16a

BIG FOUR PREMIUMS IN THE SPANISH AUDIT MARKET AND MONOPOLY POWER

Biedma López, Estíbaliz

Personal Docente e Investigador

Facultad de Ciencias Económicas y Empresariales de la Universidad de Cádiz, Universidad de Cádiz

Ruiz Barbadillo, Emiliano

Catedrático de Universidad

Facultad de Ciencias Económicas y Empresariales de la Universidad de Cádiz, Universidad de Cádiz

Rodríguez Castro, Paula I.

Personal Docente e Investigador

Facultad de Ciencias Económicas y Empresariales
Universidad de Sevilla

Área temática: A) Información Financiera y Normalización Contable

BIG FOUR PREMIUMS IN THE SPANISH AUDIT MARKET AND MONOPOLY POWER

ABSTRACT

This study seeks to investigate the effect of market competition as a moderator factor of Big Four fee premiums. Unlike previous studies, we measure market competition by structural variables, such as market concentration or entry barriers, and dynamic variables of market mobility, based on variations in the market shares of audit firms. Using a sample of Spanish non-financial listed companies over the years 2003–2010, we find that Big Four premiums are not explained by the level of competition within the market. Our findings are opposed to those of academics and regulators who consider that Big Four auditors earn higher fees through the exercise of market power. These results reinforce the idea that Big Four premiums are driven by audit firms' reputation as providers of quality-differentiated audit services.

INTRODUCTION

The aim of the present study is to determine whether the level of market competition affects the ability of Big Four accounting firms to obtain fee premiums. To the extent that these fee premiums vary with the level of competition, evidence will be obtained that the exercise of market power is the origin of these premiums.

As Hay and Knechel (2017) highlight, the Big N audit firm premium is an important area in auditing research because it relates to competition and audit quality that are of concern to regulators, auditors, and audit clients. In this regard, the economic theory of imperfect markets suggests that certain features of a market, such as the number of relevant suppliers, their market shares, and the existence of entry barriers, create specific conditions for the leading companies to develop certain anti-competitive behaviors. One example is pricing above competitive levels—i.e., the structure of the market enables market power.[1] In relation to this concern, a significant number of studies by regulatory bodies around the world (GAO, Government Accountability Office 2003, 2008; FRC, Financial Reporting Council 2009; European Commission 2010; Competition Commission 2013; European Parliament 2014a, 2014b) have highlighted the absence of competitive dynamics in the market, as well as certain possible negative effects that may occur. In particular, there is the possibility for market-leading firms to obtain monopoly rents by imposing higher prices than those that would be charged in a competitive market.

---

[1] Regarding the audit market, several studies have demonstrated the existence of high and growing concentration, and entry barriers, particularly in certain segments of the market (Dopuch and Simunic 1980; Danos and Eichenseher 1986; Pong 1999; Quick and Wolz 1999; Gramling and Stone 2001; Beattie, Goodacre, and Fearnley 2003; Francis, Richelt, and Wang 2005; Ferguson, Francis, and Stokes 2006; Hamilton, Li, and Stokes 2008; Abidin, Beattie, and Goodacre 2010). Based on the large body of evidence revealed by some of these studies, Beattie and Fearnley (1995) considered that the audit market is a narrow oligopoly, with a market structure characterized by the control exerted by multinational companies, stable market shares, and entry barriers. These aspects can adversely affect the intensity of the competition. Nevertheless, empirical evidence of the positive association between the increase in concentration and audit fees remains unclear (Evans and Schwartz 2014; Gerakos and Syverson 2015; Huang, Chang, and Chiou 2016; Eshleman and Lawson 2017; Chu, Simunic, Ye, and Zhang 2018).

However, the existence of higher prices charged by the Big Four cannot be understood as anti-competitive behavior in all cases, given that it is equally possible that market participants may not consider all service providers as perfect substitutes. That is to say, the Big Four accounting firms can be considered more reputable and able to offer differentiated audit services for which auditee companies are willing to pay higher prices to obtain better service quality (Francis 1984; Palmrose 1986; Francis and Simon 1987; Pearson and Trompeter 1994; Lee 1996; Carson, Simnett, Soo, and Wright 2012).

The implications of the two competitive arguments are different. If there is market power, there will be imperfect competition, leading to the loss of welfare in society, therefore requiring intervention by the authorities. On the other hand, if audit fee premiums are explained by the desire of audited companies to pay for higher service quality, there will be a competitive market with a differentiated demand for quality and, therefore, a different price for each quality (Simunic and Stein 1987). This way, the use of any measure to avoid high market control exerted by the Big Four accounting firms would be unnecessary, and even unjustified.

Several studies have attempted to analyze the nature of competition in the audit market of various countries; the empirical evidence regarding the existence of Big N audit firm premium was varied. While some studies concluded that the Big Four accounting firms obtained higher prices than other suppliers in the market (Francis 1984; Palmrose 1986; Pong and Whittington 1994; Ireland and Lennox 2002; McMeeking, Peasnell, and Pope 2007; Huang et al. 2016; Eshleman and Lawson 2017; Chu et al. 2018), others did not find different prices between the Big Four and non-Big Four accounting firms (Simunic 1980; Firth 1985; Simon 1985; Baber, Brooks, and Ricks 1987; Simon, Teo, and Trompeter 1992; Che-Ahmad and Houghton 1996; Ferguson and Stokes 2002; Chaney, Jeter, and Shivakumar 2004). Recently, Hay and Knechel (2017), trying to reconcile these differences by applying the meta-regression technique, found that the Big N premium is primarily a private sector phenomenon, and most prevalent in more recent years.

On the other hand, with regard to those studies that found empirical evidence of the existence of higher prices obtained by the Big Four accounting firms, some of them inferred

that these higher prices were actually due to differentiation (Francis 1984; Francis and Stokes 1986; Carson, Fargher, Simon, and Taylor 2004; Cameran 2005; Hamilton, Li, and Stokes 2008), whereas others found that market power was the explanation for higher prices obtained by Big N audit firms (Chen, Ezzamel, and Gwilliam 1993; Johnson, Walwer, and Westergaard 1995; Chen, Su, and Wu 2007). These studies infer whether the premium is the outcome of market power by analyzing the existence of this premium in different sub-markets based on client size (Simunic 1980; Francis 1984; Francis and Stokes 1986; Chen et al. 1993; Chen et al. 2007; Johnson et al. 1995; Gul 1999; Peel and Roberts 2003; Carson et al. 2004; Cameran 2005; Hamilton et al. 2008). In doing so, the sub-market of large audited companies is considered a less competitive market, in that it is practically controlled by the Big Four accounting firms, while greater competition is attributed to the sub-market composed of smaller auditees, resulting from the presence of a greater number of active audit firms. The comparison of price behavior of the Big Four auditors in both market segments provided a basis to make inferences about the nature of price competition.[2] One limitation of these studies is that they assume that sub-samples of small auditees are more competitive, but they do not directly contrast the level of market competition. In addition, these works have primarily been based on samples of large companies (mostly listed companies), in which even the segment of small auditees included large companies (Peel and Roberts 2003).

Carson et al. (2012) were the first to provide a more direct approach on whether the ability of Big Four auditors to obtain audit fee premiums is affected by their ability to exercise market power. Specifically, they analyzed the impact on the premium of a reduction in the number of Big N present in the market.

---

[2] For example, if Big N auditors impose higher prices than other suppliers in both market segments, it can be inferred that the origin of these prices is due to the fact that the Big N auditors offer a differentiated service, since they charge differentiation premiums regardless of the degree of control they have in both segments. On the other hand, if the prices charged by Big N accounting firms are higher than those charged by other providers in a less competitive sub-market and similar to those charged by the other providers in the most competitive sector, it may be possible to observe market power.

Our study seeks to broaden that of Carson et al. (2012) by examining the impact on the Big Four premium of the level of competition in the market. Unlike the aforementioned study, we use a more complete set of measures to determine the level of market competition—that is, two structural variables, such as concentration or entry barriers, and a dynamic variable, such as market mobility, based on variations in the market share of audit firms. The latter type of variable, unlike concentration measurements, is able to detect latent changes in the number of relevant companies and variations in participation. These aspects determine the underlying competitive process in oligopolies and provide a more realistic description of their competition intensity (Baldwin and Gorecki 1989; Koster, Stel, and Folkeringa 2012; Fusillo 2013). This new methodological approach will provide more robust evidence of the price behavior of the Big Four accounting firms and the nature of competition in the audit market.

Additionally, in response to the call by Hay and Knechel (2017) that encourages continued research on the existence of a Big N audit firm premium in settings where there are relatively few research studies, we add to the competition and fee premium literature by providing Spanish evidence. In this line, the diversity of empirical evidence detected, from both a temporal and a geographical point of views, led Choi, C. Kim, J. B. Kim, and Zang (2010) to argue that the ability of Big Four auditors to exercise market power was largely dependent on the institutional features of the audit market of a country. However, most of the previous evidences refer to Anglo-Saxon markets. Just a few studies have considered the presence of fee premiums in the era of the Big Four audit firms in European countries, and with mixed findings (see Hay and Knechel 2017 for a review). Cameran (2005) is the only one that indirectly examines whether the origin of the premium fee is in the exercise of market power, using a methodology similar to that of Simunic (1980). Cameran (2005) found that in Italy, in the period prior to the disappearance of Arthur Andersen, the premium seemed to be attributed to differential reputation. Nevertheless, as the author highlights, the Italian audit market is not directly comparable with the market of other major European countries. In this sense, it is worth mentioning a series of unique characteristics of the Spanish audit market that could help multinational companies exercise market power more easily in the Spanish context than in

6

other markets. The market of listed companies is small in terms of both supply and demand, with the offer featuring a higher level of concentration than in other countries (Ruiz Barbadillo, Rodríguez Castro, and Biedma López 2016). Moreover, the Spanish market is less mature and less developed in comparison to the Anglo-Saxon market, so the Big Four may not have developed the historical reputation of higher quality they have acquired in the Anglo-Saxon environment. Hence, the Spanish case may be relevant to see how the Big Four auditors operate in environments with market characteristics favorable to the exercise of market power.

To achieve these goals, we use a sample from the audit market composed of non-financial listed Spanish companies operating between 2003 and 2010. Our results indicate that, in the Spanish audit market, Big Four accounting firms receive higher fees than other smaller firms for their services. However, despite the characteristics of the market—such as high concentration—these audit fee premiums are not explained by market power exercised by these firms. This fact seems to suggest that the perceived effect of service differentiation may explain the premiums obtained by the Big Four accounting firms. This evidence is of great value for regulatory bodies and audit firms, due to the implications that these results have for the competitive behavior of audit firms. The fact that the differentiation effect of higher quality service has a direct impact on the establishment of fees can allow other smaller audit firms to focus their efforts on increasing the quality of the services provided.

The rest of our study is structured as follows. After this introduction, in the second section, we review the theoretical foundations of market power and the literature on the audit market in order to formulate the research questions. The third section presents the methodology used, along with the specification of the model, the definition of variables, and the selection of the sample. We then present the univariate and multivariate empirical results, and other analyses. Finally, we present the conclusions of the study.

THEORETICAL FOUNDATIONS AND RESEARCH QUESTION

Analysis of the nature of competition in the audit market has generated intense debate in academic and professional fields. The audit market has been regarded as a narrow oligopoly with a number of features that can affect competition intensity (Chan 1999; Abidin, Beattie,

and Goodacre 2010). In this regard, certain firms, specifically those known as the Big Four accounting firms, absorb a substantial amount of activity in the market, with relatively stable market shares over time and entry barriers, which are aspects that may imply a low level of competition. These characteristics may allow the leading firms in the market to develop certain anti-competitive behaviors, such as operating together to impose prices above those that would prevail in a competitive market (GAO 2003, 2008; Oxera 2006, 2007; FRC 2009, 2010; OECD, Organisation for Economic Co-operation and Development 2009; European Commission 2010; UK House of Lords 2011).

Indeed, in a market of perfect competition, the free functioning of supply and demand makes prices equal to marginal costs and non-dependent on the number of competitors. This implies that no company will be able to affect the price system and all companies will therefore become price accepters. However, these competitive conditions are not often in line with empirical observations of markets. Therefore, there is a certain level of imperfection in real markets, which allows leading companies to exercise market power. This power represents the possibility that leading companies have to jointly impose prices above marginal costs due to limited market competition. This fact could lead to an unjustified increase in audit costs for companies, loss of social welfare, and clear inefficiency in the functioning of the market.

The empirical literature has attempted to determine not only whether leading companies develop market power in oligopolies but also the factors that may explain its occurrence, in order to develop public policies to prevent this type of anti-competitive behavior. In this sense, it is worth noting that the traditional theory, used for decades to explain market power, is based on the paradigm called structure-behavior-outcome, according to which structural characteristics of the market can explain the behavior of leading companies such as the imposition of high prices. In turn, this allows these companies to obtain greater outcomes than would prevail in conditions of perfect competition (i.e., monopoly rents). Within this analytical framework, it is therefore of particular interest to analyze the structural features of the market that may help companies exercise market power. In this sense, two particular features have

gained a great deal of attention as possible determinants of the possibility of exercising market power, these being the level of market concentration and the existence of entry barriers.

The traditional theory of industrial organization suggests that market competition basically depends on the existence of a sufficient number of competitors which have relatively similar positions in the market. This fact means that no one supplier has the capacity to operate in the price system and become the price accepter. On the other hand, in markets where there is significant inequality in the size of companies—i.e., in concentrated markets—leading companies are aware of the strategic interdependencies occurring between them, which may motivate them to consider that entering into non-competition agreements—i.e., collusive agreements—will maximize their joint interests. In this way, concentration favors collusion and enables leading companies to take actions together with the purpose of imposing high prices in the market (Stigler 1964). Secondly, entry barriers are only certain advantages that companies established in the market have over any potential new entrant into the market. Entry barriers prevent free access to the market by imposing a number of additional costs on potential competitors. In this way, these barriers will help leading companies to perceive their position in the market as impregnable, making it easier for them to develop anti-competitive behavior, such as the exercise of market power (Baumol, Panzar, Willing, and Bailey 1982).[3]

The Exercise of Market Power in the Audit Market: Research Question

Analysis of the price behavior of the Big Four accounting firms allows performing a normative assessment of competition in a market and therefore determining whether measures aimed at increasing market competition are necessary (Chan 1999; Beattie, Goodacre, and Fearnley 2003; GAO 2003; Hackenbrack and Hogan 2005; Competition Commission 2013; Hay and Knechel 2017). In this regard, it is worth mentioning that the necessary condition that should be assessed to determine whether the Big Four auditors

---

[3] In the audit market, entry barriers are associated with the existence of recognized brand names, the level of specialization required for auditing in certain sectors of activity, and the need for an efficient minimum size for audit of larger companies.

exercise market power is whether these companies charge their clients higher prices than other market suppliers for providing an audit service.

A significant number of studies have found that the Big Four auditors do charge higher prices than other market suppliers (Francis 1984; Francis and Stokes 1986; Palmrose 1986; Simon and Francis 1988; Pong and Whittington 1994; Craswell, Francis, and Taylor 1995; Ezzamel, Gwilliam, and Holland 1996; Ireland and Lennox 2002; Ferguson, Francis, and Stokes 2003; Hay, Knechel, and Wong 2006; McMeeking et al. 2007; Ferguson and Scott 2014; Huang et al. 2016; Eshleman and Lawson 2017; Hay and Knechel 2017; Chu, Simunic, Ye, and Zhang 2018), which could be considered indicative of the exercise of market power. However, empirical evidence has been inconclusive. Other studies have concluded that despite the high level of concentration in the audit market and the dominant position of the Big Four accounting firms, they do not charge their clients higher prices than other suppliers in the market (Simunic 1980; Firth 1985; Simon 1985; Baber et al. 1987; Simon et al. 1992; Che-Ahmad and Houghton 1996; Ferguson and Stokes 2002; Chaney et al. 2004).

Even though the accumulated empirical evidence has indicated that the audit market is largely concentrated at international level and there are entry barriers, as suggested by Baldwin and Gorecki (1989), there is no lack of competition in concentrated markets; on the contrary, there may be strong competition between leading companies. This fact may indicate that concentration and entry barriers (not in all circumstances) lead to the existence of collusive agreements and the exercise of market power (Pearson and Trompeter 1994; Willekens and Achmadi 2003; GAO 2008; Evans and Schwartz 2014; Bills and Stephens 2016). In this sense, there is evidence that, in oligopoly markets, relatively high and increasing levels of concentration are not necessarily inconsistent with the existence of a vigorous competitive process between leading companies (Baldwin and Gorecki 1989; Davies and Geroski 1997).

Therefore, the necessary and sufficient condition to conclude that the Big Four accounting firms exercise market power will be determined when obtaining audit fee premiums as the result of the dominant position enjoyed by such companies (Bandyopadhyay and Kao 2004;

Feldman 2006). Indeed, audited companies may consider that not all suppliers are perfect substitutes: i.e., they perceive that certain auditors—usually the leading companies in the market—offer higher quality services (Francis 1984; Palmrose 1986; Francis and Simon 1987; Lee 1996). Given that certain companies have more incentive to show the high quality of their financial information, audit firms that offer higher quality services than the average should be chosen even though higher prices are charged for the audit services (Dopuch and Simunic 1982; Beatty 1989; Krishnan 2003). The Big Four accounting firms have a reputation at international level and a larger size in terms of logistics, human resources, and client portfolios, which enables higher quality services. Therefore, the audit fee premiums received are the outcome of the Big Four auditors obtained from the investment made to offer quality-differentiated audit services.

Regarding the empirical evidence used to discriminate whether higher fees charged by the Big Four accounting firms result from an effect of perceived differentiation or the exercise of market power, the results are mixed. While studies like those conducted by Chen et al. (1993), Johnson et al. (1995) and Chen et al. (2007) have concluded that price premiums obtained by multinational companies are due to the exercise of market power, other studies have considered that such price premiums could be explained by the differentiation of the service offered by such companies (Francis 1984; Francis and Stokes 1986; Carson et al. 2004; Cameran 2005; Hamilton et al. 2008). Based on these arguments, we formulated the following research question:

RQ: Do the Big Four accounting firms receive higher fees than the other companies due to the exercise of market power?

METHODOLOGY

Model and Variables

To conduct the present study, we use the standard audit fee model that has been widely used in empirical literature (see Hay et al. 2006 for a review). In this model, the audit fee is a function of the type of auditor that performs the service, the interaction of the type of auditor

11

with the level of competition in the market, and other control variables (see Hay et al. 2006 for a detailed list of variables and models used), as shown below:

$$AFEE = f\ (PREMIUM,\ PREMIUM*COMPETITION,\ CONTROL) \qquad (1)$$

where:

AFEE is the natural logarithm of audit fees paid to the auditors (Simunic 1980; Craswell et al. 1995; Willekens and Achmadi 2003; Carson, Redmayne, and Liao 2014).

PREMIUM is a dichotomous variable with a value of 1 when the company is audited by one of the Big Four accounting firms. If the company is not audited by a Big Four firm, the variable will receive a value of 0. If this variable is significant and has a positive sign, it will allow inferring that audit firms obtain premiums when they are one of the Big Four accounting firms.

COMPETITION is a set of variables that measure the intensity of competition in the audit market. In the present study, we used three alternative measures of the level of competition, namely the level of concentration, the existence of entry barriers, and the variation in market shares. As for the level of concentration, it is measured through the four-firm concentration ratio (C4), representing the sum of the market shares of the four major international companies per year and activity sector (Moizer and Turley 1987; Willekens and Achmadi 2003; Abidin et al. 2010). In this respect, the traditional theory of oligopoly has indicated that the level of competition in a market is inversely related to the level of concentration that may exist in it.[4]

In addition, to measure the existence of entry barriers[5] in the market, we use the number of suppliers per year in each sector of activity (SUPPLIERS) (Abidin et al. 2010). Markets with greater entry barriers will be characterized by fewer audit firms, which will allow greater interdependence between the companies that dominate the market and therefore the exercise

---

[4] Indeed, concentration is just the distribution of the service offer and indirectly reveals the smaller number of relevant companies and the greater interdependence between them, so that concentration could facilitate collusion and hence the exercise of market power.

[5] As various studies have suggested, entry barriers in the audit market may be due to the level of specialization required in certain sectors of activity, the reputation of certain companies, the difficulty in obtaining the necessary size or capacity to cope with the audit of certain companies, etc.

of market power. On the other hand, in markets where there are no strong entry barriers, the number of audit firms will be higher, as will the existence of new entrants, so that the establishment of collusive agreements to impose high prices will not be feasible.

Regarding the level of competition, we include absolute variation in market shares (MOBILITY), calculated as the sum of the absolute value of the changes in market share of companies by sector of activity over time (Sakakibara and Porter 2001). The use of market mobility measures, based on market share variations, provides observable indicators of the competitive process dynamics through which the competitive behavior and rivalry between leading companies can be inferred in a more accurate manner (Matraves and Rondi 2007; Sutton 2007). In fact, given the difficulty that colluding companies have in obtaining agreements and maintaining coordinated and joint action, they can reasonably hope to maintain their shares as constant over time (Shepherd 1970). In this way, a high absolute variation in market shares would reveal a vigorous competitive process occurring between companies, which will cause lower ability to impose higher audit prices through the exercise of market power.

PREMIUM*COMPETITION represents the interaction between the level of competition in the market and the fact of being one of the Big Four accounting firms. This coefficient will allow us to answer our research question, showing whether the prices charged by the Big Four accounting firms were higher when the level of competition in the market was low; that is, it will highlight the ability to collude and exercise market power.

CONTROL. As control variables, we considered on the one hand client attributes in terms of size (LTA), audit firms' complexity (SUBSIDIARIES, FOREIGN_OP), and audit risk (NPTA, LIQ, TDTA, RECTA, INVTA, LOSS). These variables have been widely used in previous studies (Palmrose 1986; Craswell et al. 1995; Whisenant, Sankaraguruswamy, and Raghunandan 2003; Casterella, Francis, Lewis, and Walker 2004; Choi et al. 2010). On the other hand, we considered the attributes of the auditors and audit assignments (NEW, OPINION) (Hay 2013). Finally, we included the variables INDUSTRY (Wang and Chui 2015)

13

and YEAR to control the possible effects of the type of activity sector and the temporality of the data. The set of control variables and the expected signs are summarized in Table 1.

(INSERT TABLE 1)

Sample

The sample used in the present study is composed of non-financial listed Spanish companies. The information was obtained from public records of the National Securities Market Commission (CNMV) from 2002 to 2010. Taking into account that two years in a row should be compared to calculate the variation of shares, the resulting sample had a time horizon of eight years, from 2003 to 2010. The choice of this sample and period of time was based on various factors. Firstly, we only had information about audit fees of listed companies since 2002 (Moizer and Turley 1987). Secondly, due to the increased likelihood of obtaining the necessary data, listed companies were used in previous Spanish and international studies; as a result, the sample used in the present study allowed comparisons with previous studies. Finally, the sample is small in quantitative terms but not in qualitative terms, given the social and economic importance of these companies for the Spanish economy.

Finally, once we excluded those observations for which we could not obtain information, the sample is composed of 1,006 observations (audited companies/year). Table 2 presents the information about the number of companies audited throughout the period assessed, classified according to their sector of activity.[6] In order to define each sector, we have used the sectoral classification of the Madrid Stock Exchange (13 sectors).

(INSERT TABLE 2)

RESULTS

Descriptive Statistics

---

[6] In order to assess the competition in the audit market, it is necessary to have several independent markets providing the same service—i.e., enough competition variability. In this regard, several studies have highlighted that the competition is not homogeneous among the industries in which the audited entity operates (Danos and Eichenseher 1986; Hogan and Jeter 1999; Gramling and Stone 2001). Therefore, each industrial group constitutes a market segment that can be considered as the relevant audit market in which auditors compete (Chu et al. 2018).

Table 3 shows the descriptive statistics of the sample. As can be seen, the average audit fee for the audit market of listed Spanish companies is 193,603.30€ per client.

As regards the descriptors of experimental variables, the average PREMIUM is 0.79— i.e., close to 1. This result indicates that most of the companies in the sample have been audited by one of the Big Four accounting firms. There is high concentration (C4), with an average level of 93 percent, ranging from market segments exclusively audited by the Big Four accounting firms to other markets with a concentration of 62 percent. The average number of market suppliers (SUPPLIERS) is around 6.5, with a minimum of two and a maximum of 18 suppliers in a market. Therefore, while some markets exhibit strong entry barriers, others have a high number of suppliers, which reduces the possibilities for market leaders to collude. As for absolute variation in market shares (MOBILITY), the average variation is 23 percent, showing wide dispersion.

Table 4 shows the average values of the concentration level, number of suppliers, absolute variation in market shares, and audit fees of all the sub-markets into which the sample has been divided. In light of these results, there are differences in the average values of these indicators of competition at the sectoral level, as well as in the amount of audit fees invoiced. These differences were corroborated by performing a nonparametric variance test for each variable. The test indicated that the level of competitive intensity, and therefore the possible existence of collusive agreements that allowed the exercise of market power, are not similar in the different sectors of activity.

With respect to the data of the control variables, it can be observed that there is also great dispersion in the size of the companies audited (LTA). The return on assets shows a positive average value, as is the case for LIQ and leverage (TDTA). The variables RECTA and INVTA exhibit positive average values. On the other hand, the variable SUBSIDIARIES exhibits wide dispersion, some companies having no subsidiary. Regarding the categorical variables, it can be observed that the variable LOSS has a low average value, so the largest percentage of companies do not suffer losses. The variables NEW and OPINION also exhibit a low average

15

value. NEW, which takes a value of 1 when the client is new to the auditors, has an average value of almost zero, indicating that the audited companies do not generally change audit firms easily. The fact that the variable OPINION has an average value close to zero indicates that, in most cases, the audit reports are clean. Finally, the variable FOREIGN_OP exhibits an average value above 0.5, which indicates that there is a greater percentage of companies that operate abroad in comparison to those that only operate in the country.

(INSERT TABLE 4)

Table 5 shows the Pearson correlation coefficients between the dependent variable (AFEE) and the explanatory variables. As can be seen, audit fees are positively and significantly correlated with being a Big Four accounting firm (PREMIUM), in line with the existence of premiums for being one of the four international companies. Likewise, the audit fees are positive and significantly correlated with the level of market concentration (C4), indicating that in the more concentrated markets the intervening companies charge higher prices than when the markets exhibit less concentration. Similarly, considering the possibility of exercising market power, the level of fees is negative and significantly correlated with the number of suppliers in the market (SUPPLIERS). However, there is no significant relationship between the variability of market shares (MOBILITY), as a dynamic measure of competition, and the fees earned by the firms.

With regard to the control variables, the level of fees charged for audit services is positive and significantly correlated with the size of the audited companies (LTA), the level of indebtedness (TDTA), the book value of accounts receivable (RECTA), the existence of foreign operations (FOREIGN_OP), and the number of subsidiaries (SUBSIDIARIES), and negatively and significantly correlated with the book value of total assets (INVTA) and the fact that the auditors are new (NEW).

(INSERT TABLE 5)

Regression Analysis

Table 6 shows the results of the linear regression models that have been estimated along with different goodness-of-fit measures. Statistical *t* values are adjusted with robust standard

errors corrected for heteroscedasticity and considering clusters at company level (Choi et al. 2010). In addition, the variance inflation factor (VIF) is calculated for all regressions. Based on the values obtained, our results are unlikely to be affected by collinearity problems (Gujarati and Porter 2010, 340). F-statistics indicate that all models are significant. The goodness-of-fit of all models, measured by the coefficient of determination, is in line with the explanatory capacity exhibited by the models proposed in previous studies (see Hay 2013), suggesting that our models explain a significant proportion of the variations in audit prices.

The first column illustrates the base model, only including the variable PREMIUM, in order to determine whether the Big Four accounting firms charge higher prices than other suppliers in the audit market, which is a necessary condition to analyze the price behavior of multinational companies based on the level of market competition. The second, third, and fourth columns illustrate the interactions between each term of competition in the market and the fact of being one of the Big Four accounting firms. Finally, the fifth column illustrates the three terms of interaction together. As mentioned above, these terms of interaction will show whether possible premiums earned by Big Four accounting firms are affected by the level of competition in the market.

(INSERT TABLE 6)

As can be seen in Table 6, once other determinant fee factors (such as client size, audit complexity, and client risk) are controlled, the Big Four auditors obtain higher fees than other providers in the market, which is derived from the statistical significance of the variable PREMIUM in all models.

Interaction is not significant in any model in terms of competition level due to concentration (PREMIUM*C4), entry barriers (PREMIUM*SUPPLIERS), market mobility (PREMIUM*MOBILITY), or the combined effect of the various competition measures (column 5). The audit fee premiums of the Big Four accounting firms are not affected by the level of market competition. From a regulatory point of view, and taking into account the factors mentioned above, highly concentrated markets, with a small number of suppliers due to the existence of strong entry barriers and greater stability of market shares, favor the leading

17

companies to obtain cooperation agreements to jointly impose higher prices than those charged under perfect competition. However, the fact that the prices charged by the Big Four auditors are not influenced by competition indicates that these auditors do not exercise market power in the Spanish audit market.

On the other hand, the fact that the variable PREMIUM remains positive and at the one percent significance level in all models indicates that audit fee premiums obtained by these companies could be explained by considering that the users of services perceive that these companies are offering higher quality-differentiated audit services that requires the payment of higher prices.

The control variables—i.e., the size of the audited company (LTA), the book value of accounts receivable in proportion to total assets (RECTA), and whether the company carries out foreign operations (FOREIGN_OP)—indicate that there is a positive and significant relationship with the level of fees paid for audit services. On the other hand, the higher the return on assets (NPTA), the higher the level of indebtedness (TDTA). In addition, when the client is new to the auditor (NEW), the audit fees are smaller, which represents a significant relationship.

Robustness Tests

Alternative Specification of Competition

To rule out that the results may have been affected by the variables chosen to measure competition, we have repeated the analyses of Table 6 using alternative measures of the level of market concentration, the existence of entry barriers, and mobility.

Concentration has been measured using the Herfindahl index (Minyard and Tabor 1991; Willekens and Achmadi 2003; Boone, Khurana, and Raman 2012; Eshleman and Lawson 2017; Chu et al. 2018). This index can reach values between 0 and 1. A value of 0 means that the concentration is minimal (the market is spread more or less equally), and a value of 1 means that the market is controlled by a single company. The results contained in Table 7 (column 6) indicate that the Big Four accounting firms charged higher fees than other auditors (PREMIUM is positive and at the one percent significance level). However, these audit fee

premiums are not affected by the level of market concentration (PREMIUM*H), which confirms the robustness of the evidence mentioned above.

(INSERT TABLE 7)

Minimum efficient market size (MINSIZE) has been used as one of the entry barriers: not all auditors have the resources to provide audit services to companies of a certain size, which is a natural barrier to market entry. This measure has been calculated as the average natural logarithm of the total assets of audited companies per year and industry. Therefore, the higher the value, the greater the entry barriers and greater the likelihood of prices being affected by collusive agreements. In addition, as can be seen in column 7, the minimum efficient market size does not influence the premiums obtained by the Big Four accounting firms (PREMIUM*MINSIZE).

Finally, the Gini index has been used in the industrial economy as a measure of competition (Dunn, Kohlbeck, and Mayhew 2011). This is a measure of dispersion which, in our case, is used for the market shares of different suppliers (Abidin et al. 2010; Dunn et al. 2011; Bills and Stephens 2016). Values can vary from 0 (absolute equality between competitors' market shares) to 1 (strong inequality). The increase in the differentiation of market shares between different suppliers is considered an indicator of reduced competition in the market. On the other hand, if share differences are reduced, it would be a sign of greater competitive dynamics. The previous results remain robust in the face of this new way of measuring competition (column 8).

Alternative Estimation of the Big Four Premium

Following the methodology proposed by Carson et al. (2012), we estimate a linear regression model in which the amount of premium paid by each client to each of the Big Four auditors depends on the level of market competition. The Big Four premiums are calculated as the difference between the actual audit fee paid to the Big Four audit firm (LAF) and the predicted audit fee that a client with an incumbent Big Four auditor would pay for a non-Big Four audit firm (PLAF). To obtain this predicted audit fee, model (1) is estimated for the sample of companies audited by non-Big Four auditors (Table 8, panel A).

19

The results shown in Table 8, panel B, evidence that the level of market competition, whether measured through its structure or dynamic variables, does not affect the magnitude of the premium received by the Big Four audit firms.

<center>(INSERT TABLE 8)</center>

Self-Selection Effect

As an additional analysis, we have determined whether our results are affected by the possible endogeneity of the variable PREMIUM. As already discussed by Hamilton et al. (2008), several studies that used the audit fee model have indicated that the type of auditor may be an endogenous variable. Companies choose their auditors based on various aspects, such as the characteristics of the firm and the auditor, and other non-observable characteristics (Ireland and Lennox 2002; Chaney et al. 2004, 2005; Audousset-Coulier 2015). This may lead to what is known as the self-selection effect, introducing bias into the model estimates and therefore affecting the conclusions on premium fee audits according to the type of auditor.[7]

We have used Heckman's correction (1979) to determine whether the results of the regression model are affected by the possible bias of self-selection of auditors. In a first step, we estimated a probit model of auditor selection[8] and, based on the transformation of the residuals of the model, we calculated a term for bias correction—i.e., the Inverse Mills Ratio (IMR). In a second step, the models illustrated in Table 6 were reevaluated, including IMR as an independent variable.

---

[7]For a further explanation of the effect of self-selection of auditor on audit fees, see Chaney et al., 2004.
[8]To estimate the choice of auditor, we have used an adaptation of the model proposed by Hamilton et al. (2008): BIG4 = -8.97 + 0.52*LTA - 0.97*LTDTA - 0.00*LIQ + 0.30*FOREIGN_OP - 0.20*LOSS_2C + 0.51*NPTA + 0.14*PREV_OPINION - 0.13*CATA (Pseudo R^2 = 0.306, Chi^2 = 43.82, significant with a *p*-value <0.000), where BIG4, as well as the variable PREMIUM, has a value of 1 if the company is audited by a Big Four auditor, and 0 when it is not; LTDTA represents the book value of indebtedness in the long term with respect to the total assets of the company, LOSS_2C is a dichotomous variable that takes the value of 1 if the company has experienced losses for two consecutive years, 0 if it has not; PREV_OPINION is a dichotomous variable that takes the value of 1 when the opinion of auditors was not favorable in the previous year, and 0 in all other cases; CATA is the value of current assets with respect to total assets of the company. The other variables are defined in Table 1.

The results obtained remain robust after controlling for self-selection bias (Table 9, panel A). The Big Four accounting firms charge higher prices than other firms, and the ability to collude derived from the level of concentration, the existence of entry barriers, and market mobility does not affect the obtainment of these audit fee premiums. Therefore, in light of these analyses, audit fee premiums are not explained by the exercise of market power by the Big Four accounting firms.

(INSERT TABLE 9)

Panel Data Analysis

It is possible that the fees charged for audit services, in addition to the factors already considered in the model, may be explained by characteristics of the audited companies that remain constant over time but are not observable, such as the ability to negotiate with the audit firm, managers' interest in the quality of accounting information, etc. Panel data analysis allows detection of this unobservable heterogeneity that may explain decisions about fees, thus providing more efficient estimators than ordinary regression (Jara-Bertín and López-Iturriaga 2007). This technique also allows corroboration of whether there are endogeneity problems in the rest of the variables considered in the model. To that end, we repeated the analyses of Table 6, estimating a dynamic linear model using the generalized method of moments (GMM) and the system estimator proposed by Arellano and Bond (1998). This dynamic model includes the delay of the dependent variable (AFEE_1) in the model as an explanatory variable, which means observing that the fees for one year are partly determined by the audit fees established in the previous year. This is consistent with the contract structure in the audit market, which allows negotiating contracts for three or more years.

The results obtained by these means are qualitatively similar to the previous ones (Table 9, panel B), thus confirming that audit fee premiums of the Big Four accounting firms do not seem to be due to their ability to exercise market power.

Consideration of Non-Audit Services

Some studies have observed interdependencies between audit fees and fees charged for additional services to the same clients (Simunic 1984; Palmrose 1986). Methodologically, this

fact can cause a specification problem in the model. We repeated the analysis of Table 8, panel B. The logarithm of fees received for additional services provided to audit clients was used as an explanatory variable (LNAS). The results do not differ qualitatively from the previous ones (Table 9, panel C).

Extreme Observations

Finally, we have verified whether our results are affected by the existence of extreme observations. To that end, we have analyzed the extreme values of the variables NPTA, LIQ, TDTA, RECTA, and INVTA and replaced them with the maximum value of their average +/- three times their standard deviation. This way, we made sure that the models are well specified and statistically valid (Hamilton et al. 2008). The results (Table 9, panel D) remain robust. Consequently, we are able to determine that our conclusions are unaffected by the existence of extreme observations.

CONCLUSIONS

At international level, there is a great interest in the nature and intensity of competition in the audit market and, in particular, the possible existence of certain anti-competitive practices, which may be motivated by particular structural characteristics of the market. Indeed, an important number of studies worldwide have emphasized that the audit market is controlled by the Big Four accounting firms. In other words, this market exhibits high levels of concentration, which, together with the apparent existence of entry barriers, makes it easier for these leading firms to perform certain behaviors that, by affecting the general welfare, jointly favor their private interests. One type of anti-competitive behavior, for example, is when Big Four auditors impose higher prices than would prevail in a competitive market. This fact has aroused much interest among both academia and regulators because, by those means, the Big Four accounting firms exercise market power.

In this sense, analysis of the price behavior exhibited by leading companies allows assessment of the nature of competition in a market—i.e., the level of imperfection with which a market may actually be operating and, therefore, the need to promote corrective measures in order to deal with imperfections, such as the exercise of market power. In this way, the

objective of the present study was to assess the nature of competition in the Spanish audit market through an analysis of the price behavior of the Big Four accounting firms. In this regard, we assessed whether audit fee premiums could be explained by a lack of competitors and the high control that these firms can exercise over the market. This issue is extremely important, because there may be alternative explanations that could clarify the existence of audit fee premiums—for example, the market perceives that the Big Four accounting firms offer higher quality services than other suppliers. In short, there may be a differentiated demand for quality in the market, which means that not all suppliers are perfect substitutes.

To this end, the methodology used in the literature on the audit market has basically consisted of segmenting the market according to its level of competition, distinguishing a section with less competition from another with more competition. This methodology is based on the assumption that if the Big Four accounting firms exercise market power, they can only impose higher prices than other suppliers in a market that they control and which is less competitive. On the other hand, in markets with greater competition, the Big Four accounting firms have to operate like other suppliers—i.e., as price accepters. However, if, irrespective of the level of competition in the market, the Big Four accounting firms manage to obtain higher prices in both market segments, it could be due to the fact that the clients perceive that these firms offer higher quality services.

In contrast to previous studies (Simunic 1980; Francis 1984; Francis and Stokes 1986; Johnson et al. 1995; Chen et al. 1993; Gul 1999; Carson et al. 2004; Cameran, 2005; Chen et al. 2007; Hamilton et al. 2008), we used in the present study the standard audit fee model and, through the inclusion of an interaction term, directly assessed whether the obtainment of audit fee premiums by the Big Four auditors was conditioned by the level of market competition. As a complement to this methodology, and to detect the impact of market competition on the Big Four premium, the model developed by Carson et al. (2012) was used.

In order to measure the level of competition, we used two structural characteristics of the market, namely concentration and entry barriers. The theory of industrial organization considers these two issues determining elements of the level of competition in a market. The

higher the level of market concentration and entry barriers, the more potential control can be achieved by market leaders, thus making the exercise of market power more feasible. We also included the absolute variation in market shares as a dynamic measure of competition. These types of index introduce measures of market stability or instability (Baldwin and Gorecki 1989). This way, the transfer of market shares from the losers to the winning companies will be observed in a market with a vigorous competitive process between the leading companies.

The results obtained in the present study indicated firstly that the prices charged by the Big Four accounting firms were higher than those charged by other suppliers in the market. Secondly, these audit fee premiums were not explained by the level of market competition, whether measured through the level of concentration, the existence of entry barriers, or market mobility. This seems to suggest that clients perceive that these firms offer quality-differentiated audit services for which higher prices should be paid.

This evidence is relevant because it allows the inference that the Big Four accounting firms do not engage in anti-competitive behavior, such as market power, in the Spanish audit market, even though there are entry barriers and high concentration that could reduce the level of competition. From regulators' point of view, this evidence would imply that there is no apparent need to intervene in the market, given that there is no lack of competition. This way, no interventionist measures are required to reduce concentration and entry barriers, or to promote mobility. On the other hand, and for the other competitors in the market, the evidence obtained in the present study reveals that the basis of competition is perceived quality, which implies that these firms should make efforts to increase their perceived service quality in favor of other types of strategy such as cost reduction.

The findings of this study are also of special interest since the study verifies the robustness of the premium after controlling for self-selection, which, according to Hay and Knechel (2017) ,will be of great value for the development of future meta-analysis to assess whether the premium is different after controlling for self-selection.

However, our results have certain limitations and, for this reason, the conclusions should be taken into consideration with caution. Firstly, our data refer to the Spanish audit market and

the conclusions may not be applied in other contexts. We focused on analyzing the pricing behavior of listed companies, which were considered to be of public interest and among which there is apparently less competition. However, this behavior could be different in the market of unlisted companies. From this perspective, it would be interesting to extend this analysis to the market of unlisted companies in further studies. Thirdly, the present study assessed the period 2003–2010. However, it is worth mentioning that a number of events took place after 2010, such as Directive 2014/56/UE, Regulation (UE) No. 537/2014, and the Spanish Audit Law 22/2015, which may have affected the level of competition in the Spanish audit market.

REFERENCES

Abidin, S., V. Beattie, and A. Goodacre. 2010. Audit market structure, fees and choice in a period of structural change: Evidence from the UK: 1998–2003. *The British Accounting Review* 42: 187–206.

Arellano, M., and S. Bond. 1988. *Dynamic Panel Data Estimation Using PPD: A Guide for Users*. Working Paper Series, Institute for Fiscal Studies (IFS).

Audousset-Coulier, S. 2015. Audit fees in a joint audit setting. *European Accounting Review* 24 (2): 347–377.

Baber, W. R., E. H. Brooks, and W. E. Ricks. 1987. An empirical investigation of the market for audit services in the public sector. *Journal of Accounting Research* 25 (2): 293–305.

Baldwin, J. R., and P. K. Gorecki. 1989. Measures of market dynamics: Concentration and mobility statistics for the Canadian manufacturing sector. *Annales d'Economie et Statistique* 15/16: 315–332.

Bandyopadhyay, S. P., and J. L. Kao. 2004. Market structure and audit fees: A local analysis. *Contemporary Accounting Research* 21 (3): 529–562.

Baumol, W. J., J. C. Panzar, R. D. Willing, and E. E. Bailey. 1982. *Contestable Markets and the Theory of Industry Structure.* New York, NY: Harcourt Brace Jovanovich, Inc.

Beattie, V., and S. Fearnley. 1995. The importance of audit firm characteristics and the drivers of auditor change in UK listed companies. *Accounting and Business Research* 25 (100): 227–239.

Beattie, V., A. Goodacre, and S. Fearnley. 2003. And then there were four: A study of UK audit market concentration—Causes, consequences and the scope for market adjustment. *Journal of Financial Regulation and Compliance* 11 (3): 250–265.

Beatty, R. P. 1989. Auditor reputation and the pricing of initial public offerings. *Accounting Review* 64 (4): 693–709.

Bills, K. L., and N. M. Stephens. 2016. Spatial competition at the intersection of the large and small audit firm markets. *Auditing: A Journal of Practice & Theory* 35 (1): 23–45.

Boone, J. P., I. K. Khurana, and K. K. Raman. 2012. Audit market concentration and auditor tolerance for earnings management. *Contemporary Accounting Research* 29 (4): 1171–1203.

Bruynseels, L., and M.Willekens. 2012. The effect of strategic and operating turnaround initiatives on audit reporting for distressed companies. *Accounting, Organizations and Society* 37: 223–241.

Cameran, M. 2005. Audit fees and the large auditor premium in the Italian market. *International Journal of Auditing* 9: 129–146.

Carson, E., N. Fargher, D. Simon, and M. Taylor. 2004. Audit fees and market segmentation: Further evidence on how client size matters within the context of audit fee models. *International Journal of Auditing* 8: 79–91.

Carson, E., N. B. Redmayne, and L. Liao. 2014. Audit market structure and competition in Australia. *Australian Accounting Review* 24 (4): 298–312.

Carson, E., R. Simnett, B. S. Soo, and A. M. Wright. 2012. Changes in audit market competition and the Big N premium. *Auditing: A Journal of Practice & Theory* 31 (3): 47–73.

Casterella, J. R., J. R. Francis, B. L. Lewis, and P. L. Walker. 2004. Auditor industry specialization, client bargaining power, and audit pricing. *Auditing: A Journal of Practice & Theory* 23 (1): 123–140.

Chan, D. 1999. "Low balling" and efficiency in a two-period specialization model of auditing competition. *Contemporary Accounting Research* 16: 609–642.

Chaney, P. K., D. C. Jeter, and L. Shivakumar. 2004. Self-selection of auditors and audit pricing in private firms. *The Accounting Review* 79 (1): 51–72.

Chaney, P., D. Jeter, and L. Shivakumar. 2005. *Self-selection of Auditors and Size Nonlinearities in Audit Pricing*. Working paper, Vanderbilt University, Nashville, Tennessee, 4 February.

Che-Ahmad, A., and K. A. Houghton. 1996. Audit fee premiums of big eight firms: Evidence from the market for medium-size UK auditees. *Journal of International Accounting, Auditing and Taxation* 5 (1): 53–72.

Chen, D., M. Ezzamel, and D. R. Gwilliam. 1993. Determinants of audit fees for quoted UK companies. *Journal of Business Finance and Accounting* 10 (6): 765–786.

Chen, C., X. Su, and X. Wu. 2007. Market competitiveness and Big 5 pricing. Evidence from China's binary market. *The International Journal of Accounting* 42: 1–24.

Choi, J. H., C. Kim, J. B. Kim, and Y. Zang. 2010. Audit office size, audit quality, and audit pricing. *Auditing: A Journal of Practice & Theory* 29 (1): 73–97.

Chu, L., D. A. Simunic, M. Ye, and P. Zhang. 2018. Transaction costs and competition among audit firms in local markets. *Journal of Accounting and Economics* 65: 129–147.

Competition Commission. 2013. *Statutory Audit Services for Large Companies Market Investigation*. London: UK Government.

Craswell, A. T., J. R. Francis, and S. L. Taylor. 1995. Auditor brand name reputations and industry specialization. *Journal of Accounting and Economics* 20 (3): 297–322.

Danos, P., and J. W. Eichenseher. 1986. Long-term trends toward seller concentration in the US audit market. *The Accounting Review* 61 (4): 633–650.

Davies, S., and P. Geroski. 1997. Changes in concentration, turbulence, and the dynamics of market shares. *Review of Economics and Statistics* 79: 383–391.

Dopuch, N., and D. A. Simunic. 1980. The nature of competition in the auditing profession: A descriptive and normative view. In *Regulation and the Accounting Profession*, edited by J. W. Buckley, and J. G. Weston, 77-94. Belmont, CA: Lifetime Learning Publication.

Dopuch, N., and D. Simunic. 1982. *Competition in Auditing: An Assessment*. Urbana, IL: Fourth Symposium on Auditing Research, University of Illinois.

Dunn, K., M. Kohlbeck, and B. Mayhew. 2011. The impact of the Big 4 consolidation on audit market share equality. *Auditing: A Journal of Practice & Theory* 30 (1): 49–73.

Eshleman, J. D., and B. P. Lawson. 2017. Audit market structure and audit pricing. *Accounting Horizons* 31 (1): 57–81.

European Commission. 2010. *Green Paper. Audit Policy: Lessons from the Crisis*. COM (2010) 561 final, 13.10.2010. Brussels: European Commission.

European Parliament. 2014a. *Regulation (EU) No 537/2014 of the European Parliament and of the Council of 16 April 2014 on Specific Requirements regarding Statutory Audit of Public-Interest Entities and Repealing Commission Decision 2005/909/EC*. Brussels: European Parliament.

European Parliament. 2014b. *Directive 2014/56/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2006/43/EC on Statutory Audits of Annual Accounts and Consolidated Accounts*. Brussels: European Parliament.

Evans, L., and J. Schwartz. 2014. The effect of concentration and regulation on audit fees: An application of panel data techniques. *Journal of Empirical Finance* 27: 130–144.

Ezzamel, M., D. R. Gwilliam, and K. M. Holland. 1996. Some empirical evidence from publicly quoted UK companies on the relationship between the pricing of audit and non-audit services. *Accounting and Business Research* 27 (1): 3–16.

Feldman, E. R. 2006. A basic quantification of the competitive implications of the demise of Arthur Anderson. *Review of Industrial Organization* 29 (3): 193–212.

Ferguson, A., J. Francis, and D. Stokes. 2003. The effects of firm-wide and office-level industry expertise on audit pricing. *The Accounting Review* 78 (2): 429–448.

Ferguson, A. C., J. R. Francis, and D. J. Stokes. 2006. What matters in audit pricing: Industry specialization or overall market leadership? *Accounting and Finance* 46 (1): 97–106.

Ferguson, A., and T. Scott. 2014. What if there were three? Audit pricing within the Big 4 and the PricewaterhouseCoopers' premium in the Australian audit market. *International Journal of Auditing* 18 (1): 57–67.

Ferguson, A., and D. Stokes. 2002. Brand name audit pricing, industry specialization, and leadership premiums post Big 8 and Big 6 mergers. *Contemporary Accounting Research* 19 (1): 77–110.

Financial Reporting Council (FRC). 2009. *Choice in the UK Audit Market*. 4th Progress Report. London: FRC.

Financial Reporting Council (FRC). 2010. *Choice in the UK Audit Market*. 5th Progress Report. London: FRC.

Firth, M. 1985. An analysis of audit fees and their determinants in New Zealand. *Auditing: A Journal of Practice & Theory* 4 (2): 23–37.

Francis, J. R. 1984. The effect of audit firm size on audit prices: A study of the Australian market. *Journal of Accounting and Economics* 6 (2): 133–151.

Francis, J., K. Richelt, and D. Wang. 2005. The pricing of national and city-specific reputations for industry expertise in the U.S. audit market. *The Accounting Review* 80 (1): 113–136.

Francis, J. R., and D. T. Simon. 1987. A test of audit pricing in the small-client segment of the US audit market. *Accounting Review* 62 (1): 145–157.

Francis, J. R., and D. J. Stokes. 1986. Audit prices, product differentiation, and scale economies: Further evidence from the Australian market. *Journal of Accounting Research* 24 (2): 383–393.

Fusillo, M. 2013. The stability of market shares in liner shipping. *Review of Industrial Organization* 42: 85–106.

Gerakos, J., and C. Syverson. 2015. Competition in the audit market: Policy implications. *Journal of Accounting Research* 53 (4): 725–775.

Government Accountability Office (GAO). 2003. *Public Accounting Firms: Mandated Study on Consolidation and Competition*. Washington, DC: GAO. Available at: https://www.gao.gov/products/GAO-03-864

Government Accountability Office (GAO). 2008. *Audits of Public Companies: Continued Concentration in Audit Market for Large Public Companies does not Call for Immediate Action*. General Washington, DC: GAO. Available at: http://www.gao.gov/new.items/d08163.pdf

Gramling, A. A., and D. N. Stone. 2001. Audit firm industry expertise: A review and synthesis of the archival literature. *Journal of Accounting Literature* 20: 1–29.

Gujarati, D. N., and D. C. Porter. 2010. *Econometría* (5th Edition). Mexico: McGraw-Hill.

Gul, F. A. 1999. Audit prices, product differentiation and economic equilibrium. *Auditing: A Journal of Practice & Theory* 18 (1): 90–100.

Hackenbrack, K. E., and C. E. Hogan. 2005. Client retention and engagement level pricing. *Auditing: A Journal of Practice & Theory* 24 (1): 7–20.

Hamilton, J., Y. Li, and D. Stokes. 2008. Is the audit services market competitive following Arthur Andersen's collapse? *Accounting and Finance* 48 (2): 233–258.

Hay, D. 2013. Further evidence from meta-analysis of audit fee research. *International Journal of Auditing* 17 (2): 162–176.

Hay, D. C., and W. R. Knechel. 2017. Meta-regression in auditing research: Evaluating the evidence on the Big N audit firm premium. *Auditing: A Journal of Practice & Theory* 36 (2): 133–159.

Hay, D. C., W. R. Knechel, and N. Wong. 2006. Audit fees: A meta-analysis of the effect of supply and demand attributes. *Contemporary Accounting Research* 23 (1): 141–191.

Heckman, J. J. 1979. *Statistical Models for Discrete Panel Data*. Working paper, Department of Economics and Graduate School of Business, University of Chicago.

Hogan, C. E., and D. C. Jeter. 1999. Industry specialization by auditors. *Auditing: A Journal of Practice & Theory* 18 (1): 1–17.

Huang, T.-C., H. Chang, and J.-R. Chiou. 2016. Audit market concentration, audit fees, and audit quality: Evidence from China. *Auditing: A Journal of Practice & Theory* 35 (2): 121–145.

Ireland, J. C., and C. S. Lennox. 2002. The large audit firm fee premium: A case of selectivity bias? *Journal of Accounting, Auditing and Finance* 17 (1): 73–91.

Jara-Bertín, M. A., and F. J. López-Iturriaga. 2007. Auditoría y discrecionalidad contable en la gran empresa no financiera española. *Spanish Journal of Finance and Accounting/Revista Española de Financiación y Contabilidad* 36 (135): 569–594.

Johnson, E., K. Walwer, and E. Westergaard. 1995. Supplier concentration and pricing of audit services in New Zealand. *Auditing: A Journal of Practice & Theory* 2: 74–89.

Koster, S., A. Stel, and M. Folkeringa. 2012. Start-ups as drivers of market mobility: An analysis at the region-sector level for the Netherlands. *Small Business Economics* 39 (3): 575–585.

Krishnan, G. V. 2003. Audit quality and the pricing of discretionary accruals. *Auditing: A Journal of Practice & Theory* 22 (1): 109–126.

Law 22/2015, of 20 July, on Auditing. Boletín Oficial del Estado nº173 de 21 de Julio de 2015. Spain. Available at: http://www.icac.meh.es/seccion.aspx?hid=3509

Lee, D. S. Y. 1996. Auditor market share, product differentiation and audit fees. *Accounting and Business Research* 26 (4): 315–324.

Matraves, C., and L. Rondi. 2007. Product differentiation, industry concentration and market share turbulence. *International Journal of the Economics of Business* 14 (1): 37–57.

McMeeking, K. P., K. V. Peasnell, and P. F. Pope. 2007. The effect of large audit firm mergers on audit pricing in the UK. *Accounting and Business Research* 37 (4): 301–319.

Minyard, D. H., and R. H. Tabor. 1991. The effect of Big Eight mergers on auditor concentration. *Accounting Horizons* 5 (4): 79–90.

Moizer, P., and S. Turley. 1987. Surrogates for audit fees in concentration studies: A research note. *Auditing: A Journal of Practice & Theory* 7 (1): 118–123.

Organisation for Economic Co-operation and Development (OECD). 2009. *Competition and Regulation in Auditing and Related Professions.* DAF/COMP(2009)19. Paris: OECD.

Oxera. 2006. *Competition and Choice in the UK Audit Market*. Prepared for Department of Trade and Industry and Financial Reporting Council. Oxford, UK: Oxera Consulting.

Oxera. 2007. *Ownership Rules of Audit Firms and their Consequences for Audit Market Concentration.* Oxford, UK: Oxera Consulting.

Palmrose, Z. 1986. Audit fees and auditor size: Further evidence. *Journal of Accounting Research* 24 (1): 97–110.

Pearson, T., and G. Trompeter. 1994. Competition in the market for audit services: The effect of supplier concentration on audit fees. *Contemporary Accounting Research* 11 (1): 115–135.

Peel, M. J., and R. Roberts. 2003. Audit fee determinants and auditor premiums: Evidence from the micro-firm sub-market. *Accounting and Business Research* 33 (3): 207–233.

Pong, C. 1999. Auditor concentration: A replication and extension for the UK audit market 1991–1995. *Journal of Business Finance and Accounting* 26 (3/4): 451–475.

Pong, C. M., and G. Whittington. 1994. The determinants of audit fees: Some empirical models. *Journal of Business Finance and Accounting* 21 (8): 1071–1095.

Quick, R., and M. Wolz. 1999. Concentration on the German audit market: An empirical analysis of the concentration on the German market for stock corporation audits. *International Journal of Auditing* 3 (3): 175–189.

Ruiz Barbadillo, E., P. I. Rodríguez Castro, and E. Biedma López. 2016. Barreras de entrada, concentración y competitividad en el mercado de auditoría español. *Spanish Journal of Finance and Accounting/Revista Española de Financiación y Contabilidad* 45 (1): 92–133.

Sakakibara, M., and M. E. Porter. 2001. Competing at home to win abroad: Evidence from Japanese industry. *Review of Economics and Statistics* 83: 310–322.

Shepherd, W. G. 1970. *Market Power and Economic Welfare.* New York, NY: Random House.

Simon, D. T. 1985. The audit services market additional empirical evidence. *Auditing: A Journal of Practice and Theory* 5 (1): 71–78.

Simon, D. T., and J. R. Francis. 1988. The effects of auditor change on audit fees: Tests of price cutting and price recovery. *The Accounting Review* 63 (2): 255–269.

Simon, D., S. Teo, and G. Trompeter. 1992. A comparative study of the market for audit services in Hong Kong, Malaysia, and Singapore. *International Journal of Accounting Education and Research* 27: 234–240.

Simunic, D. 1980. The pricing of audit services: Theory and evidence. *Journal of Accounting Research* 18 (1): 161–190.

Simunic, D. 1984. Auditing, consulting, and auditor independence. *Journal of Accounting Research* 22 (2): 679–702.

Simunic, D., and M. Stein. 1987. *Product Differentiation in Auditing: Auditor Choice in the Market for Unseasoned New Issues.* Vancouver, BC: Canadian Certified General Accountants' Research Foundation.

Stigler, G. J. 1964. A theory of oligopoly. *The Journal of Political Economy* 72 (1): 44–61.

Sutton, J. 2007. Quality, trade and the moving window: The globalisation process. *The Economic Journal* 117 (524): 469–498.

UK House of Lords. 2011. *Auditors: Market Concentration and their Role. Select Committee on Economic Affairs, 2nd Report of Session 2010–11.* Vol. I Report (HL Paper 119-I). London, UK: The Stationary Office Limited.

Wang, Y., and A. C. W. Chui. 2015. Product market competition and audit fees. *Auditing: A Journal of Practice & Theory* 34 (4): 139–156.

Whisenant, S., S. Sankaraguruswamy, and K. Raghunandan. 2003. Evidence on the joint determination of audit and non-audit fees. *Journal of Accounting Research* 41 (4): 721–744.

Willekens, M., and C. Achmadi. 2003. Pricing and supplier concentration in the private client segment of the audit market: Market power or competition? *The International Journal of Accounting* 38 (4): 431–455.

TABLE 1
Variable definition

Variables	Expected sign	Definition
Dependent variable		
AFEE		Natural logarithm of the audit fees
Test variables		
PREMIUM	+	1 when the auditor is a Big Four firm, 0 otherwise
C4	+	Sum of the market shares of the four major international firms per year and industry
SUPPLIERS	-	Number of suppliers per year and industry
MOBILITY	-	Sum of the absolute value of changes in market share of firms by activity sector over time
Control variables		
LTA	+	Natural logarithm of the auditee's total assets
NPTA	-	Return on assets measured as the net profit over total assets
LOSS	+	1 if the company has negative results on ordinary activities of audited financial year, 0 otherwise
LIQ	-	Acid test (current assets minus stock, deflated by current liabilities)
TDTA	+	Debt ratio (total debt over total assets)
RECTA	+	Book value of the accounts receivable with respect to the total firm assets in that tax year
INVTA	+	Book value of the inventories with respect to the total firm assets in that tax year
NEW	+/-	1 if the audit is performed by a newly appointed audit firm, 0 otherwise
OPINION	+	1 if the company received a qualified opinion in the current year, 0 otherwise
FOREIGN_OP	+	1 if the firm has operations abroad, 0 otherwise
SUBSIDIARIES	+	Square root of the firm's number of subsidiaries
INDUSTRY		Sector in which the firm operates, taken from the sector classification of the Madrid Stock Exchange (13 sectors)
YEAR		Dummy variables capturing each year in our analysis

TABLE 2
Industry distribution of the final sample

Industry\Year	2003	2004	2005	2006	2007	2008	2009	2010	Total
S1	14	15	14	14	17	15	13	12	114
S2	19	18	18	17	16	14	13	12	127
S3	10	10	10	9	9	10	8	8	74
S4	5	5	5	7	7	7	7	8	51
S5	17	15	15	14	14	14	12	13	114
S6	7	7	7	6	6	6	6	5	50
S7	10	9	8	8	8	7	7	7	64
S8	4	5	5	5	7	7	7	7	47
S9	4	2	2	2	2	3	3	3	21
S10	5	5	4	5	6	5	5	5	40
S11	9	9	7	7	9	7	7	7	62
S12	8	6	5	5	6	6	6	6	48
S13	30	26	24	22	24	24	22	22	194
Total	142	132	124	121	131	125	116	115	1006

Industry classification: S1: Oil and energy; S2: Minerals; S3: Construction; S4: Chemicals; S5: Food and beverage; S6: Textiles, clothing, and footwear; S7: Paper, printing, and others; S8: Products pharmaceuticals and biotechnology; S9: Leisure, tourism, and hospitality; S10: Communication; S11: Transport; S12: Technology; S13: Real estate.

TABLE 3
Descriptive statistics (n=1006)

Variables	Mean	Median	STD.	Min.	Max.
Panel A: Continuous variables					
AUDIT FEES (Euros)	193,603.3	65,000	546,044.5	1,500	6,983,000
AFEE	11.09	11.08	1.36	7.31	15.76
C4	0.93	0.95	0.08	0.62	1
SUPPLIERS	6.47	5	3.60	2	18
MOBILITY	0.23	0.12	0.25	0.02	1.54
LTA	19.58	19.40	1.96	14.77	25.26
NPTA	0.03	0.04	0.14	-1.88	0.73
LIQ	10.57	0.92	122.44	0.01	3,484.12
TDTA	0.51	0.53	0.28	0.00	2.92
RECTA	0.14	0.09	0.15	0	0.73
INVTA	0.11	0.02	0.17	0	0.97
SUBSIDIARIES	3.47	3.16	2.37	0	24.62
Panel B: Categorial variables					
PREMIUM	0.79	1	0.41		
LOSS	0.28	0	0.45		
NEW	0.08	0	0.27		
OPINION	0.16	0	0.36		
FOREIGN_OP	0.56	1	0.50		

Variables are defined in Table 1.

TABLE 4

Mean values by industry of the number of suppliers, concentration, market share variation, and audit fees

Industry	Suppliers	Concentration	Mobility	Audit Fees
S1	6.65	99%	0.32	775,336
S2	6.05	98%	0.11	111,469
S3	2.89	100%	0.09	135,475
S4	4.55	79%	0.33	134,566
S5	6.71	92%	0.24	82,503
S6	4.86	89%	0.29	118,897
S7	4.88	93%	0.17	64,922
S8	4.11	97%	0.34	109,878
S9	2	100%	0.31	190,314
S10	2.63	93%	0.21	199,413
S11	5.13	98%	0.23	105,195
S12	3.65	100%	0.25	411,867
S13	12.30	82%	0.25	63,906
Nonparametric test	805.45 (0.0001)	795.33 (0.0001)	116.36 (0.0001)	177.18 (0.0001)

TABLE 5
Pearson correlation matrix

	V1: (AFEE)	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15
V2: PREMIUM	0.52**														
V3: C4	0.33**	0.33**													
V4: SUPPLIERS	-0.38**	-0.35**	-0.62**												
V5: MOBILITY	0.06	-0.001	0.05	0.01											
V6: LTA	0.81**	0.47**	0.25**	-0.25**	0.03										
V7: NPTA	0.05	0.6**	0.12**	-0.06*	-0.05	0.12**									
V8: LOSS	0.05	-0.08*	0.02	-0.12**	0.04	0.02	-0.43**								
V9: LIQ	0.01	-0.05	-0.01	0.04	0.03	0.001	0.01	0.05							
V10: TDTA	0.28**	0.15**	-0.003	-0.11**	-0.03	0.37**	-0.31**	0.17**	-0.12**						
V11: RECTA	0.08**	0.07*	0.08*	-0.15**	-0.02	-0.04	0.04	-0.17**	-0.06	0.24**					
V12: INVTA	-0.11**	-0.10**	-0.26**	0.30**	0.01	-0.13**	-0.10**	0.09**	-0.05	0.14**	0.10**				
V13: NEW	-0.13**	-0.11**	-0.09**	0.10**	0.11**	-0.10**	-0.08**	0.07*	-0.1	-0.003	-0.02	0.05			
V14: OPINION	-0.06	-0.07*	-0.06	0.08*	0.07*	-0.12**	-0.28**	0018**	-0.02	0.12**	-0.06	0.17**	0.06		
V15: FOREIGN_OP	0.31**	0.19**	0.26**	-0.40**	-0.157	0.18**	0.04	0.02	0.02	0.10**	0.28**	-0.08*	-0.01	-0.09**	
V16: SUBSIDIARIES	0.52**	0.30**	0.16**	-0.25**	-0.01	0.60**	0.08*	0.01	-0.02	0.24**	0.04	-0.13**	-0.06*	-0.12**	0.21**

Variables are defined in Table 1. *,**Significant at 0.05 and 0.01, respectively (two-tailed).

TABLE 6
Linear regression analysis between audit fees and fee premium and market competition

Variables	(1) Coef. (t-Stat)	(2) Coef. (t-Stat)	(3) Coef. (t-Stat)	(4) Coef. (t-Stat)	(5) Coef. (t-Stat)
Test variables					
PREMIUM	0.44	0.44	0.57	0.42	0.57
	(4.53)***	(4.49)***	(3.83)***	(4.32)***	(3.74)***
PREMIUM*C4[a]		0.11			-0.31
		(0.19)			(-0.44)
PREMIUM*SUPPLIERS			-0.02		-0.02
			(-1.03)		(-1.13)
PREMIUM*MOBILITY				0.06	0.06
				(0.75)	(0.75)
Control variables					
LTA	0.49	0.49	0.49	0.49	0.49
	(10.25)***	(10.25)***	(10.24)***	(10.24)***	(10.26)***
NPTA	-0.79	-0.79	-0.80	-0.79	-0.80
	(-3.08)***	(-3.08)***	(-3.14)***	(-3.06)***	(-3.12)***
LOSS	0.02	0.02	0.03	0.02	0.02
	(0.35)	(0.35)	(0.37)	(0.34)	(0.36)
LIQ	0.00	0.00	0.00	0.00	0.00
	(0.91)	(0.92)	(0.88)	(0.91)	(0.87)
TDTA	-0.38	-0.38	-0.37	-0.37	-0.37
	(-2.29)**	(-2.28)**	(-2.28)**	(-2.28)**	(-2.27)**
RECTA	0.73	0.73	0.74	0.73	0.74
	(2.39)**	(2.39)**	(2.40)**	(2.39)**	(2.41)**
INVTA	0.26	0.27	0.27	0.26	0.27
	(1.13)	(1.13)	(1.17)	(1.13)	(1.17)
NEW	-0.19	-0.19	-0.19	-0.18	-0.19
	(-2.19)**	(-2.20)**	(-2.20)**	(-2.23)**	(-2.23)**
OPINION	0.17	0.17	0.16	0.17	0.17
	(2.08)**	(2.08)**	(2.01)**	(2.08)**	(2.03)**
FOREIGN_OP	0.18	0.18	0.18	0.18	0.18
	(1.84)*	(1.84)*	(1.82)*	(1.83)*	(1.84)*
SUBSIDIARIES	0.04	0.04	0.04	0.04	0.04
	(1.13)	(1.13)	(1.12)	(1.13)	(1.12)
Intercept	0.70	0.70	0.88	0.70	0.88
	(0.89)	(0.89)	(1.11)	(0.89)	(1.11)
INDUSTRY EFFECTS	YES	YES	YES	YES	YES
YEAR EFFECTS	YES	YES	YES	YES	YES
R2	0.77	0.77	0.77	0.77	0.77
Statistical F	36.06***	35.00***	35.14***	35.20***	33.14***
Observations	1006	1006	1006	1006	1006
Cluster (company)	170	170	170	170	170
Mean VIF	1.65	1.77	2.10	1.65	2.21

Variables are defined in Table 1. [a] Variable C4 mean-centered to calculate the interaction term (Bruynseels and Willekens 2012); *,**,*** statistically significant at 10%, 5%, and 1% level, respectively.

TABLE 7
Robustness tests: linear regression analysis between audit fees and fee premium and market competition

Variables	(6) Coef. (t-Stat)	(7) Coef. (t-Stat)	(8) Coef. (t-Stat)	(9) Coef. (t-Stat)
Test variables				
PREMIUM	0.53	0.45	0.50	0.52
	(3.87)***	(4.40)***	(3.28)***	(3.39)***
PREMIUM*H	-0.22			-0.43
	(-0.85)			(-0.90)
PREMIUM* MINSIZE[a]		0.01		0.03
		(0.09)		(0.32)
PREMIUM* GINI			-0.12	0.18
			(-0.50)	(0.46)
Control variables				
LTA	0.49	0.49	0.49	0.49
	(10.26)***	(10.28)***	(10.25)***	(10.28)***
NPTA	-0.78	-0.78	-0.78	-0.77
	(-3.02)***	(-3.09)***	(-3.05)***	(-3.01)***
LOSS	0.03	0.02	0.03	0.02
	(0.37)	(0.34)	(0.37)	(0.33)
LIQ	0.00	0.00	0.00	0.00
	(0.92)	(0.91)	(0.91)	(0.94)
TDTA	-0.37	-0.38	-0.37	-0.36
	(-2.25)**	(-2.26)**	(-2.28)**	(-2.18)**
RECTA	0.73	0.73	0.74	0.73
	(2.39)**	(2.39)**	(2.39)**	(2.35)**
INVTA	0.26	0.26	0.26	0.26
	(1.11)	(1.12)	(1.12)	(1.11)
NEW	-0.18	-0.19	0.18	-0.18
	(-2.20)**	(-2.19)**	(-2.19)**	(-2.20)**
OPINION	0.18	0.17	0.17	0.17
	(2.12)**	(2.08)**	(2.09)**	(2.10)**
FOREIGN_OP	0.18	0.18	0.18	0.18
	(1.82)*	(1.83)*	(1.84)*	(1.78)*
SUBSIDIARIES	0.04	0.04	0.04	0.04
	(1.11)	(1.14)	(1.12)	(1.11)
Intercept	0.69	0.89	0.69	0.90
	(0.87)	(1.13)	(0.88)	(1.14)
INDUSTRY EFFECTS	YES	YES	YES	YES
YEAR EFFECTS	YES	YES	YES	YES
R2	0.77	0.77	0.77	0.77
Statistical F	35.44***	35.12***	35.12***	33.52***
Observations	1006	1006	1006	1006
Cluster (company)	170	170	170	170
Mean VIF	2.08	1.99	2.12	4.01

H: Herfindahl index measured as the sum of squared market shares of all audit firms in the market per year and industry. MINSIZE: Efficient minimum size of each market measured as the average natural logarithm of the auditee's total assets per year and industry. GINI: measured as:

$$Gini_t = \left(\frac{2}{n_t^2 \overline{X_t}} \right) \sum_{i=1}^{n,t} \left[\left(i - \frac{n_t + 1}{2} \right) \right] X_{t,i}$$

where n is equal to the number of competitors in the market at a given moment in time, $\overline{X_t}$ is equal to the average market share of all competitors, and $X_{t,i}$ is equal to the market share of each of the competitors. The remaining variables are defined in Table 1. [a] Variable MINSIZE mean-centered to calculate the interaction term (Bruynseels and Willekens 2012); *,**,*** statistically significant at 10%, 5%, and 1% level, respectively.

TABLE 8
Robustness tests: alternative estimation of the Big Four premium

Panel A: Linear regression analysis of the non-Big Four audit fee model

	LTA	NPTA	LOSS	LIQ	TDTA	RECTA	INVTA	NEW	OPINION	FOREIGN_OP	SUBSIDIARIES	Intercept
Coef.	0.51	-1.20	0.22	-0.001	-0.65	0.77	0.40	-0.10	0.27	0.47	0.09	0.37
(t-Stat)	(10.33)***	(-2.82)***	(1.76)*	(-3.40)***	(-2.28)**	(1.47)	(1.44)	(-0.98)	(1.81)*	(3.15)***	(1.53)	(0.46)

INDUSTRY EFFECTS	YES
YEAR EFFECTS	YES
R2	0.84
Statistical F	141.90***
Observations (Cluster - company)	215 (47)
Mean VIF	1.76

Panel B: Linear regression analysis between Big Four premium and market competition

Variables	(1) Coef. (t-Stat)	(2) Coef. (t-Stat)	(3) Coef. (t-Stat)	(4) Coef. (t-Stat)	(5) Coef. (t-Stat)	(6) Coef. (t-Stat)	(7) Coef. (t-Stat)	(8) Coef. (t-Stat)
Test variables								
C4	0.70 (1.35)			0.41 (0.97)				
SUPPLIERS		-0.02 (-0.90)		-0.02 (-0.69)				
MOBILITY			0.10 (1.24)	0.08 (1.00)				
H					-0.09 (-0.32)			-0.14 (-0.28)
MINSIZE						-0.06 (-0.50)		-0.05 (-0.46)
GINI							-0.04 (-0.16)	0.06 (0.15)

TABLE 8 (continued)

Variables	(1) Coef. (t-Stat)	(2) Coef. (t-Stat)	(3) Coef. (t-Stat)	(4) Coef. (t-Stat)	(5) Coef. (t-Stat)	(6) Coef. (t-Stat)	(7) Coef. (t-Stat)	(8) Coef. (t-Stat)
Control variables								
LTA	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05	-0.05
	(-0.91)	(-0.91)	(-0.90)	(-0.91)	(-0.90)	(-0.89)	(-0.90)	(-0.89)
NPTA	0.72	0.71	0.73	0.72	0.74	0.73	0.73	0.74
	(2.33)**	(2.31)**	(2.40)**	(2.32)**	(2.98)**	(2.38)**	(2.37)**	(2.39)**
LOSS	-0.17	-0.17	-0.16	-0.17	-0.16	-0.15	-0.16	-0.15
	(-2.05)**	(-2.03)**	(-2.00)**	(-2.04)**	(-1.99)**	(-1.91)*	(-2.00)**	(-1.90)*
LIQ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(20.55)***	(20.25)***	(20.73)***	(20.33)***	(20.63)***	(20.70)***	(20.58)***	(20.60)***
TDTA	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.41
	(2.08)**	(2.07)**	(2.10)**	(2.08)**	(2.09)**	(2.08)**	(2.09)**	(2.08)**
RECTA	-0.07	-0.08	-0.08	-0.07	-0.08	-0.08	-0.08	-0.08
	(-0.21)	(-0.22)	(-0.23)	(-0.22)	(-0.22)	(-0.22)	(-0.22)	(-0.23)
INVTA	-0.35	-0.36	-0.34	-0.36	-0.35	-0.34	-0.35	-0.34
	(-1.01)	(-1.03)	(-0.99)	(-1.02)	(-1.01)	(-0.97)	(-1.01)	(-0.97)
NEW	-0.18	-0.18	-0.19	-0.19	-0.18	-0.19	-0.18	-0.19
	(-1.48)	(-1.45)	(-1.57)	(-1.52)	(-1.49)	(-1.49)	(-1.48)	(-1.49)
OPINION	-0.19	-0.19	-0.18	-0.19	-0.18	-0.18	-0.18	-0.18
	(-1.87)*	(-1.90)*	(-1.84)*	(-1.90)*	(-1.82)*	(-1.81)*	(-1.81)*	(-1.75)*
FOREIGN_OP	-0.29	-0.29	-0.29	-0.29	-0.29	-0.29	-0.29	-0.29
	(-2.43)**	(-2.39)**	(-2.42)**	(-2.42)**	(-2.40)**	(-2.41)**	(-2.39)**	(-2.40)**
SUBSIDIARIES	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04
	(-1.08)	(-1.08)	(1.07)	(-1.08)	(-1.08)	(-1.07)	(-1.08)	(-1.07)
Intercept	0.47	1.32	1.00	0.88	1.07	2.03	1.06	1.98
	(0.44)	(1.19)	(0.99)	(0.78)	(1.05)	(0.95)	(1.03)	(0.91)
INDUSTRY EFFECTS	YES	YES	YES	YES	YES	YES	YES	YES
YEAR EFFECTS	YES	YES	YES	YES	YES	YES	YES	YES

TABLE 8 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
R^2	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Statistical F	409.22***	402.49***	307.85***	426.40***	311.80***	273.57***	324.84***	258.05***
Observations	791	791	791	791	791	791	791	791
Cluster (company)	139	139	139	139	139	139	139	139
Mean VIF	2.16	2.98	1.73	3.13	1.93	3.22	1.89	3.96

*,**,*** Statistically significant at 10%, 5%, and 1% level, respectively.

TABLE 9
Synthesis of additional analysis

Variables	(1) Coef. (t-Stat)	(2) Coef. (t-Stat)	(3) Coef. (t-Stat)	(4) Coef. (t-Stat)
Panel A: Self-selection bias				
PREMIUM	0.43 (4.43)***	0.54 (3.59)***	0.43 (4.33)***	0.53 (3.56)***
PREMIUM *C4[a]	-0.04 (-0.06)			-0.41 (-0.62)
PREMIUM * SUPPLIERS		-0.01 (-0.79)		-0.02 (-1.01)
PREMIUM * MOBILITY			0.03 (0.43)	0.04 (0.51)
IMR	0.07 (0.27)	0.07 (0.25)	0.07 (0.27)	0.05 (0.2)
R2	0.77	0.77	0.77	0.77
F-statistic	32.93***	32.96***	32.99***	31.23***
Panel B: Panel data analysis				
PREMIUM	0.42 (2.53)**	0.71 (2.23)**	0.39 (2.75)***	0.68 (2.26)**
PREMIUM *C4[a]	0.17 (0.37)			-0.38 (-0.78)
PREMIUM * SUPPLIERS		-0.04 (-1.46)		-0.04 (-1.50)
PREMIUM * MOBILITY			0.03 (0.49)	0.04 (0.63)
AFEE_1	0.60 (6.94)***	0.61 (7.30)***	0.61 (6.49)***	0.61 (7.36)***
Z1	115.74 (26)***	118.21 (26)***	122.74 (26)***	114.78 (28)***
Z2	2.04 (7)*	1.80 (7)*	2.09 (7)**	2.02 (7)*
m1	-3.42	-3.49	-3.40	-3.52
m2	-0.38	-0.33	-0.39	-0.33
Hansen-Chi2 (gl)	62.97 (55)	58.74 (55)	62.86 (55)	58.62 (55)

TABLE 9 (continued)

Variables	(1) Coef. (t-Stat)	(2) Coef. (t-Stat)	(3) Coef. (t-Stat)	(4) Coef. (t-Stat)
Panel C: Consideration of non-audit services				
PREMIUM	0.45	0.71	0.43	0.71
	(2.44)**	(2.55)**	(2.53)**	(2.51)**
PREMIUM *C4[a]	0.09			-0.38
	(0.23)			(-0.96)
PREMIUM * SUPPLIERS		-0.04		-0.04
		(-1.53)		(-1.59)
PREMIUM * MOBILITY			0.03	0.03
			(0.33)	(0.42)
AFEE_1	0.59	0.59	0.59	0.59
	(7.10)***	(7.47)***	(7.00)***	(7.39)***
LNAS	0.01	0.01	0.01	0.01
	(1.44)	(1.62)	(1.44)	(1.63)
Z1	94.52 (27)***	96.12 (27)***	100.12 (27)***	94.94 (29)***
Z2	1.77 (7)*	1.61 (7)	1.86 (7)*	1.96 (7)*
m1	-3.32	-3.36	-3.33	-3.39
m2	-0.26	-0.19	-0.26	-0.19
Hansen-Chi2 (gl)	70.48 (69)	71.95 (69)	70.68 (69)	72.00 (69)
Panel D: Extreme observations				
PREMIUM	0.41	0.55	0.41	0.54
	(4.07)***	(3.70)***	(4.14)***	(3.47)***
PREMIUM *C4[a]	-0.12			-0.49
	(-0.18)			(-0.69)
PREMIUM * SUPPLIERS		-0.02		-0.02
		(-0.98)		(-1.00)
PREMIUM * MOBILITY			0.06	0.04
			(0.76)	(0.53)
R2	0.77	0.77	0.77	0.77
F-statistic	37.27***	37.94***	38.53***	34.75***

Variables are defined in Table 1. [a] Variable C4 mean-centered to calculate the interaction term (Bruynseels and Willekens 2012); *,**,*** statistically significant at 10%, 5%, and 1% level, respectively.