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Influence of Ownership Structure on the Choice of Big Four Independent Auditors

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Resumo/Abstract

The aim of the study is to investigate the influence of the ownership structure on the choice of a Big Four independent audit, expecting a positive relationship if there is an entrenchment effect represented by the voting rights variable and a negative relationship if there is an incentive effect represented by the right cash flow variable. We analyze 122 publicly traded companies listed on B3 between the years 2010 to 2018. In addition to the variables of interest, we also control other variables that can influence the choice of a Big: company size, leverage, return on assets, issuance of ADRs, sector, CEO duality, board independence, B3 governance level and specialist auditor. The study uses an econometric method rarely used in research on this topic, the logit for panel data. The results found suggest that the right to cash flows (incentive effect) negatively influences the choice of a Big Four audit in the national scenario, confirming the second research hypothesis. As for the control variables, the findings suggest that the issuance of ADRs and being a member of a sector, whose auditing firm is a specialist influence the choice for a big four. The main contribution made by the work is to expand the evidence about the surrogate effect between internal mechanisms of corporate governance, with emphasis on the capital structure, and external mechanisms of corporate governance, such as the chosen external audit.

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Keywords: External audit; Big Four; Ownership structure; Corporate governance**.**

1 INTRODUCTION

The relationship between ownership structures and conflicts of interest has always been a point of discussion in the Corporate Governance theme (Saito & Silveira, 2008). The literature shows that in emerging countries (such as Brazil), where governance mechanisms are not so well defined, characterized by a weak legal protection environment for investors (Li & Qian, 2013; Prazeres & Lagioia, 2020), high concentration of ownership and control and risk of expropriation of minority shareholders by controlling shareholders, the main agency conflict is between the principals (Shleifer & Vishny, 1997; La Porta, Lopez-de-Silanes & Shleifer 1999, 2000).

Among the mechanisms of Corporate Governance, capable of mitigating conflicts between agent and principal pointed out in the literature, is the independent audit, also known as external audit. According to Fan and Wong (2005), the entrepreneur may consider hiring auditors to increase his credibility with investors, since external auditors can potentially guarantee the quality of publicly disclosed accounting information, limiting the entrepreneur's ability to manipulate information. accounting and, so, extract wealth from shareholders.

Empirical studies deal with the relationship between external audit and agency conflicts. An example of this is the research by Hope, Langli and Thomas (2012), in which the authors seek to understand how agency conflicts arise in private companies through ownership structure and family relationships. Thus, for agency configurations where the main shareholder and the CEO are not from the same family, the results show that the propensity to hire a Big Four auditor increases as shareholder concentration, second-largest shareholder ownership and family influence increase. of the main shareholder on the board decreases. Other research, such as Cho and Wu (2014), find results that, when agency conflicts are severe, managers should hire high-quality auditors (which would correspond to the Big Four or Big Five) in order to mitigate agency conflicts.

In Brazil, studies that investigated this internal corporate governance mechanism related it to audit fees (Mello & Valentim, 2018; Simão, Callado & Pinheiro, 2018 and Mascena, Barakat & Fischmann 2016) and earnings management (Almeida & Almeida, 2009). Marques and Louzada (2018), in turn, examine the effect of contracting a Big Four audit on the probability of receiving a modified opinion from the auditor.

Pizetta and Costa (2013) have a proposal similar to that of the present article, whose research aim is to investigate the association between the characteristics of the board of directors and the hiring of specialized external audit in companies listed on B3 in the years 1998, 2000, 2002, 2004 and 2006. This study differs in that it uses a more adequate econometric method that is rarely used in the literature to estimate the regression model, the logit for panel data, in addition to exploring a more recent time interval.

Given that the empirical studies found had different objectives, there is a need to study the relationship between ownership structure and choice of Big Four audit, in order to better understand the occurrence (or not) of conflicts between shareholders in the Brazilian business scenario.

In view of the above, the present study is justified because, when investigating the influence of the ownership structure in the choice of a Big Four audit, one would have the opportunity to find which of the effects of the ownership concentration that determine the preference for a firm of Big Four audit. In this sense, the research question that guides this article is the following: what is the influence of the ownership structure in the choice of the Big Four for the external audit of companies listed on B3?

The general objective of this study is to analyze the influence of the ownership structure in the choice of the Big Four for the external audit of companies listed on B3. To achieve the general goal, we define the following specific aims: a) to oppose the most common practices used in the literature on the subject to estimate binary choice models, since these are subject to methodological criticism; b) perform econometric analysis using a method proper to the problem, in this case, data estimation in logit panel.

The research contributes to the Corporate Governance literature, showing how the relationship between an external mechanism (independent audit) and an internal mechanism (ownership structure) behaves in the context of emerging markets (Fan & Wong, 2005). The results of this study may also be of interest to companies, shareholders, and administrators. The existence of conflicts between shareholders can make it difficult to obtain financing and, consequently, limit the company's growth (Rodrigues, 2015). The conclusions of this research may also be useful for investors, governments, and regulatory bodies, as it may raise the need to strengthen legal provisions that refer to shareholder protection (Neves, 2015).

2 THEORETICAL REFERENCE

2.1 Agency Theory and Corporate Governance

The idea presented by the theory of contracts or contractual theory of the firm is that the company exists as a group of contracts between the various interested parties. Therefore, studies were developed with the aim of finding solutions and studying the risks involved when cooperating parties have different goals and divisions of work (Berle &

Means, 1932; Jensen & Meckling, 1976; Ross, 1973). As the company becomes a complex structure of contracts between productive resources and each of these resources has a personal motivation to seek to maximize their well-being, agency theory emerges to explain and try to predict this relationship (Jensen & Meckling, 1976; Fama, 1980).

Berle and Means (1932) is a seminal work (Saito & Silveira, 2008; Adelopo, Jallow & Scott, 2012; Brugni, Bortolon & Almeida, 2013) that laid the foundations for understanding this theory and the agency conflict between the principal (shareholder) and agent (executive) it suggests. In the authors' view, the principal must surround himself with all the instruments available to avoid being expropriated by the agent. This is because if both parties to the relationship are utility maximizers, there is good reason to believe that the agent will not always act in the interests of the principal (Jensen & Meckling, 1976).

Therefore, inserted in this context and as a way of aligning interests, minimizing agency conflicts, Corporate Governance is born, which according to Silveira (2015)

> is the set of acculturation activities and mechanisms – internal or external, of incentive or control – that aim to make: (1) from an internal point of view, people make decisions in the best long-term interest of the organization, comply with the rules and behave ethically; and (2) from the external point of view, companies are transparent with their stakeholders and ensure full rights to all their shareholders in an equitable manner. (Silveira, 2015, p. 6).

In the Brazilian scenario, given the importance of the relationship between controlling and minority shareholders, Crisóstomo, Brandão & López-Iturriaga, (2020) analyze the incentives of large shareholders to implement the governance system that favors their interests in a highly concentrated ownership structure and low legal protection for investors. The estimates of the GMM System (Generalized Moments Method) for a balanced data panel referring to a sample of 85 Brazilian companies listed in the period from 2010 to 2013, showed that the ownership concentration is harmful to the quality of the Corporate Governance system, since large shareholders may not be interested in a better governance system because of their personal interests.

Therefore, the literature shows that, as emphasized by Kanagaretnam, Lobo and Whalen (2007), corporate governance mechanisms affect the information disclosed by the company to its shareholders and reduce the probability that management, acting in its own interest, sets up actions that deviate from maximizing the company's value.

2.2 Independent audit and ownership structure

The literature on Corporate Governance report ownership structure as a critical component for the development of economies. Performance control and management responsibility are essential in corporate governance (Simão et al., 2018) and the external audit is part of this context as an important instrument for keeping good levels of governance. (Castro, Peleias & Silva, 2015).

Empirical studies point to the ability of auditors of Big Four companies as a differentiating element in relation to other auditing firms (Teoh & Wong, 1993; DeFond & Jiambalvo, 1993; Becker et al., 1998; Krishnan, 2003; Almeida & Almeida, 2009). Bonfim, Fagundes Jr. and Cardozo (2014) report that companies seek to have their reports audited by the Big Four because they are traditional, consolidated, globally recognized firms that ensure greater credibility. Companies with significant size and/or complex transactions also choose the Big Four over small and medium-sized auditing firms, as the latter do not have the necessary structure to audit larger and/or more complex companies.

Francis and Wilson (1988) are among the first to investigate the relationship between Big Four auditing and agency conflicts. The hypothesis evaluated by these authors was that the demand for a higher quality audit is explained as a function of the increase in agency costs.

In the present study, agency conflicts will be measured through ownership concentration. According to Silveira, Lanzana, Barros and Famá (2004), in Brazilian public companies, due to the presence of a concentrated ownership structure, the main agency conflict occurs between controlling and minority shareholders. Alhababsah (2019) adds that in scenarios where there is no strong legal environment (as is the case in Brazil), the ownership structure is an important corporate governance mechanism.

According to Silveira (2015), the entrenchment effect is the main negative effect of shareholder concentration, as it starts from the understanding that the greater the voting right of the reference shareholder, the greater the expropriation of minority shareholders' wealth. The alignment effect, on the other hand, is the main positive effect: it is hypothesized that the greater the participation of the controlling shareholder in the total capital of the company, the greater the interest in maximizing its value.

In the international scenario, we found empirical studies, as Guedhami, Pittman and Saffar (2009), that investigated the relationship between external audit quality and agency conflicts between the various stakeholders and not only between majority and minority shareholders. These authors undertook a research effort in order to estimate the relationship between the divergence of interests of state and foreign ownership in the choice of a Big Four audit. According to the authors, state owners may have strong motives to manipulate financial statements and thus hide information about the company's actual performance. Given this, it would not be interesting to hire a quality audit. Foreign owners, in turn, keep that a quality audit allows the monitoring, protection and efficient allocation of their capital in the company. The evidence found was consistent with the arguments raised by the authors.

The evidence found by Ho and Kang (2013) showed that compared to non-family businesses, family businesses are less likely to hire Big Four auditors due to less severe agency issues between owners and managers. Additional analysis showed that the tendency for family businesses to hire high-quality auditors and pay lower audit fees is stronger when family owners actively monitor their businesses.

Faced with a scenario where the ownership structure is highly concentrated, the study by Zhang, Ye, Cui and Zang (2019) investigates the impact of strong shareholder incentives on the choice of auditors for companies in the Chinese capital market. The results suggest that a reduction in conflicts between large shareholders and external investors leads to a lower demand for high quality auditing. In addition, evidence also suggests that auditing in environments with weak legal protection for investors such as China also plays an important governance role, manifested in the positive relationship between agency conflicts and hiring large auditors.

Based on the studies cited, there is a vast international literature that associates Big Four external auditing and ownership structure, suggesting that greater ownership concentration, at a level called “entrenchment effect” tends to positively influence the choice of Big Four auditing as a form of to mitigate information asymmetry. Therefore, the present work seeks to extend the previous findings and contribute to empirical research in Brazil.

2.3 Development of Research Hypotheses

The concentration of shares in large shareholders has negative effects, which incurs costs for companies. The main one is the entrenchment effect, which occurs when, after a certain concentration of ownership, large shareholders start to pursue private benefits of control at the expense of other investors (Silveira et al., 2004). This increases the concern of minority shareholders about the expropriation of managers and/or controllers and, consequently, the need for a quality audit as a way to mitigate these concerns (Fan & Wong, 2005; Habib & Jiang, 2015). The results of Fan and Wong (2005) show that the choice of a Big 5 audit is significantly and positively associated with the entrenchment problem captured by the degree of control of controlling shareholders.

The study conducted by Tessema, Kim, and Dandu (2018) found evidence in South Korea that the disparity between control rights and to cash flows rights negatively affects earnings quality. Such a result ratifies the assumption that there is a greater possibility of the controlling shareholder expropriating minority shareholders or the firm itself. El-Dyasty and Elanor (2021), in turn, found similar results in Egypt, with evidence of a positive and significant influence of institutional ownership on the choice of Big Four audit.

In view of this, the present research suggests the first hypothesis as an expectation of the results to be found:

H1 = The decision of companies listed on B3 to hire a Big Four audit is positively influenced by the entrenchment effect inserted in their ownership structure.

The presence of large controlling shareholders also has positive effects. The main one is the so-called incentive effect, which is characterized by the fact that, because they have many resources invested in the company, large shareholders have a greater incentive to collect information and monitor managers (Silveira et al., 2004). Additionally, Musah, Okyere, and Agyepong (2021) clarify that in the context of ownership structures with less disparity between control rights and cash flow rights there is a greater incentive for shareholders to monitor the investment made with their investments.

Shan et. al. (2019) report that the results of existing research suggest that the preference for a larger audit firm will be lower in those client companies where the interests of managers are aligned with those of shareholders, because the risk of opportunistic behavior is less likely in these companies. In contrast, Gerged et al. (2020) examined whether compliance with corporate governance practices impacts the choice of independent auditor and its quality. The findings suggest a limited impact of good corporate governance practices on the choice of the big four auditor in the UK. Inserted in this context, the following research hypothesis is raised:

H2 = The decision of companies listed on B3 to hire a Big Four audit is negatively influenced by the incentive effect inserted in their ownership structure.

3. METHODOLOGICAL PROCEDURES

3.1 Research sample and variables

The research population is made up of publicly traded Brazilian companies that trade shares on B3. As in previous studies (Kasai 2014; Shan, Troshani & Tarca, 2019; Alhababsah, 2019; Zhang et al., 2019) financial and insurance companies were excluded from the sample composition (given the accounting particularities and specific rules that the differ from other companies) and those that do not have data available for the entire study period.

In addition to these, companies with assets other than shares and ADRs were excluded (as they are not studied in this research), companies with missing data for the entire sample period and companies that disclose the same data for different classes of shares, generating duplicity. After these exclusions, 193 companies were initially identified, and companies with missing data necessary to calculate one or more variables that are part of the econometric model were also removed from the sample. Therefore, the final sample consisted of 122 companies and 961 observations.

The analysis period comprises 2010-2018. The beginning took place in 2010 because it was from this year that the Reference Form (FR) became mandatory for companies registered and active in the CVM.

Data collection took place by consulting the Reference Form, found on the CVM website and the Economatica® database. Data were processed in Microsoft Excel and analyzed in Software R.

Table 1 presents a summary of all variables used in the study.

Table 1 - Research and measurement variables

Variable	Expected relationship	Measurement/Identification	Source	Reference
AUDITOR		Dummy variable, which takes the value 1 when the auditor is from one of the Big Four companies and 0 otherwise	Reference Form	Fan e Wong (2005), Almeida e Almeida (2009), Cho e Wu (2014), Alhababsah (2019), Shan, Troshani e Tarca, (2019)
V	Positive	Percentage of voting rights held by the largest shareholder	Reference Form	Fan e Wong (2005), Caixe e Krauter (2013)
C	Negative	Percentage of cash flow rights owned by the largest shareholder	Reference Form	Fan e Wong (2005), Caixe e Krauter (2013)
SIZE	Positive	Natural logarithm of the market value of equity	Economatica	Fan e Wong (2005), Afza e Nazir (2014), Zhang, Ye, Cui e Zang, (2019)
LEV	Positive or Negative	Long-term debt divided by total assets	Economatica	Fan e Wong (2005), Alhababsah (2019), Zhang, Ye, Cui e Zang, (2019)
ROA	Positive or Negative	Return on assets	Economatica	Fan e Wong (2005), Alhababsah (2019), Zhang, Ye, Cui e Zang, (2019)
CROSS	Positive	Dummy variable, which assumes value 1 when the company issues American Depositary Receipt and 0 otherwise	Economatica	Fan e Wong (2005), Barcelos (2018)
SET	Positive	Sector, dummy variable, which takes the value 1 when the company belongs to a regulated sector and 0 otherwise	Economatica	Beck, Cunha e Franz (2015), Borges, Nardi e Silva (2017), Barcelos (2018)
DC	Positive	CEO duality, a dummy that assigns 1 if different people held the CEO and chair positions, and 0 otherwise	Reference Form	Makni, Kolsi e Affes (2012), Pizetta e Costa (2013), Mascena, Barakat e Fischmann (2016), Yeung e Lento (2017)

INDEP	Positive	Board independence, a dummy that takes the value 1 if the independent board is composed of more than 50% of independent directors and 0 otherwise	Reference Form	Silveira (2004), Makni, Kolsi e Affes (2012), Mascena, Barakat e Fischmann (2016), Yeung e Lento (2017)
NG	Positive or Negative	B3 Governance Level, a dummy that assumes value 1 for companies listed on Level 2 or Novo Mercado and 0 otherwise	B3 listing segment	Hallak e Silva (2012), Castro, Peleias e Silva (2015), Bastos, Cueva, Mendes, Sarlo Neto (2017), Nascimento, Angotti, Macedo e Bortolon (2018), Costa, Sampaio e Flores (2019)
AESP	Positive	Expert auditor, dummy that assigns a value of 1 if an expert audit audited the company, and 0 otherwise. The research proposes a new form of measurement: the ratio between the sum of the revenues of clients of the Big Four audit firms in the sector under analysis in relation to the sum of the total revenues of all companies in the same sector, where we consider an audit firm as specialized if the metric result is greater than 20%.	Economatica	Craswell, Francis e Taylor (1995), Neal e Riley Jr, (2004), Casterella, Francis, Lewis e Walker (2004), Pizetta e Costa (2013), Cho e Wu (2014), Beck, Cunha e Franz (2015)

3.2 Econometric procedures and regression model

This study uses the econometric technique of the logit model for panel data applied to investigate the probability of a company hiring or not a Big Four audit. In the international scenario, the study by Guedhami, Pittman and Saffar (2009) presented a similar approach to the proposal of this research. We justified the estimation by panel data by the possibility of controlling the unobserved heterogeneity associated with data with panel structure.

To evaluate the proposed hypotheses, we use the adapted logistic regression model proposed by Fan and Wong (2005):

$$
\begin{aligned}
logit(\text{AUDITORi}) \\
= ln\left(\frac{\text{AUDITORi}}{1-\text{AUDITORi}}\right) = \ \mu + \beta1\text{Vi} + \beta2\text{Ci} + \beta3\text{SIZEi} + \beta4\text{LEVi} + \beta5\text{ROAi} + \beta6\text{CROSSi} \\
+\beta7\text{SETi} + \beta8\text{DCi} + \beta9\text{INDEPi} + \beta10\text{NGi} + \beta11\text{AESPi}
\end{aligned}
$$

We added to the model proposed by Fan and Wong (2005) four control variables widely used in the literature, namely: CEO duality; the independence of the board; the level of corporate governance; and the expert auditor.

4. DISCUSSION AND ANALYSIS OF RESULTS

4.1 Descriptive statistics and preliminary assessments

Table 2 shows the results related to descriptive statistics for the study variables, with the exception of dummy variables.

Table 2 - Descriptive Statistics

Variable	Number of observations	Mean	Median	Standard deviation	Minimum	Maximum
AUDITOR	961	0.8158	1	0.3878	0	1
V	961	0.5568	0.5141	0.2136	0.1085	0.9999
C	961	0.5008	0.4878	0.1731	0.1085	0.9973
SIZE	961	14.35876	14.8042	2.1766	8.1687	19.7563
LEV	961	0.2154	0.1883	0.3013	0	3.8434
ROA	961	-0.32006	3.9181	46.2009	-11.73634	54.3067

Note: we omitted binary variables, with the exception of the dependent variable AUDITOR

The dependent variable AUDITOR presented an average of 81.58%, showing that a Big Four audited most of companies of B3. Two other binary variables, whose values were not reported in the table, showed similar percentages: in 81.78% of the companies, the positions of CEO and chair of the board of directors are held by different people; and 80.54% have a specialist audit in the sector.

As for the independent variable V, the average found was 55.68%, a common characteristic of companies in the Brazilian scenario, in which the majority shareholder is the one who holds more than 50% of shares with voting rights. The percentages of the minimum and maximum values correspond to 10.85% and 99.99%, respectively. Variable C, in turn, had an average of 50.08% and minimum values of 10.85% and maximum of 99.73%.

Regarding the control variables, the one that represents the size of the companies (SIZE), as it is a variable transformed into natural logarithm, has original values that vary between R$ 3,529,000.00 and R$ 380,246,723,000.00, and the median value is equivalent to R$ 2,687,908.00. Regarding leverage (LEV), the companies in the sample had an average indebtedness of 21.54% and minimum and maximum values of 0 and 384%, respectively.

As for profitability (ROA), the ability of companies to generate profits with their respective assets, the average, minimum and maximum values found were, respectively, -0.32, -11.73634 and 54.30.

The following results refer to the correlation tests (Pearson and Spearman), which summarize the degree of relationship between the variables. The dimensionless coefficients indicate the direction and robustness of the association between two variables, however, it is worth noting that, when the values are positive, the relationship is direct; when the values are negative, the relationship is inverse; and, when the value is null, there is no relationship, and the robustness is proportional to its value in module (Gujarati & Porter, 2011).

Tables 3 and 4 present the Pearson and Spearman correlation matrices, calculated for the variables that make up the study model and show how they are associated. The values, which can vary between -1 and 1, suggest the strength of the relationship between the variables.

Table 3 – Pearson correlation matrix.

	AUDITOR	V	C	SIZE	LEV	ROA	CROSS	SET	DC	INDEP	NG	AESP
AUDITOR	1.0000											
V	-0.0069	1.0000										
C	0.0615	0.7182	1.0000									
SIZE	0.4730	-0.0392	0.0882	1.0000								
LEV	-0.0757	-0.0630	-0.0078	0.0098	1.0000							
ROA	0.1531	-0.0618	-0.0889	0.2466	-0.0017	1.0000						
CROSS	0.1028	0.0746	0.0192	0.4483	0.0603	0.0234	1.0000					
SET	0.1454	0.2319	0.1642	0.3305	0.0371	0.0500	0.3675	1.0000				
DC	0.2558	-0.0833	-0.0436	0.2943	-0.0036	0.0190	0.1253	0.1093	1.0000			
INDEP	0.1383	-0.0609	0.0671	0.0929	0.0320	0.0438	0.0051	-0.0904	0.0784	1.0000		
NG	0.2947	-0.3130	-0.0847	0.2524	0.0351	0.1053	-0.1857	-0.2017	0.2681	0.3068	1.0000	
AESP	0.7155	-0.0921	-0.039	0.5074	-0.038	0.1250	0.1660	0.1291	0.2784	0.1475	0.3441	1.0000

Table 4 – Spearman correlation matrix.

	AUDITOR	V	C	SIZE	LEV	ROA	CROSS	SET	DC	INDEP	NG	AESP
AUDITOR	1.0000											
V	0.0037	1.0000										
C	0.0575	0.7496	1.0000									
SIZE	0.4028	0.0665	0.1597	1.0000								
LEV	0.1521	-0.1009	-0.0106	0.2928	1.0000							
ROA	0.2902	0.1074	0.1461	0.4226	-0.1463	1.0000						
CROSS	0.1028	0.1069	0.0423	0.4779	0.1791	-0.0621	1.0000					
SET	0.1454	0.2292	0.1325	0.3463	0.1670	0.0848	0.3675	1.0000				
DC	0.2558	-0.0634	-0.0231	0.2465	0.2265	0.0388	0.1253	0.1093	1.0000			
INDEP	0.1383	-0.0255	0.0961	0.0714	0.1248	0.0743	0.0051	-0.0904	0.0784	1.0000		
NG	0.2947	-0.2531	-0.0419	0.2147	0.2093	0.1397	-0.1857	-0.2017	0.2681	0.3068	1.0000	
AESP	0.7118	-0.075	-0.03	0.465	0.2027	0.2215	0.1669	0.1304	0.2755	0.1486	0.3400	1.0000

Among the variables that are related in the proposed model, Pearson's correlation matrix (Table 3) shows the highest correlations between variables C and V and AESP and AUDITOR. The values found were 0.7182 and 0.7155, respectively, and indicate a direct correlation between the variables. Spearman's correlation matrix (Table 4), in turn, presents the highest correlations between the variables AESP and AUDITOR, and C and V whose values were 0.7118 and 0.7496, respectively, and also indicate a direct correlation between the variables. We discard the hypothesis of multicollinearity after the analysis of the VIF, available in Table 5.

Table 5 – Variance inflation factor (VIF)

	V	C	SIZE	LEV	ROA	CROSS	SET	DC	INDEP	NG	AESP
VIF	2.48	2.32	2.07	1.02	1.10	1.52	1.34	1.18	1.13	1.66	1.49

4.2 Econometric analysis and hypothesis testing

The research proposes to use a robust method that fits the panel characteristics of the database, which is the logit for panel data. The econometric analysis of the data assessed pooled models (often found in the literature), of fixed effects and random effects, in order to identify which of the techniques provides the best fit to the data set. Considering the goodness of fit criteria AIC and BIC, we have that the technique that best fits the data is the logit for panel data with random effect, as can be seen in Table 6.

Table 6 – Criterion goodness of fit.

Critério	Pooled	Fixed effect	Random effect
AIC	473.90	2170.42	278.79
BIC	53232	2212.40	347.11

Table 7 presents the estimates of the proposed model, using logit for panel data with random effects. Two models are presented, the unrestricted one, considering all the variables considered for the model, and the restricted one, considering the set of variables that best fit the model, according to the goodness-of-fit criteria considered. Both in the unrestricted model and in the restricted model, the sigma analysis reinforces the choice of the random effects model.

Table 7 – Estimations of the random effects model.

	Unrestricted model					Restricted model				
	Estimate	Std. error	t value	p-value		Estimate	Std. error	t value	p-value	
(Intercept)	-9.6064	2.7928	-3.4400	0.0006	***	-	-	-	-	
V	-0.8667	3.8141	-0.2270	0.8202		-	-	-	-	
C	2.2777	3.5011	0.6510	0.5153		-3.1350	1.2535	-2.5010	0.0124	*
SIZE	0.3694	0.1616	2.2850	0.0223	*	-	-	-	-	
LEV	-2.8385	2.5731	-1.1030	0.2700		-	-	-	-	
ROA	0.0031	0.0042	0.7380	0.4606		-	-	-	-	
CROSS	-3.1852	1.1179	-2.8490	0.0044	**	1.5231	0.7802	1.9520	0.0509	.
SET	3.3445	1.2300	2.7190	0.0065	**	-	-	-	-	
DC	-0.5889	0.7064	-0.8340	0.4045		-	-	-	-	
INDEP	-0.9970	1.0082	-0.9890	0.3227		-	-	-	-	
NG	1.2031	0.7870	1.5290	0.1264		-	-	-	-	
AESP	14.8370	2.5204	5.8870	0.0000	***	10.4882	1.4569	7.1990	0.0000	***
sigma	6.4992	1.0442	6.2240	0.0000	***	6.0667	0.8328	7.2840	0.0000	***
rho	0.9277					0.9179				
AIC	283.8269					AIC 278.7865				
BIC	347.1106					BIC 298.2584				
Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1‘’ 1										

Although the unconstrained model is not the best fit, it is useful for analyzing H1. Note that the estimated parameter associated with the variable V is statistically equivalent to zero, which suggests the non-validity of H1.

The estimation results of the best-adjusted model of random effects showed that only three variables of the model presented statistical significance, C, CROSS and AESP. Note that the signs of the estimated coefficients confirmed the initial expectations predicted about the dependent variable.

The estimate of the parameter associated with C suggests that the incentive effect, in the sample considered, is negatively influential on the choice of a Big Four audit, which is in line with and strengthens the conclusions of Fan and Wong (2005). This result suggests the validity of H2. The results found associated with the CROSS variable confirm the findings of Fan and Wong (2005), showing that the fact that the company issues ADRs positively influences the choice of a big four audit. Finally, the estimate of the parameter associated with the PEA variable was also significant, as were the findings by Ganz et al. (2019), suggesting that companies belonging to sectors served by specialized auditing tend to choose this specialist from a big four.

Finally, the sigma scale parameter indicates an intraclass rho correlation of approximately 0.93. This indicates a high correlation between the propensity to choose the big four in different years, *ceteris paribus*.

5. CONCLUDING REMARKS

The present research analyzes the influence of the ownership structure in the choice of a Big Four external audit by publicly held companies listed on B3, and, for its realization, a sample of 961 observations was used, referring to 122 non-financial companies listed on B3 among the period from 2010 to 2018. The operationalization of this analysis took place through a logistic regression, or logit, for panel data and empirically evaluated via association between the dependent variable Big Four audit and the independent variables right to vote and right to flow of cash, in addition to other controls.

The results found suggest that the right to cash flows (incentive effect) negatively influences the choice of a Big Four audit in the national scenario, confirming the second research hypothesis.

The data also showed that the CROSS and AESP variables are positively associated with the AUDITOR variable and are statistically significant. This shows that, in the Brazilian scenario, in addition to voting rights, the issuance of ADRs and the audit firm's specialization also influence the companies' choice of a Big Four audit. The other control variables (size, leverage, return on assets, sector, CEO duality, board independence and B3's governance level) were not statistically significant.

The results found expand the discussion about the literature that involves the corporate governance theme, specifically the relationship between external audit and ownership structure. Furthermore, they corroborate the empirical evidence that the positive effect of the concentrated ownership structure tends to discourage the decision of the company incurring costs to hire a Big Four audit (Claessens et al., 2002). In the national scenario, as already mentioned, in which the environment is characterized by low legal protection for investors, the separation between ownership and control and the risk of expropriation of minority shareholders by controllers, the most common conflicts are between the main ones.

It is important to emphasize that the econometric method used in this work, the logit for panel data, despite being the most proper method, is little used in the literature that investigates the same object outlined here. Based on this, it is worth saying that the findings of this research are not conclusive, requiring further investigations in order to corroborate or refute them.

Regarding the measurement of the explanatory variables of ownership structure, which analyzes the shareholding of the largest shareholder, the structure of ownership and indirect control, resulting from the use of corporate pyramids, was not considered. It is important to point out this limitation, since it differs from the form used in the study by Fan and Wong (2005), which guides this research.

Despite the limitations presented, it is worth noting that such findings contribute to a better understanding of the phenomenon studied, since there are few studies that use the proposed method. This evidence can serve to compare them with the results found in other studies, especially in the national scenario lacking research on this topic.

In this sense, another suggestion for future research can be listed, namely: as empirical studies always exclude financial companies due to their particularities, innovative studies could focus on this sector, investigating what influences the choice of a Big Four audit in these companies.

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