***
BIG4	0.825	0.061	13.343	0.000 ***
LTA	0.378	0.016	22.972	0.000 ***
ARINV	0.418	0.126	3.300	0.001***
TENURE	0.033	0.011	2.915	0.003 ***
REPLAG	-0.001	0.000	-1.971	0.048**
SEGMENT	0.006	0.002	2.872	0.004 ***
AGE	-0.003	0.001	-2.475	0.013 ***
CG	0.160	0.080	1.979	0.047 **

R-Squared 0.599
Adjusted R-squared 0.596
Standard error 0.899
F-Statistic 188.780
Comments 1.398

Where: Tax Litigation (LT) represents the reported amount of tax issues in administrative and judicial tax proceedings still pending a decision. It is calculated as the sum of the tax provision and contingent tax liability, divided by the company's total assets. LT*CG aims to measure the moderating effect of corporate governance (CG) on the relationship between tax litigation (LT) and auditor remuneration. LN_NAF represents the natural logarithm of consultancy fees. Big4 is a dummy variable that takes the value of 1 for companies belonging to the four largest auditing firms in the world, known as the Big Four (PricewaterhouseCoopers, Deloitte, Ernst & Young, and KPMG), and the value of 0 for other companies. LTA represents the natural logarithm of total assets at the end of the fiscal year. ARINV is a measure that combines the company's receivables and inventory, expressed as a proportion of total assets. TENURE denotes the period of time during which the auditor was involved in auditing the company. REPLAG is the number of days elapsed between the end of the fiscal year and the announcement of the company's financial results. SEGMENT represents the number of distinct business segments the company has. AGE represents the age of the company. CG is a dummy variable that takes the value of 1 for cases of listing in one of BM&FBovespa's corporate governance segments and the value of 0 for others. LT (Tax Litigiousness) represents the company's exposure to tax issues, calculated as the sum of the tax provision and the contingent tax liability, divided by total assets.

***, ** and * indicate statistical significance at 1%, 5% and 10%

Based on the coefficient of 0.406 for the LT*CG interaction, with a p-value of 0.000, we can see that this interaction is statistically significant at a 1% significance level. This indicates a robust relationship between tax litigation (LT), corporate governance (CG), and auditor remuneration. A positive and significant coefficient for the LT*CG interaction suggests that corporate governance can intensify the impact of tax litigation on auditors' fees. This implies that companies with better corporate governance practices and higher levels of tax litigation tend to pay higher fees to auditors compared to companies with similar levels of tax litigation but less effective corporate governance. These results emphasize the importance of sound governance in managing tax risks and determining audit costs, especially in companies with a significant history of tax litigation. The statistical significance at a 1% confidence level reinforces the robustness of these findings and the relevance of corporate governance in the relationship between tax litigation and auditor remuneration. Thus, research hypothesis 2 is confirmed.

The study revealed several significant associations between variables related to audit fees, providing important insights into the determinants of these costs and their implications. The significant correlation between the logarithm of consulting fees (LN_NAF) and audit fees (LN_AF) ($p < 0.01$) indicates that companies that charge more for audits also tend to charge more for consulting services, especially in complex audits (Kajola et al., 2022). Additionally, the positive relationship between audit fees and hiring the Big Four (coefficient of 0.825, $p < 0.01$) suggests that companies seek credibility and reputation by paying more for these audit firms (Larbi, 2024).

Company size, expressed as the natural logarithm of total assets (LTA), is significantly related to audit fees (coefficient of 0.378, $p < 0.01$), highlighting how larger companies require more detailed audits to ensure the accuracy of financial information (Lawal, 2022; Tania and Tarmizi, 2023). The ARINV variable, which combines receivables and inventory as a proportion of total assets, also shows a significant positive association with higher audit fees (coefficient of 0.418, $p < 0.01$) (Whisenant et al., 2003; Mitra & Hossain, 2007). Similarly, TENURE, representing the auditor's length of involvement with the company, shows a modest but significant association with audit fees ($p < 0.01$).

On the other hand, analysis of the REPLAG variable reveals a significant negative correlation ($p < 0.05$), indicating that longer periods between the end of the fiscal year and the release of financial results are associated with reduced audit fees, contrary to previous expectations (Tania and Tarmizi, 2023). The SEGMENT variable shows that companies with operations in multiple business segments tend to have a more complex structure, resulting in more detailed and extensive audits, reflected by an increase in audit fees ($p < 0.01$). Meanwhile, company age (AGE) reveals a weak but statistically significant association, suggesting that older companies tend to pay lower audit fees.

Highlighting the importance of corporate governance, the results show that sound governance increases the transparency and reliability of financial information, requiring more rigorous and consequently more costly audits (Xue and O'Sullivan, 2023; Shakhatreh, 2021). Additionally, dealing with companies involved in tax litigation increases the complexity of the audit, resulting in higher fees due to the effort and time required for an accurate audit. This suggests an intersection between corporate governance, choice of audit firms, and operational complexity for future investigation.

5 CONCLUSIONS

This study is a pioneering investigation into two new variables that determine auditor remuneration at B3. Notable for its originality due to the lack of studies on the subject in the Brazilian literature, the research introduces the variable Tax Litigation (LT), which measures tax issues in administrative and judicial proceedings pending a decision. Calculated as the sum of the tax provision and the contingent tax liability divided by the company's total assets, LT offers crucial insights into auditing and corporate governance practices. In addition, the LT*CG variable investigates the moderating effect of corporate governance (CG) on the relationship between tax litigation (LT) and auditor remuneration. This analysis provides a deeper understanding of how governance quality influences audit costs in companies with high levels of tax litigation.

Using a robust fixed effect model, 1,398 companies were analyzed from 2017 to 2022. The results show that both Tax Litigation (LT) and LT*CG have a significant impact on auditor remuneration, confirming hypotheses 1 and 2. In other words, an increase in tax litigation is positively related to the amount of auditors' fees, indicating that auditors tend to charge more when working with companies involved in tax litigation.

This study also reveals that the audit process can be prolonged in cases of tax litigation, due to the need for detailed reviews and the specialized expertise required.

Companies with better corporate governance practices and greater tax litigation tend to pay higher fees to auditors, reflecting the additional complexity and risks involved. In addition, several other variables, such as consultancy fees, affiliation with large firms, size and age of the company, have shown significant influence. The increasing complexity of financial operations demands specialized advice, which is reflected in higher audit and consulting fees to meet regulatory requirements and stakeholder expectations.

The choice of the Big Four is associated with higher audit fees, highlighting the importance of reputation and experience for stakeholders. The size of companies also has a direct influence on auditors' fees, highlighting the complexity of operations and the need for comprehensive audits to ensure transparency. Additionally, the positive correlation between audit fees and consultancy fees suggests that companies with complex audit requirements also require extensive consultancy services, further driving up costs.

Another significant finding is the impact of corporate governance on audit fees. Companies with robust governance practices incur higher audit costs, emphasizing the role of governance in ensuring the reliability and transparency of financial information. This relationship is particularly pronounced in companies facing significant tax litigation, where the need for rigorous audit practices is paramount.

The findings of this study provide a valuable empirical basis for guiding companies' strategic decisions, including the choice of audit firms that promote investor confidence. The significant influence of Tax Litigiousness (LT) and the LT*CG interaction variable on audit fees highlights the importance of future research in this field. It is recommended to emphasize the use of these discovered variables in new studies, aiming at a deeper understanding of the dynamics between auditor remuneration, audit quality, and other aspects related to financial performance and investor confidence over time.

Despite the contributions of this research, it is important to acknowledge its limitations. One limitation is the focus on companies listed on B3, which may limit the generalizability of the findings to other contexts or markets. Additionally, the study period from 2017 to 2022, while comprehensive, may not capture longer-term trends or the impact of recent regulatory changes. Future research could extend the analysis to different markets and longer time frames to validate and expand upon these findings. Moreover, the study primarily relies on quantitative data; incorporating qualitative insights from auditors and corporate managers could provide a richer understanding of the factors influencing auditor remuneration.

In conclusion, this research contributes to the academic debate by filling a gap in the Brazilian literature on the determinants of auditor remuneration. It underscores the importance of considering tax litigation and corporate governance in audit fee models. The insights provided by this study are vital for regulators, managers, and investors seeking to navigate the complexities of the Brazilian market and improve corporate governance practices. Future research should continue to explore these variables to deepen our understanding of how they influence audit quality and financial performance, ultimately promoting a more transparent and efficient financial market.

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