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DETERMINANTS OF INDEPENDENT AUDIT FEES IN BRAZILIAN COMPANIES

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Abstract

Accounting and financial reports summarize the financial situation of companies and are essential for decision-making. Independent auditors verify this information, and the value of their fees is a point of interest in literature. This study analyzes the determining factors of audit fees for companies listed on B3. The research is quantitative, based on 182 companies listed between 2017 and 2020, using descriptive statistics, mean tests, regression with panel data and bootstrap. The results indicate that companies audited by BIG4 firms, which have larger audit committees and were part of the pandemic year tend to have higher costs. However, a greater number of members on the committee reduces costs. The bootstrap technique confirmed the consistency of the model estimators.

Keywords:

Determinants, Fees, Independent auditorium, Brazil

1. INTRODUCTION

Companies carry out their operations and produce documents that record relevant facts, which will support internal decision-making or that of interested parties in the companies. Records involving accounting and financial reports summarize the company's financial situation. However, there are examples (such as the Worldcom and Enron cases) that warn of improper or manipulated records of such statements, which raise uncertainty about the reliability of the information passed on to the market [22] [23].

To face this impasse, governance mechanisms are required by those interested in the company, among such instruments is the independent audit of this information. Therefore, specialized companies are hired to express an opinion on the adequacy of the statements to the company's reality, considering the materiality and sampling of certain accounts. Thus, audit contracts are signed, with an extension of the work and the amount of the fees. The latter arouse academic/professional interest due to the belief that they signal some aspect of the company's risk, because, perhaps, the greater demand for work, and consequent increase in the cost of the audit, to reach an opinion would indicate greater difficulty in accessing or attesting to the quality of internal controls [22], [24] - [26].

The value of audit fees has been the subject of study because it indicates perceived risk and complexity of the work. Thus, this study seeks to answer: what factors determine the audit fees of non-financial firms listed on B3? The objective of this research is to analyze these determinants, considering recent impacts, such as the COVID-19 pandemic.

To this end, 182 companies were analyzed from 2017 to 2020, applying descriptive statistics, mean tests, and regression models. The bootstrap technique was used to validate the consistency of the estimators.

The relevance of the work is evident in its contributions, specifically those associated with the academic and professional worlds. With regard to the scientific academy, the research contributes by working with a recent sample (covering up to the most critical period of the pandemic in 2020), includes companies representing various sectors and uses more sophisticated statistics, which allows the work to contribute to the understanding of possible determining factors for the amounts charged as fees, presenting evidence that contributes to the topic.

The managerial contribution lies in the observation that the professional environment can benefit from knowing one more of its characteristics: the expense they incur in auditing costs of their statements. Therefore, understanding what influences such costs can support a series of decisions, such as strategic planning on the possibility of reducing this compliance/governance cost. It is also possible to use the signaling effect of fees as one of the approaches to corporate risk, which is very useful for analysts working in the capital market to support decisions involving business combinations for companies [21].

2. LITERATURE REVIEW

2.1 INDEPENDENT AUDIT

As companies develop, both in terms of geographic expansion and business complexity, the practice of splitting control (management) and ownership (possession) gains momentum, so that shareholders (principals) cede control to executives (agents) hired to manage the company in the interests of the owners. However, this confluence of interests does not always occur, which characterizes an agency conflict, given that the agent has a timely and higher level of information than the principal, a situation marked by information asymmetry. Thus, the actions of executives can harm both the quantity and quality of information provided to owners and the market, and they may even feel tempted to divert funds and use the company for their own personal interests [23], [27], [28].

In addition to this more classic agency conflict, the pulverization of capital has given the spotlight to another asymmetrical relationship, this time between majority and minority shareholders. There is a risk of expropriation of minority shareholders, given the concentration of power or influence of the dominant shareholders in corporate management. Nevertheless, financial crises (such as the Asian crisis in 1997 and the global crisis of 2008) and corporate scandals (such as Worldcom and Enron) have raised doubts about the quality of the information made available, the effectiveness of regulatory bodies and the systems for protecting investors and other stakeholders [22], [29], [30], [31].

According to [22], these occurrences of scandals foster policymakers' distrust of the effectiveness of corporate governance mechanisms that should inhibit these situations.

According to the authors, this situation has led to calls for more regulation of corporate behavior, culminating in laws such as Sarbanes-Oxley in 2002 and Dodd-Frank in 2010. In addition to the increase in the compulsory protective framework, the adoption of voluntary corporate governance practices also contributes to strengthening stakeholder confidence, recognizing and rewarding such companies, such as the 'environmental, social and corporate governance' (ESG) label for companies that are aware of environmental, social and corporate demands [32]. Among the mandatory or voluntary practices that a company can adopt are the creation of internal management oversight bodies, periodic disclosure of information, adoption of good practices expected by special segments of stock exchanges, internal and external auditing, among others.

In turn, auditing plays an important role as an information intermediary between companies and users of accounting information, since it aims to point out inconsistencies in the statements before they are released into the market. In this context, by validating corporate information, auditing becomes a mechanism that can provide users with greater security, which highlights its social function of reducing risks, as well as adding value to the company [11], [21], [24], [25], [26].

It should be noted that the external - or independent - audit is carried out by an independent professional, with no connection to the company's staff, so that his intervention is set out in the service contract, but his report is not subordinated to the injunctions or interests of the contractor. In his work, the auditor will carry out tests and make inquiries wherever there is a need to raise questions that will clarify the conclusion of the work, including the risks of the client company, influencing decisions such as the acceptance of the client, the extent of the tests, the type of opinion and the fees [24], [33], [34].

Law 6.404, of December 15, 1976, in §3 of art. 177, states that the financial statements of Brazilian publicly traded companies must be submitted for examination by independent auditors registered with the Brazilian Securities and Exchange Commission (CVM). Law 11.638, of December 28, 2007, in article 3, extended the obligation to large companies with total assets of more than R$ 240 million or gross revenue of more than R$ 300 million. Also obliged to contract these services are publicly traded companies that make up the securities distribution and intermediation system, in accordance with Article 26 of Law No. 6385 of September 7, 1976. Regulatory bodies oblige: The National Electric Energy Agency (ANEEL) regulates, by means of art. 7, II, §3 of Normative Resolution no. 369, of February 23, 2010, that electricity companies are obliged to have their statements audited. Health care plan operators are required by Law No. 9,656 of June 3, 1998. The National Telecommunications Agency (ANATEL) requires telecommunications concessionaires to have their financial statements audited by Resolution No. 396 of March 31, 2005. The Central Bank of Brazil (BACEN) regulates the publication of audited statements, in accordance with Resolution 3,198 of May 27, 2004. Resolution No. 118, of December 22, 2004, of the National Private Insurance Council, makes this mandatory for insurance companies, capitalization companies and open supplementary pension entities [3], [33], [35].

It is a compulsory process for these entities and because it promotes greater reliability in the financial statements, the issues surrounding independent auditing arouse the interest of the business community, regulators, investors and even academics. Such issues include the risk perceived by the auditor, opinions on the company's suitability and the amount charged for auditing services, for example.

A range of studies on the determinants of audit fees in Brazil have been published since 2009, with the mandatory disclosure of audit expenses and, more recently, with past transformations, such as the new independent auditors' report for fiscal years ending after 2015. This line of study allows users of accounting information to analyze which risk factors of audited companies are considered by auditors, to weigh them up in their investment decisions [1], [21].

Audit fees refer to the amount paid by firms to have their statements audited. This amount is budgeted, taking into account the characteristics of the audited entity, risks, the sector in which it operates, the extent of the tasks and other relevant considerations, including the consideration of not charging a tiny or exorbitant amount, so that an offer letter is sent with this sum [3]. The identification of these factors forms the basis for these studies, and variations can occur to consider other aspects such as the advantages for corporations, valuation by investors, effectiveness of risk prevention, among other motivations.

2.2 PREVIOUS STUDIES

With the factors of globalization, the globalization of the credit and capital markets, as well as the demand for timely, reliable and relevant information, together with the demand for protection mechanisms for investors and other interested parties, independent auditing has emerged at the heart of these as an important activity for maintaining good levels of governance [11]. Given its importance, a wide range of work has been carried out on the topic, mainly investigating audit fees. The search to identify determining factors for the amount charged, as well as possible effects that signal these and the dynamics of changes in auditing procedures, can encourage researchers to contribute to the theme and mature knowledge of the subject.

In this study, [11] analyzed the determinants of audit fees paid by companies listed on the Brazilian stock exchange in 2012. The sample consisted of 335 companies, which were analyzed using multiple regression. The authors found that size, complexity and the fact that the auditing company was a BIG N (one of the BIG 4) had a positive relationship with the fees. When segregated by size, it was observed that in smaller companies, the amount of fees charged is lower for the more leveraged and risky firms. On the other hand, for larger clients, the riskier ones with the best governance practices incurred the highest audit costs. Similarly, in the first year of the audit, the smallest clients receive the lowest fees for this service.

In their work, [12] studied the determinants of fees for companies listed on BM&F Bovespa's Novo Mercado. The sample consisted of 83 companies from 2010 to 2011. The audit fees were obtained from the reference forms, while the economic and financial indicators (size, ROA, market-to-book and leverage) were obtained from Thomson One Banker. The data was analyzed using panel regression. The results indicated that the size of the company has a positive influence on the value of the fees and financial leverage has an inverse influence; for the other variables there was no significance.

In their research, [36] analyzed the influence of corporate governance, size and whether or not it was the first audit on the composition of BM&FBovespa companies' fees for 2016, excluding companies in the financial sector. The sample consisted of 295 companies, analyzed using multiple regression. The results showed that the dependent variable relating to independent audit fees had a higher value when the company was listed in a higher Corporate Governance Level, when the company is larger and when it is audited by a BIG4.

The study by [21] analyzed the determinants of the fees paid to independent auditors by Brazilian publicly traded companies between 2010 and 2014. The research was carried out with 349 entities, analyzed using panel data regression. The results showed that performance, complexity, size of audit firms, adoption of corporate governance practices, auditor rotation, sector and litigation risks have a positive influence on fees.

In turn, [26] carried out a qualitative investigation, using a questionnaire, with 63 independent auditors with experience in the market and in planning positions, asking them about their expectations in relation to the new independent audit report and the effects on planning and service fees. The survey's conclusions point out that, in the view of the respondents, factors such as the high complexity of the business, the larger size of the client, when the first audit is carried out and when the client is linked to regulatory agencies are likely to increase the value of audit service fees, while organizations that adopt better governance practices are likely to incur lower fees, given the expected lower business risks. Finally, when it comes to the main audit issues, the majority of respondents feel that there will be no significant effect on fees, even if senior auditors or partners are expected to be more involved in discussions.

In their article, [3] looked at the determinants of audit fees paid by 215 companies listed on B3 between 2010 and 2016. The factors investigated were internationalized companies, size, degree of indebtedness, type of external audit, share of foreign clients in revenue, type of control and profit or loss for the year. The use of panel data regression made it possible to identify a positive relationship between size, type of audit and participation in foreign markets in the amount of fees.

[1] set out to analyze the impact of the adoption of the new independent auditors' report on the audit fees of 344 entities listed on B3, considering the two-year period prior to the adoption of the new report (2014-2015) and the first two-year period of its validity (2016-2017). Using panel data regression, the authors found that the adoption of the new report had no impact on the audit fees of the companies examined. In addition, it was found that disclosure of Key Audit Matters related to entity-level risks positively influences fees, and the classic variables showed a positive relationship (complexity, litigation risk, inherent risk, company size and type of audit firm) and a negative influence (type of audit report, rotation and economic sector).

In their study, [4] aimed to examine the relationship between audit committee effectiveness and the value of audit fees, considering a sample of 130 companies listed on the Indonesian Stock Exchange between 2016 and 2017. Regarding the effectiveness of an audit committee, the authors clarify that it is measured by the size of the audit committee, frequency of meetings and experience of the committee. The study found that the size and frequency of meetings are directly related to the amount of fees. This suggests that an increase in the number of independent committee members produces a higher quality report and therefore they tend to choose a reputable auditor, even if they pay more. In the same way that more frequent meetings imply greater oversight by the committee to improve the quality of the audit, higher fees are to be expected.

In turn, [2] set out to examine the factors that impact external audit fees in manufacturing companies listed on the Amman Stock Exchange. The sample included 58 Jordanian companies from 2014 to 2018, analyzed by multiple linear regression. The research points out that the factors influencing the fees were audit report delay, risk, client size, audit firm status and corporate complexity, with a negative influence associated with the type of industry and profitability.

In their study, [37] they investigate the effect of board gender diversity (in the audit committee) on audit fees, as well as examining whether the relationship between the proportion of female directors and audit fees is moderated by the enactment of the gender quota law in 2011. The sample consists of 97 French firms listed on the SBF 120 index between 2002 and 2017, and this data is analyzed using the generalized method of moments of the two-stage system. The research suggests that female independent directors and audit committee members, by improving the effectiveness of board monitoring, affect audit risk assessment, resulting in lower fees. The study also notes that the law had no perceived effectiveness in increasing the proportion of inside directors, but did increase the appointments of independent directors and audit committee members. After the law, audit service fees had a negative relationship only for independent directors.

[38] investigated the factors that influence audit fees for Vietnamese clothing and textile companies, based on data obtained from questionnaires applied to 186 independent auditors and 180 company directors and chief accountants. The data was analyzed using the partial least squares model. The results indicate that the characteristics of the audit firm, clients, auditors, audit characteristics and the relationship between the audit firm and clients had positive effects on audit fees, as did the age and experience of the auditor, with the same sign of influence. In addition, it was found that auditors believe that the greatest impact on fees is attributable to client characteristics, while clients claimed that audit characteristics had the greatest impact on fees paid.

From this literature, it can be inferred that the studies analyze the fees from different aspects. However, it is possible to see that there is a preference for quantitative tools, with a predominance of panel data (when the sample considers more than one period) and multiple linear regression (when only one year is analyzed). In these previous studies, the most used dependent variable was the amount incurred in audit fees; almost all of the studies that used it transformed it using the natural logarithm, with the study by [1] indicating that it then proceeded with a winsorization.

There are studies that have found contradictory effects for some independent variables, and almost no study has found a significant relationship with all variables. These considerations show that (i) there are still effects that are unclear for the determining factors, (ii) the literature is recent and continues to arouse interest in journals and (iii) the most current research tends to take into account the changes that auditing is undergoing (for

example, finding an article that focused on the new auditors' report as soon as its regulations became available).

These issues are current and require further research to fill the gaps mentioned, including a new change that occurred in business due to restrictions arising from the COVID-19 pandemic, points that this article intends to contribute to the advancement of knowledge. In addition to the deaths and the shutdown of part of the economic sectors, [39] highlights that the misalignment between central and local governments may have contributed to the delay in the resumption of production, a consequence that signaled a drop in global GDP, sharply affecting workers, small and medium-sized enterprises (SMEs) and the self-employed. [40] clarifies that there was a strong influence of the COVID-19 period on the economic and financial sustainability of Brazilian companies, it was evident that there were high losses in value of these organizations, there was a drop in profitability and an increase in the level of debt.

2.3 HYPOTHESES

Research indicates that audits by BIG4 firms tend to charge more [3]. The existence of an audit committee can reduce costs, while its absence or inactivity can increase them [4]. The duality of CEO and chairman of the board can increase risks, impacting fees [5].

- H_1: The size of the board has a positive impact on fees.
- H_2: The duality of CEO functions increases fees.
- H_3: The existence of an audit committee reduces fees.
- H_4: A greater number of members on the committee reduces fees.
- H_5: The pandemic year of 2020 impacts fees.

3. METHODOLOGY

The research is quantitative and descriptive, based on a sample of 182 companies listed on the Brazilian stock exchange (B3), from 2017 to 2020, totaling 728 observations for the entire period. The time horizon was limited to 2020 because it was desired to capture the possible most severe impact of the pandemic (y2020) on audit fees. Data were collected via Economática®, financial reports and regulatory references.

To achieve the objectives, the natural logarithm of the value of audit fees was defined as the dependent variable (HON_AUD). The independent variables were the size of the board of directors (TAM_CADM), as well as the existence of duality (if the chairman of the board is the company's CEO - DUE_CADM), the existence of the audit committee, the size of the committee (TAM_CAUD), the number of meetings held by the committee (ATIV_CAUD), the audit opinion (assumes value 1 for a report with a modified opinion - Opn_aud) and the type of audit firm (assumes value 1 if the auditor is a BIG4). To control the effects of company characteristics, we worked with control variables established in the literature, such as size (AT) and return on assets (ROA). It should be noted that the latter two and the audit opinion are lagged by one year (t-1). This is because the aim is to approximate real practice, since when defining the amount to be charged, the auditor uses information from the previous year that has already been audited and may use the opinion of previous auditors as a risk issue and an indication of the volume of work.

The analyses are developed using descriptive statistics, Student's T-test, regression with panel data and bootstrap resampling. Extreme values will be treated as outliers by applying the natural logarithm (ln), thus preserving much of the original attributes of the database. It will also be checked whether additional adjustment by winsorization improves the quality of the data for analysis or whether removing the main outlier would be the best approach (reducing the database).

The test of differences in means aims to verify whether there is a statistically significant difference in the value of fees charged by the groups of companies in the sample. In turn, the regression model (Eq.(1)) seeks to identify whether the factors suggested by the research can be decisive to the point of influencing the value of fees charged for independent audit services.

$$HON\_AUD_{it} = \beta_0 + \beta_1 TAM\_CADM_{it} + \beta_2 DUE\_CADM_{it} + \beta_3 CAUD_{it} + \beta_4 TAM\_CAUD_{it} + \beta_5 ATIV\_CAUD_{it} + \beta_6 OPN\_AUD_{it-1} + \beta_7 BIG4_{it} + \beta_8 TAM_{it-1} + \beta_9 ROA_{it-1} + \beta_{10} y2020_{it} + \varepsilon_{it} \quad (1)$$

where, HON_AUD represents the natural logarithm of the value of the fees paid for the audit service. TAM_CADM indicates the number of members on the board of directors. DUE_CADM assumes the value 1 if the chairman of the board of directors is the company's CEO, and 0 otherwise. CAUD assumes value 1 if the company has an audit committee, and 0 otherwise. TAM_CAUD is the total number of members of the audit committee. ATIV_CAUD is the number of meetings held during the year. OPN_AUD assumes value 1 for a report with a modified opinion, and 0 otherwise. BIG4 assumes the value 1 if the auditor is a BIG4, and 0 otherwise. TAM is the natural logarithm of total assets. ROA is the ratio of net income to total assets. y2020 assumes value 1 if the observation refers to the year 2020, and 0 otherwise.

The bootstrap resampling technique was applied to verify the robustness of the model estimators, in which the observed sample is treated as a finite population and random samples are generated from it to estimate population characteristics and make inferences about the population. This reduces the likelihood that the original sample will be repeated but allows us to observe the bias and standard error properties of the estimators of the parameter of interest, suggesting the consistency of the model [6]. Although no studies focused on audit fees using bootstrap were identified, there are studies in the financial area that used this instrument to verify the properties of the estimators, such as [7], [8] and [9].

4. RESULTS

A first view of the data characteristics can be observed through descriptive statistics. Since this research works with data in different forms (continuous, integer and dichotomous values), then, to simplify and organize the reasoning, those that assume continuous or integer values will first be presented, as shown in Table.1.

Table.1. Descriptive statistics of non-dichotomous research variables

Item	Average	Median	Sd
HON_AUD[1]	1275196.43	290750.54	3926783.99
AT[2]	19250475.03	1739996.00	99166997.87

ROA	-0.23	0.02	3.17
TAM_CAUD	0.82	0.00	1.68
ATIV_CAUD	0.03	0.00	0.63
TAM_CADM	13.38	13.00	7.85

Note: 1 = Values in real units (R$), the Brazilian currency. 2 = Values in thousand reais (R$ ÷ 1000). AT = Total assets.

Source: Prepared by the authors (2025).

Descriptive statistics showed great variability in fees, with an average of R$1.27 million. The values are heterogeneous among companies. Understanding what influences such discrepancy in the amounts charged is a focus of studies on audit fees. Since there is evidence of discrepant values in both the dependent variable and the size of the audited companies, this calls for the treatment of outliers in the sample.

According to [10], there are several ways to treat outliers, such as reducing discrepancies using the natural logarithm (which preserves much of the characteristics of the original data), there is also the possibility of winsorizing the data (which replaces the extreme value with a value that exceeds its predecessor), applying a trimming process (which eliminates a percentage of the largest and smallest values from the base), among others. In this study, we chose to preserve the real data as much as possible, thus applying the natural logarithm to the variables related to fees and the size of the audited company. Figure 1 shows the boxplot of the variable fee value in its original form (figure on the left) and after treatment using the natural logarithm (on the right).

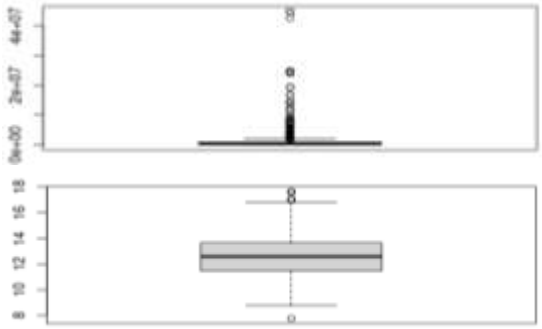

Fig.1. Boxplot of the value of audit fees before and after treatment by ln

Before the treatment there was a disturbance in the data, to the point that there were many discrepancy points, including some so far from the central terms of the boxplot that the figure became ‘flattened’. This is different from what is seen after the use of ln, where it is already possible to observe the elements more clearly and the few outliers that remain are very close to the limits of the boxplot, making additional treatment unnecessary. It was identified that the discrepant values were related to a few companies that incurred the highest values of these variables, mainly Petrobras, in all years, and some other large companies at some specific moments, such as Eletrobras and Vale. Previous works adopted the logarithmization of the dependent variable, such as [2]-[5], [11]-[12].

The Student’s T-test makes it possible to compare the average of a variable (in this case, the value of external audit fees) between two groups (‘with’ or ‘without’ the occurrence of each dichotomous variable). The test orientations (two-tailed, one-tailed to the right or to the left) are defined according to the expected sign in the hypotheses (if there is any type of difference in the means of the groups, if the mean in the group without the characteristic is greater than that of the group with it, if the mean of the group with the characteristic is greater than that of the group without it, respectively). The results of the application of the t-test are presented in Table.2.

Table.2. Average test for fee values by dichotomous variable

OPN_AUD	**Observations**	**Average (R$)**	**T**	**P-value**
Without	690	1328834.4	6.2537	0.0000
With	38	301.244,2		
BIG4	**Observations**	**Average (R$)**	**T**	**P-value**
Without	269	152235	-7.8916	0.0000
With	459	1933315		
CAUD	**Observations**	**Average (R$)**	**T**	**P-value**
Without	558	775890.3	-3.9274	0.0001
With	170	2914095.3		
DUE_CADM	**Observations**	**Average (R$)**	**T**	**P-value**
Without	625	1420741.9	5.6368	0.0000
With	103	392032.2		
y2020	**Observations**	**Average (R$)**	**T**	**P-value**
Without	546	1234305	-0.46054	0. 6455
With	182	1397869		

Source: Prepared by the authors (2025).

It is noted that (i) groups of companies audited by BIG4, (ii) those that did not have a qualified opinion in the previous year, (iii) companies with an audit committee and (iv) those with no dual board were those that incurred the highest audit costs. Despite the contradiction observed in corporations with better governance practices incurring the highest costs, it is worth mentioning that these entities are generally the largest and most complex in the market. Thus, simply separating them into groups based on a characteristic does not isolate the effect of other attributes of the organizations that also contribute to the increase in fees, which is why regression analysis may clarify which factors lead to higher fees.

An additional detail about the y2020 variable is that this year alone may not have incurred higher costs, with a statistically significant difference, when compared to all other periods, as observed by insignificance. However, this does not preclude the possibility that there was a significant increase during this pandemic period, even if the increase is not as sharp as mentioned in the descriptive statistics subsection. Again, the regression may show whether, in fact, the health emergency period influenced an increase or not in independent audit fees.

Due to the differences between companies, it is justified not to work directly with the values in real units for the monetary variables (fees and size), but to adjust these values by ln, which preserves the differentiation between companies but reduces the magnitude of the differences. The Shapiro-Wilk test indicated that the data follows an approximately normal distribution. In view of this, a panel data model with fixed effects was estimated, which was chosen after applying the Chow, Breusch-Pagan and Hausman tests; this same effect was adopted by [12] and [3]. The Table.3 presents the results of the model.

Table.3. Panel data model for independent audit fees

Variable	Panel model
	Coefficient (Standard Error)
Opn_aud	0.0370 (0.1766)
BIG4	0.2273* (0.1228)
CAUD	0.5000* (0.2165)
TAM_CAUD	-0.1300* (0.0576)
ATIV_CAUD	-0.0153 (0.0501)
TAM_CADM	-0.0100 (0.0130)
DUE_CADM	-0.1793 (0.1687)
TAM	0.07646*** (0.0193)
ROA	-0.0007 (0.0031)
y2020	0.1121** (0.0529)
Constante	11.4941*** (0.3128)
Prob F	0.0002
R^2 within	0.0596

Note: *significant at 10%, **significant at 5%, ***significant at 1%. Source: Prepared by the authors (2025).

The fact that the auditing firm is one of the four largest in the industry (BIG4) contributes to an increase in the value of fees, corroborating hypothesis H7, findings that are in line with [1], [2] and [3]. In fact, it seems that the theorization of the ability of BIG4 to charge higher fees is effective in practice, given that they are firms with market expertise, a good reputation and influence on other companies in the segment.

The fact that the company maintains an audit committee (CAUD) contributes to an increase in the value of fees, going against hypothesis H3 and contradicting the findings of [1]. Apparently, the existence of a committee to minimize internal risks is not enough to reduce the efforts of the external audit and thus incur lower fees. New studies can delve deeper into this issue and find new evidence for this direct influence. However, as the number of members of this committee increases, there is a reduction in external audit costs, in line with hypothesis H4. This finding supports the idea that more people working towards a goal ends up minimizing the chances of errors going undetected, a consideration that would be recognized by auditors, which would imply lower charges on their part. Future research can investigate whether factors such as training, diversity of members, seniority, time at the company and remuneration of members can influence this result.

It was observed that the larger the client company, the higher the fees charged and vice versa. This agrees with hypothesis H8 and with the studies by [1], [2] and [4]. For larger size, both a greater capacity to bear expenses is expected and greater complexity is suggested in attesting to the veracity of all of a company's business and assets, thus confirming the theoretical proposition. The year 2020 was marked by the worsening of COVID-19, with the first Brazilian case confirmed in February of that same year, and the pandemic declared shortly after in March, the month in which the first death from the disease occurred in Brazil. Faced with the emergency, governments took initiatives to reduce the level of contamination, hospitalizations and deaths from the virus, which implied restrictions such as suspension of classes, reduction in the supply of public transport, closure and/or restriction of non-essential services and companies, as well as measures that relaxed regulations, especially labor regulations, measures that raised discussion from the political, business and popular circles [13]-[16]. However, when auditing firms signed their service and price contracts to audit the 2020 financial statements in the following fiscal year of 2021, the extent of the pandemic impact on the businesses of both their audited clients and the auditing industry itself was not yet fully known. Thus, the data suggest that the effect of a pandemic year (y2020) contributes to increasing the fees charged (supporting hypothesis H9), perhaps to offset market uncertainties at that time. The other hypotheses could not be verified, given the insignificance in the test.

In addition to treating the outliers using ln, winsorization was applied at 1% after using the logarithm, an approach used by [1]. At 1%, it was possible to remove the extreme values that remained after ln. It was noted that a certain adjustment of the data to the normal distribution was preserved, after checking the histogram. Thus, the models were tested again with the dependent variable winsorized at 1% and there was almost no difference: fixed effects were still chosen, the same variables were significant, with the same sign, only the R^2 which reduced to 4.82%. By following a more abrupt strategy, such as removing the Petrobras data (main outlier), a very different result for the regression was also not obtained, with the R^2 becoming 4.64%. Of the treatments, the use of ln managed to drastically reduce the outlier values, preserving the characteristics of the original data and being more adherent to the normal distribution (verified by histogram and the Shapiro-Wilk test). In addition, the previous literature adopts the logarithmization criterion, therefore, it was decided to maintain the analyses with the ln correction instead of transforming the data by winsorization. This preserves the notion of the principle of parsimony by adopting the simplest method that provides relatively adequate results when compared to more complex options [17]. T Next, the bootstrap resampling technique was used, simulating 100 samples of the same size as the original, as shown in Table.4.

Table.4. Bias and standard error results for 79 bootstrap resamples

Item	Z	Bias (Standard Error)	95% Confidence Interval
OPN_AUD	0.0370	0.0573 (0,1144)	-0.1871 0.2613 (N)
			-0.1521 0.3195 (P)
			-0.1941 0.1884 (BC)
BIG4	0.2273	0.0176 (0.0681)	0.0937 0.3610 (N)
			0.1152 0.3778 (P)
			0.1135 0.3495 (BC)
CAUD	0.5001	0.0082 (0.3741)	-0.2331 1.2333 (N)

			-0.2580 1.3484 (P)
			-0.2017 1.3484 (BC)
T_caud	-0.130	-0.0116 (0.1169)	-0.3593 0.0991 (N)
			-0.4258 0.0938 (P)
			-0.3639 0.1272 (BC)
Ativ_caud	-0.0153	0.0037 (0.0190)	-0.0526 0.0219 (N)
			-0.0473 0.0203 (P)
			–0.0473 0.0147 (BC)
T_cadm	-0.0100	0.0014 (0,0129)	-0.0354 0.0154 (N)
			-0.0320 0.0206 (P)
			-0.0320 0.0135 (BC)
Due_cadm	-0.1793	-0.1259 (0.4101)	-0.9831 0.6245 (N)
			-1.5330 0.3581 (P)
			-0.7759 0.4306 (BC)
TAM	0.0764	-0.0015 (0.0320)	0.0135 0.1393 (N)
			0.0132 0.1459 (P)
			0.0193 0.1518 (BC)
ROA	–0.0007	-0.0014 (0.0312)	0.0619 0.0604 (N)
			0.0902 0.0638 (P)
			0.0674 0.0638 (BC)
y2020	0.1121	-0.0080 (0.0691)	-0.0232 0.2474 (N)
			-0.0475 0.2398 (P)
			-0.0418 0.2398 (BC)
Constante	11.4940	0.0301 (0. 4334)	10.6445 12.3436 (N)
			10.5889 12.2573 (P)
			10.5889 12.2372 (BC)

Note: N = Standard normal bootstrap confidence interval. P = Percentile bootstrap confidence interval. BC = Bias-corrected bootstrap confidence interval.

Source: Prepared by the authors (2025).

The command used requested the definition of 100 resamples, but the STATA software performed 79, since in the other 21 samples generated it was not possible to calculate one or more of the parameters. However, the number of high samples was already required to overcome this type of situation. Therefore, there is still a considerable volume of data (79 samples, each with 728 observations, totaling 57,512 simulated observations), which allows inference regarding the parameters of the model tested, especially the bias and standard error. The findings in Table 5 show that all variables had bias and standard error very close to zero. Bias is one of the statistical properties; in short, it shows the difference between the estimator and the real value of the parameter; the smaller this distance, the better [18]. In turn, the standard error is the sample standard deviation of the bootstrap replications; lower values for this error indicate that the resamples have greater consistency in obtaining the estimator of interest [19].

With these properties of the estimators (coefficients of each dependent variable in the fixed-effect panel regression), it is suggested that they are reasonably good representatives of the population parameter (coefficients for all publicly traded companies). Notably, the variables do not explain all the variability of the sample; other factors need to be investigated, but of the portion that they can specify, the bootstrap stresses the model with several sample replications and even so, the evidence for the estimators presents relatively good properties.

5. CONCLUSION

The research focused on audit fees, since this cost considers several characteristics of the company and helps interested users to have knowledge of the main risk factors of the audited companies. Thus, this study analyzed the determining factors of the audit fees of the companies listed on B3. To this end, a survey was conducted with 182 publicly traded companies from 2017 to 2020, and the results were obtained through descriptive statistics, mean tests and regression with panel data.

In this sense, the general objective of this study was defined as analyzing the determining factors of the audit fees of the companies listed on B3. When applying the panel data regression model, it was found that the fact that the audit firm is a BIG4, the existence of an audit committee and the size positively influence the value of the fees, with the opposite occurring for the variable related to the size of the committee. The study also found that 2020, marked by the most critical moment of the COVID-19 pandemic, had a positive influence on the value of fees, given the uncertainties brought about by this period, a fact that led firms to charge more for audit services.

Based on descriptive statistics, it was possible to infer that Petrobras was the company that incurred the highest external audit costs. This fact may be related to the consequences of Operation Lava-Jato, launched in March 2014, which investigated a large money laundering and embezzlement scheme involving Petrobras, major construction companies in the country, and politicians [20]. Thus, several areas of the company demanded greater attention from the auditor and, consequently, higher fees were charged.

The contributions of the study lie in the findings themselves, which interested parties can use. For the scientific community, the research adds to the list of previous studies that contribute to the understanding of fees, including the indication that the pandemic has also impacted the independent audit sector, incurring higher charges at a time of heightened uncertainty.

In turn, corporate sectors can take advantage of the identification of which factors influence the amounts that will be charged to them for possible planning of this course, so that knowing this makes it possible to anticipate a larger or smaller budget, as well as identify which points are manageable to reduce this expense. Other advantages can be observed, such as the market recognizing that the moment of a health crisis (such as the Covid-19 pandemic) can impact on the cost of hiring an audit, which can be valued in some way, as well as putting pressure on the results of companies that are already not in good financial health.

The limitations of this research include the period of analysis (four years), and the sample restricted to companies listed on the stock exchange. Therefore, it is suggested that future research expand the sample base and time horizon, as well as use other analysis factors related to the auditor's work, such as the number of main audit matters, whether other services other than auditing of financial statements were contracted, and rotation. It is also recommended that such characteristics be analyzed in different countries in order to verify the influence of institutional, legal, and cultural aspects on audit fees.

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