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## Analysis of the Relationship Between Audit Market Structure and Audit Fees Charged to Brazilian Companies

### ABSTRACT

**Objective:** The aim of this study is to analyze the influence of market structure on audit fees, based on industrial economics theories.

**Method:** We use a Ordinary Least Squares (OLS) model in which audit fees is a dependent variable and concentration measures, market share and leadership, and a proxy for audit quality are the main independent variables. The population was composed by the companies listed on Brazil Stock Exchange – B3, from 2010 to 2015, resulting in a sample with 1,663 observations in the period.

**Originality/Relevance:** This research explores different metrics of market structure and control variables for a sample and period not previously analyzed in the Brazilian literature. The article addresses a relevant topic for competition regulatory agencies, clients of audit firms and external users of financial statements.

**Results:** The results confirmed the hypothesis that there is a positive relationship between market concentration and the audit fees, even when considering only the group of big firms. Evidence shows the existence of value to the brand and possible search for quality in auditing by publicly traded companies. We also found a positive relationship between audit fees and earnings management, contrary to the predicted hypothesis.

**Theoretical/Methodological contributions:** The results showed that firms with higher market share charged higher audit fees to their clients. Among the big firms, the leader has significantly higher audit fees than the other firms. In addition, the positive relationship between audit fees and earnings management may mean that the audit firms charge higher amounts for those clients who practice management more intensively.

**Keywords:** Audit fees; Market Structure; Market Leadership.

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## 1 INTRODUCTION

The financial statements audit service has particular characteristics in its market, once it is divided into two groups: large firms, classified as *big* firms and the other firms, which comprise smaller networks and small businesses.

Several scientific studies show that the size of the audit firm is positively related to the quality of the services provided. DeAngelo (1981) describes that having a larger number of clients, large companies are less subject to the pressures that lead them to act in an opportunistic manner or with bias of protection to the interests of the audited entity. Earnings management studies (Becker, DeFond, Jiambalvo & Subramanyam, 1998), litigations in which the firms were the accused party (Palmrose, 1988), the auditor's experience and expertise (Cahan & Sun, 2015) point out that the larger the audit firm, the higher the quality of the services offered.

Another element that brought empirical evidence of the higher quality of big firms is the audit fees. Palmrose (1986) in the United States, Francis (1984) in the Australian market, Castro, Peleias and Silva (2015) in Brazil and Hu (2015) in Japan, obtained results in which the highest audit fees charged by big firms were attributed to higher quality of its services.

The reasons presented in the literature as determinants of audit fees (for example: client size, risks, complexity) can be considered common to all auditors. It is assumed, therefore, that all firms take such factors into account when composing their price. Still, studies provide empirical evidence on the existence of significant differences between the audit fees charged by big firms and other firms. These discrepancies began to be attributed to the concept of premium audit fees, which represent a higher price charged by large firms due to their greater reputation and the power of their brands.

Such characteristics of the audit market fit the concepts of the industrial economy that deal with market structures, among them, those who study the existence of product differentiation between competitors as a result of market concentration. Understanding how the structure of the audit market affects the price level is relevant as it can indicate to regulatory agencies that have an obligation to watch over competition, the effects of market concentration in this sector and indicate possible changes in rules, such as the audit firm rotation or other regulations. In addition, it can allow to clients and external users of financial statements, a better view on the price differentials of companies with greater market share, read big, in relation to the others.

In the Brazilian context the results are still incipient, as far as we were able to find, of how the prices charged by audit firms relate to their market structure and how competitors use pricing strategies, whether as a brand and reputation differential, whether competing for the market through the number of clients and the lowest price. Thus, the problem to be answered in this research is: is there a relationship between the market structure of audit firms and the audit fees paid to them by publicly traded companies?

In order to achieve the objectives of this study, information from publicly traded companies was used, whose shares are traded on Brazil Stock Exchange – B3, from 2010 to 2015. Data from financial statements and reference forms were collected resulting in a sample of 1,663 observations. The regression model was estimated with 13 control variables based on national and international literature related to the determining factors of audit fees, in addition to the main independent variables. Relevant and still little explored variables were considered, such as the presence of goodwill and other comprehensive income in the set of financial statements.

The research is justified, because it attempts to provide a greater understanding of how the market structure of auditing firms in Brazil affects pricing strategies, having a direct impact on clients' costs. This aspect proves to be important since publicly traded companies have great

relevance in the economy, resulting from the possibility of any investor can be able to acquire a stake in its capital. Therefore, the conclusion of the audit affects a large number of stakeholders and the quality work may require a higher volume of resources, impacting audit fees. A lower price strategy can mean loss of quality in the work performed. At the same time, the results of this work, like that of Eshleman and Lawson (2017), indicate that a part of the additional audit fees actually results from the greater market power of large firms. Thus, the research highlights the importance that companies place on their service providers, since the price, in certain situations, is taken as an indicator of the perception of quality.

Research in the Brazilian capital market is justified by its specific characteristics, such as the size of the capital market and the presence of mandatory rotation of auditors. Such facts may give different dynamics to the auditor's relationship with the auditee and indicate to regulatory agencies a greater need for monitoring of the structure and market concentration of this sector. The study in the Brazilian context is also relevant because it uses a longer period than previous research (Castro, Peleias & Silva, 2015), in relation to the existence of payment of differentiated audit fees (premium).

This research also demonstrates its originality when using different metrics of market concentration and by emphasizing as control variables the relevance of the size of the audit firm and the quality of the audit service (measured by discretionary accruals) for the determination of audit fees. The use of these variables contributes to the debate on the two themes in Brazilian literature. Furthermore, the research presents robustness tests on the results obtained through additional leadership metrics among companies considered big.

The rest of the work is divided as follows: Section 2 presents the economic theories that support the research hypotheses; Section 3 presents the data and the research method; Section 4 describes the results and discusses them; and Section 5 presents the final considerations and research suggestions.

## 2 LITERATURE REVIEW AND DEVELOPMENT OF THE HYPOTHESES

### 2.1 Perfect and imperfect competition models

The perfect competition model is defined by three main factors, according to Stigler (1946): i) goods supplied and demanded by a large number of sellers, without their influence on the price; ii) free entry to the market and absence of price and resource restrictions; and iii) knowledge of all relevant factors by all market participants. In addition, another concept of perfect competition is the homogeneity of the product. According to Carlton and Perloff (2005), in a perfect competition all firms sell an identical product and the consumer sees this product as equal, without differentiating the supplier companies.

On the other hand, in the model of imperfect competition there is competition, but more limited than in the model of perfect competition (Stiglitz, 1997). This model is subdivided into monopoly, oligopoly and monopolistic competition. In common between them is the fact that companies are not considered price takers, as they can decide on the price charged (Kupfer & Hasenklever, 2013). The main characteristics of these models are:

a) monopoly: where a single company sells to several customers and there is a barrier to entry for new suppliers (Carlton & Perloff, 2005). Consumers have no other supplier and this one has the power to impose its price on consumers (Kupfer & Hasenklever, 2013). In this model, there is no competition;

b) oligopoly: few suppliers with substantial barriers prevent the entry of new participants (Carlton & Perloff, 2005). Participating companies are concerned about how rivals will respond to their actions (Stiglitz, 1997). In this model, there is some competition;

c) monopolistic competition: there is free entry of participants, however, unlike perfect competition, an increase in price does not cause the total loss of customers. The more a company can increase its prices without losing customers, the greater its market power (Stiglitz, 1997).

In the market structure of audit firms it is possible to verify that there is a restriction in the number of service providers and this number has been decreasing, from eight big firms in the 1980s to four today (Carson, Redmayne & Liao, 2014). The high levels of market concentration between these companies (Dantas, Chaves, Sousa & da Silva, 2012; Wootton, Tonge & Wolk, 1994) and the absence of new competitors show the difficulty of entry for new providers. Such factors bring the audit market environment closer to an oligopoly model, a concept given by authors such as Allen, Ramanna and Roychowdhury (2013) and Beattie, Goodacre and Fearnley (2003). In this environment, the largest auditing firms maintain their market share in a relevant percentage and sustain prices above their competitors.

## **2.2 Product differentiation**

In a market with homogeneous products, consumers are unable to differentiate products or brands in the choice process (Shy, 1995). When products are differentiated, they become imperfect substitutes and, thus, a company can increase its price without losing all its customers (Carlton & Perloff, 2005); different from a market with perfect competition, where the price increase would lead to the total loss of its participation.

According to Stiglitz (1997), there are three fundamental characteristics for product differentiation: i) differences in product characteristics; ii) difference in the location of firms; and iii) differences perceived by the client, often induced by advertising. In addition to these attributes, there is also a classification between two main types of differentiation: horizontal differentiation and vertical differentiation. According to Tirole (1988), the horizontal differentiation is given by the particularity of the consumer: the products are taken as different without, however, have an unanimity among consumers. In a vertical differentiation, most consumers agree with most of the characteristics of one product in relation to another (Tirole, 1988).

There are cases where the consumer are unable to discern about the quality of the product before purchasing it (experience goods) (Tirole, 1988). Asymmetry of information allows a seller to have more information about the quality of a product than the buyer (Stiglitz, 1997). According to Carlton and Perloff (2005), there are two results from the asymmetry of information about quality: there may not be a balance or, if it exists, resources can be used less efficiently than they would be if there were perfect, symmetrical information.

## **2.3 Price as a quality determinant for the audit**

According to Martin (1986), the consumer must be uncertain about the quality of a product before its purchase, to use an indirect measure as a determinant of quality. Pollak (1977) argues that the preference for goods may depend on price because people judge quality by it, and this is a rational strategy under certain circumstances. Also according to the author, the preference for goods based on their sale value is the result of the assessment that the high price carries a 'snob appeal'. For Ireland and Lennox (2002) in a competitive audit market, price differences between firms represent a consequent return of the high quality. For DeFond and Zhang (2014) the audit fee amount represents the efforts made by the auditor, which is intuitively linked to quality.

Palmrose (1986), when verifying that the largest firms charge the highest audit fees, carried out tests to distinguish whether this charge is due to the higher quality of the firms or a monopolistic attitude. When substituting the price variable for hours worked, the author found a higher number of hours used by the largest firms, attributing this to the use of more time in search of evidence and in obtaining a higher level of assurance. In the Brazilian context, Castro *et al.* (2015) found evidence that the largest firms charge higher audit fees, and this fact was understood by the authors as a consequence of the best services practiced by big firms. Lopo, Martinez and Moraes (2017) analyzed the period from 2009 to 2012 in Brazil and observed that publicly traded companies where auditors are less remunerated, tend to have higher earnings management.

There are also discussions in the literature about abnormal audit fees (those with a value higher than the usual price determinants). If, on the one hand, abnormal audit fees can create incentives for the auditor to submit to client pressure, reducing the quality of his audit (Choi, Kim & Zang, 2010), on the other, they can be positively related to the quality of audit work, representing an indication of a higher level of effort in the work performed (Eshleman & Guo, 2014).

## 2.4 Studies on the market structure of audits

In the 1970s and 1980s, researches on the market structure of audits was justified by the concern related to the increasing concentration on the offer of audit services (Eichenseher & Danos, 1981). Simunic (1980), when analyzing a sample of companies from USA, concluded that, despite the market concentration by large firms, this factor alone does not support the claims that large firms monopolize the market. Wootton *et al.* (1994) verified that mergers increased market concentration indices; however, the research results also pointed to a greater balance in the competitive forces among the big companies (at the time, six firms). Government-linked bodies in the United States (GAO - Government Accountability Office) have also concluded that a high level of market concentration is not necessarily inconsistent with a competitive environment (GAO, 2003). In Brazil, Dantas, Chaves, Sousa and da Silva (2012) showed that between 2000 and 2009 the big firms maintained, on average, 67% of clients of publicly traded companies, excluding financial institutions.

Other studies have examined whether the higher concentration leads to an increase in audit fees. Huang, Chang and Chiou (2015) justify the need of the study of relationship between market concentration and audit fees, as this reduces the client's choice possibilities and results in higher audit fees and lower audit quality. However, the authors found results in the Chinese market that revealed a positive relationship between market concentration and audit fees and a negative relationship between audit fees and earnings management. In the American market, Eshleman and Lawson (2017) found evidence of a positive and significant relationship between market concentration, audit fees and quality of audits.

Regarding market share, Francis, Stokes and Anderson (1999) argue that market share is an important measure because it measures market leadership, which allows inferences about the auditor's reputation and experience. Ciconte, Knechel and Schelleman (2015) verified the existence of a positive relationship between market share and profitability and maintain that a factor with an impact on the profitability of audit firms is product differentiation. This differentiation is a consequence of the charging of premium audit fees between big and non-big firms, but also between big firms themselves (Ciconte, Knechel & Schelleman, 2015).

Studies have also found that the audit fees charged, whose values differed significantly between firms, were the result of the premium received by firms due to their reputation and brand. The first studies on audit fees already contributed to the discovery of differentiation in

prices charged by certain firms. Simunic (1980) found evidence that an audit firm (Pricewaterhouse) charged audit fees above its competitors.

For Simon (1997), premium audit fees are generally interpreted as an indication of real or perceived differentiation in the quality of auditors. The payment of premium audit fees may also be a consequence, according to Cameran (2005), of the firms' greater reputation. Ferguson and Scott (2014) found, between 2002 and 2004, in Australia, a great concentration of market between three big (PwC, EY, KPMG). However, the results of the survey did not demonstrate collusion in the prices charged, which in turn was supported by the presence of premium audit fees maintained by one of the firms (PwC). The authors attributed to the brand the fact that there are higher audit fees charged by one of the firms. The premium brand found suggests that reputation plays an important role in the audit market (Ferguson & Scott, 2014).

## 2.5 Hypothesis development

Measuring of the quality of a product or service is not always possible and, due to the asymmetry of information, indirect factors are attributed, such as, for example, the price charged. In auditing services, the market pays higher amounts to the largest firms, and several results attribute this phenomenon to the higher quality and better reputation of large auditing companies. In this context, the research raises the following hypotheses:

The greater market share held by the audit firm allows the charging of higher audit fees due to the attribution of a premium for the brand and for the differentiation of the product (Cameran, 2005; Ciconte *et al.*, 2015; Ferguson & Scott, 2014; Simon, 1997). Such market behavior is supported by theories of industrial economics, where attributes can be used by the consumer in the judgment of differentiation, including reliability, image and brand (Kupfer & Hasenclever, 2013). Considering that Brazilian market is similar to other markets, where the predominance of big firms is also present, we expect the same relationship between market leadership and audit fees charged, already identified in the literature in other markets. Thus, the first research hypothesis is developed:

H1: The audit fees received are positively related with the market share maintained by the audit firm.

According to the theories of industrial economics, in a market without perfect competition, including those with oligopoly characteristics, as the empirical evidence classifies the audit market (Allen, Ramanna & Roychowdhury, 2013; Beattie, Goodacre & Fearnley, 2003), the big competitors can increase their price without necessarily losing clients (Carlton & Perloff, 2005). Previous researches in audit have shown that concentration between big firms causes an increase in audit fees (Eshleman & Lawson, 2017; Huang, Chang & Chiou, 2015).

In view of the market power maintained by big firms in Brazil, where the percentages of market dominance are similar to those of other countries (Dantas *et al.*, 2012; Willekens & Achmadi, 2003), audit fees charged by large firms are expected to be significantly higher than audit fees charged by other service providers. Thus, the second research hypothesis presented is:

H2: The audit fees received are positively related to the size of the audit firm.

Finally, researches have shown that higher audit fees are positively related to higher quality of the audits (Castro *et al.*, 2015; Eshleman & Guo, 2014; Palmrose, 1986). As these are services where quality can only be confirmed after its use (experience goods) (Tirole, 1988) and, taking into account the attribution of quality through the price, the third hypothesis tries to confirm that the price differentiation is reflected in the quality of the services provided by the audits:

H3: The audit fees received are positively related with the quality of the audits performed.

### 3 METHODOLOGICAL PROCEDURES

#### 3.1 Population, sample and data collection

The study population comprises all publicly traded companies in Brazil Stock Exchange - B3, in the period from 2010 to 2015, except financial institutions. From this population, data were collected from the Brazilian version of the SECproxy statement (*Formulário de Referência*), as well as information contained in the financial statements through the Economática® platform. The sample comprises 1,959 observations. In view of the lack of disclosure of certain information over the years, the regression models were calculated with a sample of 1,663 observations.

#### 3.2 Regression models

The market share is measured based on the share of each audit firm referring to: the total assets audited by the firm divided by the total assets of the clients in the sample; the total revenue audited by the firm divided by the total revenue of the clients in the sample; and the mean of assets and revenues audited by the firm divided by the mean of total revenue and assets of the sample clients.

The metrics for the market share calculations were based on previous studies, which used assets and revenue for calculation (Audousset-Coulier, Jeny & Jiang, 2016; Pearson & Trompeter, 1994; Wang, Sewon, Iqbal & Smith, 2011), as well as studies that calculated the *Herfindahl–Hirschman Index* using such metrics (Dantas et al. 2012). Beyond to the base of previous works, it was also chosen to present a metric calculated based on the mean of assets and revenues, since companies can have low assets and high revenues, or vice versa, simultaneously. Thus, distortions in this sense are avoided and supplant the criticism and discussions on the use of only one or other measure for the size of the company, a discussion that was recently brought up by Dang, Li and Yang (2018).

The formula for calculating the HHI index is performed through the sum of the square of the participation of all audit firms, in each parameter (revenue, assets and mean), according to the description already used by Dantas et al. (2012). Finally, leadership is also tested using a dummy variable that represents whether the firm is the market leader in the sample, represented by the number 1, or 0 otherwise. Leadership was measured by the highest amount of revenue, assets and the mean of both, audited by each audit firm in the sample. The complete regression model is composed as follows:

$$\begin{aligned}
 \text{AudFees}_{it} = & \alpha + \beta_1 \text{MarketStructure} + \beta_2 \text{Big} + \beta_3 \text{Accruals} + \beta_4 \text{Asset}_{it} + \beta_5 \text{InvAsset} \\
 & + \beta_6 \text{CrAsset} + \beta_7 \text{Goodwill} + \beta_8 \text{OtherComprehensiveResults} \\
 & + \beta_9 \text{DebtRatio}_{it} + \beta_{10} \text{Loss} + \beta_{11} \text{Governance}_{it} + \beta_{12} \text{Regulated} \\
 & + \beta_{13} \text{Report} + \beta_{14} \text{AuditReportLag}_{it} + \beta_{15} \text{FirstYear}_{it} + \beta_{16} \text{Consulting}_{it} \\
 & + \varepsilon_t
 \end{aligned}$$

Where:

*AudFees* = Represents the audit fee amount received by the audit firm. In the regression, the natural *log* of audit fees was used.

*MarketStructure* = Independent variable in the study, determines the percentage of participation of each audit firm compared to the total number of audited companies, according to defined metrics.

*Big* = Dummy variable that expresses the value 1 if the company was audited by a big audit firm and 0 otherwise.

*Accruals* = Variable that demonstrates the level of residuals in the accruals model, evaluating earnings management, calculated using the Modified Dechow and Dichev model (McNichols, 2002). Among the models that measure accruals, the Jones model (1991), the Modified Jones model (Dechow, Sloan & Sweeney, 1995), the Dechow and Dichev model (2002) and the Modified Dechow and Dichev model (McNichols, 2002) stand out. Bearing in mind that the models have been complementing each other over the time, the Modified Dechow and Dichev model (McNichols, 2002) offers a set of measured attributes that aim to improve the previous models.

*Asset* = It means the size of the audited client, according to total assets, in natural log.

*CrAsset e InvAsset* = Variables that measure the representativeness of accounts receivable and inventories over total assets.

*Goodwill* = Dummy variable that represents the presence on company balance sheet of goodwill due to expected future profitability.

*OtherComprehensiveResults* = Dummy variable that demonstrates the existence of values in the statement of other comprehensive income.

*Debt Ratio* = Measure used as a determinant of risk observed by the auditor, calculated from the total liabilities over total assets.

*Loss* = Dummy variable that expresses the company's result: 1 if the company had a net loss in the year and 0 if a profit was obtained.

*Governance* = Company classified at a differentiated level of corporate governance. A dummy variable was assigned to companies classified at the “*Novo Mercado*” level of Brazil Stock Exchange - B3.

*Regulated* = Variable that evaluates whether the sector's regulation by specific agency influences the amounts of audit fees received. Were defined in regulated sectors the activities classified in the Economática® base as: i) water, sewage and other systems; ii) electricity, gas and water company; iii) oil and gas extraction; iv) generation, transmission and distribution of electricity; v) other outpatient health services, and vi) telecommunications.

*Report* = Dummy variable that expresses the type of opinion given by the auditor: 1 when the opinion is modified and 0 when the opinion is not modified.

*AuditReportLag* = Variable that seeks to observe the time between the base date of the report and the date of issue of the financial statements and audit report.

*FirstYear* = Variable that determines whether it is the first year of the audit firm with this client.

*Consulting* = Amounts received for non-audit services.

## **4 DESCRIPTION AND ANALYSIS OF RESULTS**

### **4.1 Descriptive statistics**

Table 1 shows the sample's descriptive statistics. There are presented the data of mean, standard deviation, maximum and minimum values of the variables that make up the statistical model.

It should be noted in Table 1 that the dependent variable, audit fees, is presented measured in reais, but is inserted in the model in a logarithmic way, the same occurring with total assets. The revenue variable, also in reais, is presented to the reader only for the purpose of comparing the amount of audit fees and total assets. The consulting variable, which will serve as a control, is also presented in reais. The other variables were calculated as described in Section 3.2.

**Table 1**  
**Descriptive statistics**

Variables	Obs.	Mean	Standard Deviation	Mín.	Max.
Audit Fees	1959	843,606.09	1,633,710.14	17,748.00	11,596,500.00
HHI Revenue	1959	0.0452	0.0349	-	0.115672
HHI Asset	1959	0.0480	0.0491	-	0.169917
HHI Mean	1959	0.0466	0.0425	-	0.148174
MKS Revenue	1959	0.1841	0.1062	-	0.340106
MKS Asset	1959	0.1834	0.1201	0.00	0.412210
MKS Mean	1959	0.1836	0.1134	0.00	0.384934
Accruals	1776	0.0593	0.1607	0.000017	5.943883
Total Assets	1959	7,349,524.47	17,914,863.15	7,394.00	138,385,400.00
Revenue	1959	3,763,337.86	8,874,283.97	209.00	60,748,853.00
Big	1959	0.7769	0.42	0	1
Inventory/Assets	1959	0.0670	0.09	0	0.648037
AR/Assets	1959	0.1295	0.12	0	0.977563
Goodwill	1959	0.0898	0.29	0	1
Comprehensive	1959	0.1919	0.39	0	1
Debt ratio	1959	0.7815	2.13	0.007	46.75670
Loss	1959	0.2700	0.44	0	1
Report	1952	0.0528	0.22	0	1
Report lag	1959	94.586	97.80	10.00	509.00
Regulated	1959	0.2251	0.42	0	1
First Year	1811	0.2319	0.42	0	1
Consulting	1959	88,441.98	257,307.61	-	1,800,000.00
Total	1959				

The descriptive statistics show an average audit fees amount for the period, in the amount of R\$ 843,606. The values of assets, revenue and consulting fees are also presented in reais. The accruals, calculated in absolute values (excluding negative results), have an average value of 0.0593 reaching the value of 5.9439. The concentration indicators measured by the HHI have an average value of 0.04 while the market share has an average of 18% for all the measures used. The maximum values of market share are 34% when using the revenue metric of the audited customers, 41% when using the metric of the assets of the audited companies and a maximum average indicator of 38%.

The other data show other characteristics of the sample. The variable big points out that 78% of the companies were audited by big firms. Data referring to inventory over assets and accounts receivable over assets present on average 7% and 13% of representativeness, respectively. Goodwill and other comprehensive income were measured by assigning of a dummy variable and have 8% and 20% presence in the financial statements that make up the sample. The companies have a debt ratio that, on average, represents 78% of the total assets and 27% showed a loss during the period. The audit report took, on average, 95 days to be issued and 5% of the reports had a modified audit opinion. First-year audits and regulated entities both represented 23% of the sample.

The data were organized in a panel and with the purpose of verifying possible multicollinearity, that is, if the regressors are correlated, being estimated the correlations between the variables of the sample, using as a premise of high correlation results above 0.8. A correlation above 0.8 was found between the market share variable measured by the audited revenue and the variable big. This correlation is explained by the nature of the variables, considering that the leadership was maintained among the group of the four largest firms throughout the studied period.

Complementary tests - not tabulated - removing the variable big from the model were carried out and are explained in the presentation of the results. Tests were also performed using the variance inflation factor. The results were not tabulated; however, as a general rule, if the VIF is greater than 10, the variable will be highly collinear (Gujarati & Porter, 2011). No variables were observed with estimated VIF values for regressions through Stata® software, with values above 10.

Considering the characteristics of the panel with unbalanced data, the result of the absence of information throughout the period and for all companies, the models were estimated in a cross-section pool format. According to Gujarati and Porter (2011), when bringing together different individuals in different periods, it is possible that a “camouflage” of individuality occurs and that, in its turn, is included in the error term. Thus, to include the effect not observed in the regression models, temporal and heterogeneity dummy variables of the sample items were created, thus constituting fixed effects. In each regression, fixed effects of time were calculated, with year dummies between 2010 and 2015, in addition to dummies that differentiate the individuals in the sample, by classifying companies by sector. The definition of the sample sectors was based on the classification of Brazil Stock Exchange - B3, available together with the data collected in the Economática® tool.

#### **4.2 Regression model with variable of interest market share**

According to defined regression models, the first model presented uses the market share measure to assess the relationship with the audit fees, in addition to the other variables defined for the study. Table 2 shows three columns, among which there is only change in the market share calculation model (revenue, assets and the mean between them). All other variables are kept the same in the three columns.

In the market share model, there is a positive and significant relationship between the largest market share measured by total assets and by the mean between revenue and assets, so that the market share measured by total revenues did not show significant results. Such lack of significance may be related to the correlation observed between the variables big and market share. For this reason, a regression was estimated without the variable big, where the market share variable starts to present a positive and significant relationship. Bearing in mind that the largest market shares remain with the big companies, the result confirms the research hypothesis, occurring only a division of significance between the variables, which are similar.

The variable of interest that differentiates big and other firms is significant and positive, in accordance with results achieved by other audit researches. Contrary to expectations, the level of accruals is positively and significantly related to audit fees. Although different from what is expected, there are other findings in the literature in this sense (Cho, Ki & Kwon, 2017; Pinheiro, 2018). The results obtained for the variables of interest are detailed in section 4.6. For control variables, it is observed that, among the variables related to the size of the audited company, they are positively related to audit fees, size variables (total assets), accounts receivable upon the assets, goodwill and other comprehensive income. Such variables represent

the complexity faced by the auditor and the effort spent to form an opinion on the financial statements.

**Table 2**  
**Market share regression results**

Variables	Model Revenue	Model Assets	Model Mean
Market Share	0.5544 (0.3653)	0.5648** (0.2648)	0.6196** (0.3024)
Big	0.4283*** (0.0962)	0.4250*** (0.0789)	0.4138*** (0.0853)
Accruals	0.7380*** (0.1954)	0.7248*** (0.1953)	0.7273*** (0.1953)
Size	0.4102*** (0.0158)	0.4086*** (0.0158)	0.4089*** (0.0158)
Inventory/Assets	-0.0702 (0.2414)	-0.0808 (0.2410)	-0.0760 (0.2412)
Accounts Receivable /Assets	0.4815*** (0.1663)	0.4749*** (0.1663)	0.4769*** (0.1664)
Goodwill	0.2270** (0.0945)	0.2233** (0.0948)	0.2244** (0.0947)
Other Comprehensive Income	0.1332** (0.0603)	0.1297** (0.0604)	0.1310** (0.0604)
Debt ratio	0.0111* (0.0064)	0.0108* (0.0064)	0.0109* (0.0064)
Loss	0.0631 (0.0527)	0.0619 (0.0528)	0.0624 (0.0528)
Governance	0.4097*** (0.0505)	0.4122*** (0.0505)	0.4119*** (0.0505)
Regulated	-0.4519** (0.1999)	-0.4338** (0.2029)	-0.4387** (0.2019)
Report	0.0814 (0.0979)	0.0780 (0.0983)	0.0784 (0.0982)
Report lag	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)
First Year	-0.2012*** (0.0515)	-0.2034*** (0.0515)	-0.2030*** (0.0516)
Consulting Fees	0.0285*** (0.0042)	0.0286*** (0.0042)	0.0285*** (0.0042)
SectorDummy	Yes	Yes	Yes
YearDummy	Yes	Yes	Yes
Constant	6.0254*** (0.2108)	6.0588*** (0.2107)	6.0504*** (0.2108)
F Statistic	140.27	140.06	141.26
Sample Size	1663	1663	1663
R <sup>2</sup>	0.6427	0.6432	0.6431

Note: Standard deviation in parentheses. Significant to: \*10%, \*\* 5% e \*\*\*1%

The use of variables goodwill and other comprehensive income is highlighted. Both have a high level of complexity given their nature: goodwill for future profitability needs to be tested annually, in accordance with accounting standards, in order to assess the need of impairment of values and the presence of other comprehensive income may mean the presence of assets or liabilities measured at fair value, both requiring greater efforts by the part of the auditor. Research results found a positive relationship between other comprehensive income and audit fees (Huang, Lin & Raghunandan, 2016), as well as evidences that the presence of goodwill in the financial statements increases the auditor's audit fee (Ghosh, Xing & Wang, 2016).

Among the financial variables, debt ratio showed a positive relationship with the audit fees charged. The debt ratio is directly related to a company's ability to honor its debts, which impacts the auditor's risk measurement - whether due to the risk of non-payment, management or manipulation of accounting balances and non-compliance of covenants. Companies that operate in regulated markets have paid lower amounts of audit fees. Although no results were found for this variable in the literature of the Brazilian market, a possible assessment of the lowest price charged is that, as these companies are in an environment supervised by regulatory agencies, the risk perceived by the auditor is less due to the continuous monitoring and requirements made by the regulator for the operation of these companies.

For the variables related to the audit, the results show evidence that in the first year occurs a "low-balling", where the auditor charges lower audit fees, possibly to win the client (Castro *et al.*, 2015), as well as a positive relationship between audit and consulting fees. Clients who spend more on auditing services also do so on consulting services, which may be related with an interest in providing good services (valued by the price).

It should be noted that the variable corporate governance has a positive and significant relationship with the audit fees charged, results already obtained by Castro *et al.* (2015) and Hallak and Silva (2012) in the Brazilian market. The payment of higher audit fees by companies that have differentiated levels of governance can demonstrate management's concern in better audit services.

The variables, loss, issuance of a modified report and time for issuing the report do not appear to be significant in the composition of the audit fee amounts.

### 4.3 Regression model with variable of interest HHI

The second model defined for the study uses a concentration measure calculated using the Herfindahl–Hirschman Index. Like the model that uses market share, Table 3 has three columns where the relations of the variable of interest are presented with the calculation of the HHI index with three different metrics: revenue, assets and the mean between both. All other variables are kept the same in the three columns.

In Table 3, the results are similar to the market share model in the variables of interest and in the control variables. The three measures of market structure proved to be positive and significantly related to audit fees. The variable big remains significant at the 1% level. Once again, accruals were positively related to audit fees, different from what was expected in the formulation of the hypotheses. Control variables and  $R^2$  did not differ between models, corroborating the results of the first regression.

**Table 3**  
**HHI regression results**

Variables	Model Revenue	Model Assets	Model Mean
HHI	1.3412* (0.7944)	1.1553** (0.4915)	1.3425** (0.5897)
Big	0.4712*** (0.0700)	0.4776*** (0.0605)	0.4690*** (0.0633)
Accruals	0.7355*** (0.1956)	0.7232*** (0.1956)	0.7249*** (0.1955)
Size	0.4108*** (0.0158)	0.4089*** (0.0157)	0.4093*** (0.0157)
Inventory/Assets	-0.0722 (0.2417)	-0.0828 (0.2412)	-0.0788 (0.2415)
Accounts Receivable /Assets	0.4826*** (0.1665)	0.4739*** (0.1664)	0.4763*** (0.1666)
Goodwill	0.2254** (0.0945)	0.2214** (0.0949)	0.2221** (0.0947)
Other Comprehensive Income	0.1329** (0.0603)	0.1289** (0.0604)	0.1300** (0.0604)
Debt ratio	0.0109* (0.0064)	0.0105* (0.0064)	0.0107* (0.0064)
Loss	0.0638 (0.0527)	0.0626 (0.0527)	0.0631 (0.0527)
Governance	0.4113*** (0.0506)	0.4134*** (0.0505)	0.4134*** (0.0506)
Regulated	-0.4505** (0.1998)	-0.4298** (0.2030)	-0.4345** (0.2020)
Report	0.0810 (0.0981)	0.0773 (0.0986)	0.0777 (0.0984)
Report lag	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)
First Year	-0.2012*** (0.0515)	-0.2036*** (0.0515)	-0.2032*** (0.0515)
Consulting Fees	0.0284*** (0.0042)	0.0285*** (0.0042)	0.0285*** (0.0042)
Sector Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Constant	6.0264*** (0.2107)	6.0630*** (0.2106)	6.0550*** (0.2106)
F Statistic	141.47	141.13	141.24
Sample Size	1663	1663	1663
R <sup>2</sup>	0.6428	0.6434	0.6434

Note: Standard deviation in parentheses. Significant to: \*10%, \*\* 5%, \*\*\*1%

**4.4 Regression model with variable of interest leadership dummy**

The study also uses a third form of differentiation, using a dummy variable that differentiates the market leader from other audit firms. Table 4 has, as well as the previous tables, three columns that demonstrate the relationship of the variable of interest with the leadership measured in three different ways (revenue, assets and the mean of both), keeping the other variables of the model unchanged.

**Table 4**  
**Leadership dummy regression results**

Variables	Model Revenue	Model Assets	Model Mean
Leadership	0.0598 (0.0503)	0.1193** (0.0579)	0.1193** (0.0579)
Big	0.5292*** (0.0544)	0.5178*** (0.0539)	0.5178*** (0.0539)
Accruals	0.7385*** (0.1964)	0.7256*** (0.1956)	0.7256*** (0.1956)
Size	0.4112*** (0.0158)	0.4089*** (0.0157)	0.4089*** (0.0157)
Inventory/Assets	-0.0773 (0.2420)	-0.0932 (0.2402)	-0.0932 (0.2402)
Accounts Receivable /Assets	0.4841*** (0.1663)	0.4707*** (0.1659)	0.4707*** (0.1659)
Goodwill	0.2243** (0.0949)	0.2232** (0.0950)	0.2232** (0.0950)
Other Comprehensive Income	0.1312** (0.0604)	0.1270** (0.0605)	0.1270** (0.0605)
Debt ratio	0.0108* (0.0064)	0.0103 (0.0064)	0.0103 (0.0064)
Loss	0.0637 (0.0528)	0.0602 (0.0527)	0.0602 (0.0527)
Governance	0.4088*** (0.0505)	0.4119*** (0.0505)	0.4119*** (0.0505)
Regulated	-0.4508** (0.1998)	-0.4262** (0.2043)	-0.4262** (0.2043)
Report	0.0828 (0.0985)	0.0785 (0.0988)	0.0785 (0.0988)
Report lag	-0.0001 (0.0002)	-0.0000 (0.0002)	-0.0000 (0.0002)
First Year	-0.1991 *** (0.0513)	-0.2043*** (0.0516)	-0.2043*** (0.0516)
Consulting Fees	0.0287*** (0.0042)	0.0288*** (0.0042)	0.0288*** (0.0042)
Sector Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Constant	6.0284*** (0.2116)	6.0689*** (0.2103)	6.0689*** (0.2103)
F Statistic	141.65	141.17	141.17
Sample Size	1663	1663	1663
R <sup>2</sup>	0.6425	0.6433	0.6433

Note: Standard deviation in parentheses. Significant to: \*10%, \*\* 5%, \*\*\*1%

The last model, shown in Table 4, shows results with a weaker significance (10%). The market leader, measured by assets and by the mean of assets and revenue, remains positive and significantly related to audit fees, while the leadership measured by revenues is not significant.

The results of the big and accruals variables were once again significant and positively related to audit fees. In general, the three models presented similar results as well in the variables of interest as in the control variables.

#### 4.5 Additional Tests

Regressions were calculated considering only the big firms, excluding the other audit firms from the sample. Based on the literature that points to the existence of a significant difference between large firms (Ferguson & Scott, 2014), the aim was to verify whether the effect of market share, concentration and leadership also persisted within the group of larger firms.

The results showed that even among the group of big firms there is a differentiation between the market leader and the others, allowing a higher charge of audit fees, although not confirming the lower level of accruals, which continued to present a positive and significant relation.

Since there is a firm that practices higher audit fees, this contributes to a perception of price differentiation, possibly, as empirical theory suggests, due to the strength of the brand and reputation. In the complete sample, the statistical models provided evidence of price differentiation practiced both by the group of big firms and as well by market power (greater share). Considering that there is also differentiation between the group of the four largest firms, the evidences supports the idea that there is the possibility that a firm, or part of the group, will exercise higher audit fees by the strength of its brand - which is even more evident when the leadership dummy is significant among the other firms.

Bearing in mind that during the sample period, about 70% of the companies were audited by the big firms, it is possible to assume that the characteristics of the audited companies are similar, which reinforces the possibility that the differentiation of prices occurs through the imposition of the brand and attribution of quality, not only to the greater volume of hours used by large firms. The other control variables did not differ from the complete model as determinants of audit fees and the sample  $R^2$  was also relevant, reaching 0.527.

#### 4.6 Discussion of Results

The three estimates: market share, HHI and leadership showed similar results, although with variations in the statistical significance of the variables of interest. The models confirm that the market structure is positively related to the audit fees charged by the audit firms, during the studied period. The results corroborate the findings of Dunn, Kohlbeck and Mayhew (2013); Francis *et al.* (1999); and Willekens and Achmadi (2003), who used metrics and produced similar results to the work performed.

Such results can be interpreted in two ways. The first, according to the theory, is a consequence of the power of the brand and the reputation of the audit firms, especially the big firms, obtained with the largest market presence and which result in higher audit fees even when considering the control variables. The second conclusion that this result suggests is that there is also, on the part of companies, a higher payment of audit fees, which may be a consequence of a search for higher quality in audit services. The client, therefore, pays higher audit fees to that firm that has the largest market share, with the aim of obtaining better services - the market structure serves as a decision factor -, given the impossibility of judging the quality of a service before enjoying it. One factor that corroborates this conclusion is the presence of a significant and positive relationship between the governance variable and the audit fees variable. Although higher levels of governance can mean lower audit risks, firms practice higher audit fees for the

perception of quality they generate through the price. In turn, the companies agree to pay higher audit fees, which may mean their concern about the quality of service and audit.

The accruals variable was used in this work in a hypothesis that predicted a negative relationship with audit fees. Higher audit fees - indirect indicators of higher service quality - presumed a lower level of earnings management, generating a negative relationship between the variables. By resulting, in all models, in a positive and significant relationship between these variables, this research sought in the literature related findings that could help in understanding this relationship. In Brazil, in a contemporary work, Pinheiro (2018) found similar results using other calculation methods for accruals, through the Modified Jones (Dechow *et al.*, 1995) and Dechow and Dichev (2002) models. In the international literature, Cho, Ki and Kwon (2017) also found a positive and significant relationship between audit fees and earnings management.

Contrary to the predicted hypothesis, the higher level of accruals related to higher audit fees may counter the idea that leading firms - consequently, big firms - perform higher quality jobs, since the financial statements are released after the auditor's work and already reflect, in theory, all the proposed accounting adjustments. On the other hand, audit contracts are generally signed at the beginning of the fiscal year and during this negotiation the auditor assesses, in the client acceptance process, the risks to which he will be exposed when auditing a specific entity. It is assumed that the audit firm can charge a higher amount of audit fees, already initially agreed, for detecting the greatest risks brought by the company.

Thus, there is a possibility that the levels of management have been reduced by the auditor throughout the work, executing his largest budget of hours as a consequence of the higher amounts of audit fees charged. Admitting this explanation, although there is a positive relationship between the variables, it can mean a greater quality or greater expenditure of hours by the auditor in order to reduce to a reasonable level the risk of material misstatement of the financial statements.

## **5 FINAL CONSIDERATIONS**

The measures that associate the largest market share, concentration levels and leadership with the audit fees received were found to be significantly related to the audit fees charged by the audit firms in the period considered. The results of this research contribute to the literature, by demonstrating that in Brazil, even with several control variables, the market position occupied by the firm is decisive for an increase in the price charged.

Even when analyzing only the market of the four largest firms, for which the literature sought to assess the existence of collusion (Ferguson & Scott, 2014; Pearson & Trompeter, 1994; Willekens & Achmadi, 2003), what demonstrates the relevance of the theme, there is a significant difference between the market leader and the other firms in charge of audit fees. This result allows to conclude that big firms exercise market power, despite the concentration does not exclude competitiveness.

Regarding the quality of the audits, the results revealed a positive relationship between audit fees and accrual levels. Although different from other results found that served as a basis for establishing the hypotheses, the conclusion for the analyzed sample is that there is a greater demand where the levels of earnings management are higher, which can mean a greater effort employed by the auditor - or the expectation of this need - in the defining of the audit fees. On the other hand, there is also a possibility that with the efforts and resources allocated by the audit firm, it is not possible to decrease the level of earnings management. In view of these divergent positions, the study suggests as a proposal for new researches, a deepening of the

relationship between the quality of audits and audit fees, in broader periods and with other metrics.

The findings of this research offer new conclusions to studies on auditing in Brazil, expanding results on the prices charged by audit firms and the existence of market power among them. The differentiation of audit fees between the big group provides evidence that there are firms with product differentiation and dispel the idea of the lack of competitiveness among service providers. Finally, the positive relationship between the market structure and the audit fees may show an attribution of quality by the contracting companies, which in turn may mean a search for better audit services.

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## Análise da Relação entre a Estrutura de Mercado das Firms de Auditoria e os Honorários de Auditoria Cobrados de Empresas Brasileiras

### RESUMO

**Objetivo:** Analisar a influência da estrutura de mercado nos honorários de auditoria, a partir das teorias da economia industrial.

**Método:** Foi utilizado o modelo de mínimos quadrados ordinários, tendo os honorários de auditoria como variável dependente, as medidas de concentração, fatias e liderança de mercado como variáveis de interesse e uma proxy para qualidade das auditorias, em uma amostra de 1.663 observações no período de 2010 a 2015, de companhias listadas na [B]3 (Brasil, Bolsa, Balcão).

**Originalidade/Relevância:** A pesquisa explora diferentes métricas de estrutura de mercado e variáveis de controle para uma amostra e período até então não analisados na literatura nacional. Aborda uma temática de relevância para órgãos reguladores, clientes de firmas de auditoria e usuários externos das demonstrações financeiras.

**Resultados:** Há relação positiva entre concentração de mercado e os honorários de auditoria, inclusive quando considerado somente firmas big. As evidências demonstram atribuição de valor à marca e possível busca por qualidade na contratação de auditorias pelas companhias abertas. Foi encontrada, ainda, uma relação positiva entre gerenciamento de resultados e honorários, ao contrário da hipótese prevista.

**Contribuições teóricas/metodológicas:** Os achados revelaram que as firmas com maior market share (participação de mercado) cobraram maiores honorários de seus clientes. Entre firmas big, a líder auferiu honorários significativamente maiores. A relação positiva entre gerenciamento de resultados e honorários pode significar que as empresas de auditoria cobrem maiores valores para aqueles clientes que praticam com mais agressividade o gerenciamento.

**Palavras-chave:** Honorários de auditoria; Estrutura de mercado; Liderança de mercado.

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