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ARTICLE

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Audit quality and fees: Evidence from Spain

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ABSTRACT

This empirical research uses panel data methodology to find the main factors determining Spanish audit quality. on a sample with more than 60,000 audited companies from 2013 to 2018. Prior to analysing the quality of the audit, we have adjusted the best possible model to the audit fees behaviour in order to extract the abnormal fees. Our dynamic model shows that audited company's size, the previous year's audit fees, the years with the same audit firm, the auditor's opinion, the auditor rotation, the concentration or dedication to the client and the client sector are explanatory factors of audit fees. Further, we find evidence that audit quality improves with number of hours billed for audit work and decreases with sector concentration of auditor and, a novel multiplicative effect, the auditor size by abnormal audit fees, in such a way that the surcharge (abnormal fees) of the big audit firms contribute negatively to improve the audit quality.

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1. Introduction

The reform of audit services in Europe (Directive 2014/56/EU) aims to stabilise financial markets by increasing confidence in audits through seeking higher auditor independence and an increase in audit quality. The tools used to do this include restricting audit clients with audit contracts from providing certain additional non-audit services as well as limiting non-audit fees.

In the Spanish case, some empirical research focuses on analysing audit fees. Monterrey Mayoral and Sánchez-Segura (2007b) evaluate the explanatory factors of auditor's fees for a sample of non-financial and listed Spanish companies from the perspective of the generation of economies of scale when those fees are set together with fees for additional services (consulting). They conclude that the knowledge spillover derived from one activity is applied to the others, and that the level of the fees is directly influenced by the complexity of the work and the audit risk. Sierra-García et al. (2019)

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study the relationship between corporate governance and the cost of auditing in companies listed on the Spanish continuous market. They analyse whether the existence of internal audits reduces (negative relationship) the cost of external audits, as proposed by Turpin (1990). Their results show a positive relationship that is far from expectation. Gandía and Huguet (2020) analyse the audit feed effect on cost of debt in Spanish SME (Small and Medium-size Enterprise) firms and find that higher audit fees are associated with a lower cost of debt for voluntarily audited companies, while the association is not significant for mandatory audits. This result suggests that the type of audit and the audit fees do not have a direct effect on the credibility of audits. The combination of both factors has relevance for lenders, leading them to positively value higher audit fees in the voluntary setting. López-Corrales and Pedrosa Rodríguez (2020) do not find a relationship between audit fees and financial crises. However, their results show that audit fees are related to the following factors: the size of the company that is being audited, the ratio of inventories plus accounts receivable divided by total assets, return on assets (ROA), the delay in issuing the audit report, the type of auditor (Big 4[1]), and whether the audited company belongs to the construction sector. Finally, for Portuguese and Spanish companies, Silva et al. (2020) find that in Spain audit fees are determined by the size, complexity and risk of the audited company, and that Big-4 firms charge higher fees. They also find that companies that change their audit firm pay lower fees during the year of rotation and that in Portugal, the only explanatory factor of audit fees is company size.

The literature also studies Spanish audit quality. Gómez-Aguilar et al. (2004) find that audit quality (measured by the auditor's level of independence and knowledge) affects the probability that a financially distressed company would receive a going-concern opinion. Ruiz-Barbadillo et al. (2006) show that the longer the audit engagement, the lower the probability of opinion shopping. Ruiz-Barbadillo et al. (2009) find no evidence to suggest that a mandatory rotation requirement is associated with a higher likelihood of issuing going-concern opinions. Heras et al. (2012) show that audit quality has increased after the Financial Act 44 × 2002. Duréndez Gómez-Guillamón and Maté Sánchez-Val (2012) find a location effect according to the highest quality values in the most developed Spanish areas. Cano Rodríguez and Sánchez Alegría (2012) study if banks and lenders take into account auditor selection in the formation of the cost of debt and find that only private companies obtain a lower cost of debt when they select a high-quality auditor. Fuentes and Sierra-Grau (2015) analyse the effects of adopting the IFRS (International Financial Reporting Standards) and the 2007 General Accounting Plan (which came into force at the beginning of 2008) on audit fees. They show a significant increase in the audit cost following these changes in their results, and this increase was not offset by the expected improvement in the quality of the financial information. Finally, Cabal-García et al. (2019) show that none of the reforms caused an improvement in financial reporting quality of non-financial listed Spanish companies which are considered to be Public Interest Entities.

We note a lack of studies that relate audit fees to audit quality in Spain from the above literature. Monterrey Mayoral and Sánchez-Segura (2007a) only analyse the effect of both the time the auditor has held the position and the fees with respect to the auditor's independence for Spanish listed companies. The latter is measured by its quality, which is approximated by means of abnormal or discretionary accruals. They find that only the

duration of the engagement presents a statistically significant negative relationship (the longer the contract, the lower the abnormal accruals and therefore the higher the quality of the audit), and that the fees or the multiplicative effect of fees and duration are not statistically significant. Therefore, we focus on the relationship between audit fees and quality. Specifically, we study if abnormal or discretionary accruals are explained by abnormal audit fees. In addition, the above-mentioned researchers study the effect of a small set of variables (contract duration, regulation changes, internal audit, etc.), and only include listed companies or SME in their sample. Therefore, the results are biased by the low number of regressors employed and by the size and type of companies in the sample.

We use discretionary accruals to measure audit quality, as Monterrey Mayoral and Sánchez-Segura (2007a) and Garcia-Blandon and Argiles-Bosch (2017b). This is in contrast to Cano-Rodríguez (2010), who find that Big Auditors typically provide higher quality audits than non-Big Auditors do by using accounting conservatism as measures of quality. Our aim is to analyse explanatory factors of audit quality. In order to accomplish this, we use the largest sample, to our knowledge, of Spanish firms. It includes all types of audited companies, whether listed or not and from all productive sectors. We believe that this type of sample will lead to more robust results. We analyse more than 148,000 audits for a period between 2013 and 2018, both inclusive. The econometric methodology is panel data techniques, as found in Garcia-Blandon and Argiles-Bosch (2013). We use panel data estimation for better control of individual unobserved heterogeneity as well as to reduce potential problems caused by omitted variable bias.

The empirical methodology consists of three stages. First, we extract the abnormal fees from the model that best fits the behaviour of audit fees while accounting for that all the explanatory variables considered in the financial and accounting literature. These include non-audit fees, auditor size, complexity of the work, auditor risk, auditor's opinion, and delay in issuing the audit report. In addition, we consider auditor rotation as a regressor on audit fees. This is contrast to González-Díaz et al. (2015), where this variable is instead included as a regressor on audit quality. Additionally, we also estimate the multiplicative effect of auditor's opinion by non-audit fees as an additional regressor in order to detect a possible asymmetric size effect. This new regressor allows contrasting the Cano-Rodríguez (2010) results (bigger auditor, higher quality), by using discretionary accruals instead of accounting conservatism as measures of audit quality. Our results show that the audited company's size, the auditor size, opinion and rotation are significant regressors. We also find new significant regressors for Spanish cases: the auditor's specialisation by sector and the previous year's audit fees. The result is a novel contribution to audit fees modelling. Specifically, this is an autoregression on price which requires using dynamic panel data. Second, we estimate the abnormal accruals as a measure of audit quality. Finally, we search for explanatory variables of audit quality.

We test the usual regressors analysed in the literature as abnormal fees. However, the empirical literature uses multiplier effects. For example, Garcia-Blandon and Argiles-Bosch (2017b) find that firm and partner tenure do not seem to play a relevant role as determinants of audit quality in Spanish listed companies, but suggest that audit quality is maximised when medium firm and partner tenures interact. We therefore include a new regressor which shows the combined effect of abnormal fees and the size of the audit firm. In addition, we contemplate the auditor concentration by client effect. This is

similar to Garcia-Blandon and Argiles-Bosch (2017a), who analyse the effect of auditor industry specialisation on audit quality for Spanish listed companies and find a significant impact of the industry specialisation of audit partners on audit quality.

Moreover, we find empirical evidence that indicates that a higher number of hours billed for audit work improves audit quality, while client concentration and a new multiplicative effect (auditor's opinion by abnormal audit fees) contribute negatively to improve the audit quality.

The paper is structured as follows: section 2 reviews the accounting literature on the subject and formulates the research question; section 3 explains the methodology used to test the hypotheses; section 4 describes the data; section 5 shows the empirical results; and section 6 presents the conclusions.

2. Literature review

Simunic (1980) is the seminal work on audit fees, and his model includes relevant factors for both the client and the audit firm. His main conclusions are that the size, complexity, and risk of the client are positively correlated with audit fees. Based on this groundbreaking work, and up until the present day, a whole literature has developed on the subject. Below, we review accounting literature which defines audit fees modelling and supports the hypotheses on quality audit.

2.1. Audit fees modelling

2.1.1. Audit fees vs non-audit fees (consulting)

One of the primary factors that may explain a lack of independence is the fees that audit firms receive for auxiliary jobs. These include tax consulting, systems consulting, management consulting, international business consulting, human resource management, and financial and investment consulting (Firth, 1997). Simunic (1984) finds that there is a positive relationship between audit fees and non-audit fees, which is explained by knowledge spillover theory i.e auditors use the knowledge obtained from the audit performed to carry out work other than the audit itself, allowing them to generate an asymmetry of information in the consulting field. Palmrose (1986) was the first paper to find evidence of a positive relationship between audit fees and other services fees (tax, accounting, and non-accounting consulting). However, another hypothesis related to the compensation between audit and non-audit fees is the so-called loss leader hypothesis. This hypothesis posits that a decrease in audit fees would be offset by invoicing more lucrative consulting work (Hillison & Kennelley, 1988). In contrast, according to O'Keefe et al. (1994), if the relationship is negative, we would have a joint pricing strategy, where a reduction in audit fees would be passed on as an added cost to the providers of consulting services.

Whisenant et al. (2003) estimate the relationship between audit fees and fees for non-audit services and find that the relationship is bidirectional, concluding that the fees are set jointly. Reynolds et al. (2004) study whether the auditor's objectivity is related to the non-audit services provided to the client and the client's economic independence. This objectivity is measured through discretionary accruals, and no relationship (expected positive or negative) is found between them and the consulting fees once a sectorial

variable is included. Note, however, that this study reveals the possibility of using a variable to measure the auditor's economic dependence as a ratio between the income generated by the client and the auditor's total income.

Ratzinger-Sakel and Schönberger (2015) analyse the effects of Directive 2017/56/EU in Germany, France, and the United Kingdom. They conclude that regulating the blacklist of non audit services in Europe may go against the idiosyncratic characteristics of countries and companies, without improving accounting users' perception of the auditor's independence.

Finally, empirical studies of audit fees does not include autoregressive effects i.e. whether the cost of exercise t explains the cost of t + 1. However, Whisenant et al. (2003) identify a clear bidirectional and contemporary causality between audit and consulting fees, and suggest that the lagged audit fees must be included as a new regressor.

In this context, our study is a new contribution to the literature, since we include a one-lagged audit fee as a regressor and use a specific methodology to avoid the endogeneity problem which arises.

2.1.2. Size of the auditor

The financial literature finds that the size of the audit firm is a recurring explanatory factor (positive relationship) for the volume of audit fees in different markets (Chan et al., 1993; Low et al., 1990). For Australian companies, Carson et al. (2004) find evidence of price premiums to Big 6 auditors in the small client segment, but the results do not show a linear relationship to client size as is typically assumed in audit fee models.

More recently, Dekeyser et al. (2019) find that the effect of the auditor size is negatively related to audit costs, and this is transferred to the client in the price. However, as the auditor's specialisation in the sector increases, this transfer decreases. Finally, they note that the auditor's specialisation means fewer hours worked without a loss in work quality.

2.1.3. Complexity of the audit work

Butterworth and Houghton (1995) find a positive relationship between the difficulty of the audit (measured by time and labour employed) and fees. Jaramillo Jaramillo et al. (2012) detect the same positive relationship in audited companies with respect to the variable which measures realisable assets (inventories + short-term receivables) over total assets.

Low et al. (1990) and Chan et al. (1993) relate this complexity to the size of the client measured by firm assets, while Rose (1999) uses the internationalisation of the client as a measure. Mayhew and Wilkins (2003) find a positive relationship between auditor specialisation in complex sectors (for example, financial) and fees. Studies on the effect of client size, as a measure of complexity, are so widespread that even Cullinan et al. (2016) test whether the usual transformations (logarithm and square root) of firm size variables are adequate to reflect their non-linear relationship with audit fees as a consequence of Simunic's non-linear model Simunic (1980). Their results indicate that for assets with complex valuations there are other transformations which capture this relationship better, although this result is conditioned on a lack of regressors that capture more effects related to the audit's complexity and risk in order to be able to identify those effects on the assets. Bronson et al. (2017) find that audit fees are higher for foreign

companies listed on U.S. markets as a result of the greater complexity of the work. However, other papers justify that complexity through the sectoral specialisation of the auditors. In this regard, Bae et al. (2016) find for a sample of Korean companies that the auditor's sectoral specialisation increases both the fees and the hours devoted to the audit, which could be a sign of the audit quality. However, they show that there are no economies of scale as a consequence of sectoral specialisation.

Mareque et al. (2018) use a panel data regression with fixed effects to estimate the determinants of audit fees among football clubs and find evidence of an increase in audit fees after the implementation of financial fair play regulations set by the Union of European Football Associations. As a consequence, a recommendation emerges for the regulator consisting of controlling the quality of the audit reports.

Dekeyser et al. (2019) show that the auditor's specialisation means fewer hours worked without a loss in work quality, and Beardsley et al. (2019) analyse the relationship between audit and consulting fees, while adding a sector concentration index of the auditors which measures the degree of annual specialisation of the auditor in each industry of the sample. They find a significant negative effect from specialisation on the relationship between the pressure on audit fees and the consulting work performed by the firm.

2.1.4. Audit risk

The accounting literature finds that there is a positive relationship between the risk of the audit work and fees. This risk is a function of potential subsequent litigation against the auditor. Thus, J. Francis and Stokes (1986) use the client's debt ratio to measure risk. The most recent literature analyzes the relationship between corporate governance and audit fees, and Gul and Tsui (2001) study whether accounting conservatism of managers (agency contract), measured by the ratio of earnings to accruals, explains the price of the audit. Carcello et al. (2002) find a positive relationship between the percentage of independent executives and the audit fees. Abbott et al. (2003) examine the relationship between audit committees and the ratio of consulting fees to audit fees, finding a negative relationship. In other words, the existence of audit committees with independent members means that the percentage of billing for non-audit services in relation to audit services is lower. This empirical research includes a dummy variable which takes a value of 1 if the audit committee has independent executives and 0 otherwise, as well as two more variables that represent the concentration of ownership in the audited company. Specifically, this is the percentage of votes held by the company's management and the percentage of votes over 5% held by non-management partners. Another variable used to measure audit risk is the company's growth option (Xiao & You, 2009), in this case using different variables depending on the type of company (if it is listed, book-to-market is commonly used, if not, variations related to accounting indicators).

Other papers consider risk based on the economic situation (Krishnan & Zhang, 2014) or changes in accounting and audit regulations (Ghosh & Pawlewicz, 2009). Raffournier and Schatt (2018) show that IFRS adoption in Switzerland is associated with higher audit fees, with the exception of very large companies. Musah et al. (2018) study the effect of IFRS adoption on audit and non-audit fees for financial and non-financial firms in Ghana and find a positive and significant relationship with audit and non-audit fees post IFRS adoption. Furthermore, their results show that the Big4 charge higher audit and non-

audit fees than non-Big4. Lisic et al. (2019) analyse the ratio between consulting and audit revenues and the relationship to audit quality. They check whether this relationship has undergone significant variations as a result of a regulatory change (Ley Sarbanes-Oxley Act of, 2002). Their results show that before the regulatory change a higher proportion of consulting income had a negative impact on the quality of audit, but that relationship is not statistically significant after the change in regulation.

Zhang and Huang (2013) analyse the relationship between audit fees and firm risk during the 2008 financial crisis and find that increasing company risk supposes higher audit fees for non-Big 4 accounting firms. Xu et al. (2013) study the impact of the global financial crisis on auditor behaviour in Australia. They study whether audit fees and audit reporting lag increase while controlling for client characteristics and find that audit fees are higher while audit report lags do not increase. For Swedish companies during the global financial crisis, Alexeyeva and Svanström (2015) find that the audit fees increase, but audit report lags do not. Moreover, their results show a significant increase in audit fees in post-crisis periods with auditors paying more attention to companies' leverage and loss reporting. The companies also spent less on non-audit services. Yang et al. (2018) use another approach by introducing three types of company risk (strategic, financial, and operational) which were obtained by applying text mining techniques to company financial reports into the explanatory model of audit fees. The results indicate that there is a positive relationship between audit fees and company-specific financial, strategic, and operational risks.

2.1.5. Audit report opinion

Wines (1994) found that the auditors of those companies which received clean reports for a particular period obtained a significantly higher proportion of renumeration for additional services than those who issued at least one negative opinion. Basioudis et al. (2008) find a positive relationship between the size of the fees (audit and non-audit) and the audit opinion. Lisic et al. (2019) also include a dummy variable related to the auditor's opinion in their explanatory model for audit fees.

2.2. Audit quality

The empirical literature analyzes the relationship between audit quality and fees using the residuals obtained from a general explanatory model of audit fees as a representative factor of audit quality. Choi et al. (2010), Hoopes et al. (2018) and Moon et al. (2019)[2] study abnormally high audit fees, calculated as the difference between the actual fee and the expected one. Specifically, these studies look for a relationship between abnormal cost and audit quality, where the latter is represented by two premiums: quality by audit firm size and quality by sector specialisation.

Audit quality is modelled using accruals as explanatory variables. In addition to the extra cost of the audit, variables which reflect the effect of the size and specialisation of the auditor are included. To reflect the effect of the size of the auditor, a distinction is usually made either between the Big Four and the rest (J.R. Francis & Yu, 2009), or by categorising auditors into groups by size (Moon et al., 2019). However, taking into account that the audit market in Spain is clearly identified by the size of the auditor as discussed below (see Table 2), this study is the first to use the variable derived from the

multiplicative effect between size and abnormal audit fees to understand how they affect audit quality with respect to the size of the audit firm.

Reichelt and Wang (2010) include the specialisation premium by using dummy variables and find that companies with specialised auditors show fewer abnormal accruals, although as was noted above, it would be preferable to use sector concentration indices of audit firms instead of binary variables.

In this context, there is one last relevant research question to be dealt with:

Research question: Is there a relationship between audit quality and abnormal audit fees?

3. Methodology

To study audit quality, we need to first estimate the abnormal fees and this requires the best adjusting of the audit fees mentioned previously. The empirical literature reviewed use a multiple linear regression, in which the dependent variable is a log transformation to avoid a negative estimated audit fee.

A major drawback of the linear regression model when many individuals are available at different points in time (less than number of individuals) is the endogeneity problems that are caused by the individual effects in the sample. Therefore, panel data models are more suitable, since these models allow displaying the individual effects by company, either in the form of fixed or random effects, for which the Hausman test was applied previously. We include a lagged dependent variable as a regressor in a dynamic panel data model, despite the fact that the usual modelling is static in the literature that was reviewed above.

We use the Generalised Method of Moments (GMM) in order to estimate this dynamic panel data model, and use levels of the dependent variable and its differences with different lags as instrumental variables in order to avoid possible endogeneity problems.

This methodology is known as GMM-SYS (Arellano & Bond, 1991). So, the general model to adjust the audit fees is expressed as follows:

$$Log\left(a_{i,t}\right) = \beta_0 + \sum_{j=1}^{J} \beta_j \cdot x_{i,j,t} + z_{i,t} \tag{1}$$

where the subscripts *i, t, j* represent company, year, and regressor, respectively. *J* is the maximum number of independent variables included to model the audit fees and *x* is the value that each of these regressors has for each company and year; *a* is the audit fees and *z* is the residuals.

According to the literature, we include as regressors (*x*) non-audit fees, size of the auditor, complexity of the audit work, audit risk and audit report opinion:

- Non-audit fees (logarithm) in the same year of endogenous variable. This factor is captured by three variables (according to data from ICAC): design services, internal audit and others.
- Total assets of audited company (logarithm).

- Year-on-year turnover variation.
- Number of years that the audit contract has lasted (logarithm)
- The ratio between the cost of the audit and the total turnover for the auditor.
- The consulting income of the audit firm (logarithm).
- Audit report opinion defined as a dummy variable (centred to avoid collinearity with other dummies: rejected = −1, with qualifications = 0; favourable=1).
- Economic cycle effect (time variables by year for possible external effects).
- Economic sector (0 to 9 to capture the effect group defined in Table 4).
- The impact of auditor rotation defines a dummy variable (first year of the auditor at the company = 1; otherwise = 0).
- Sector concentration indicator measured by the number of audits done by an audit firm in a particular year for a specific economic sector compared to the total number of audits for that sector and year.
- Inventory plus short-term receivables to total assets.
- Number of company employees (square root).
- Number of company subsidiaries (square root).
- Corporate operations is a dummy with value 1 if the company has carried out a corporate operation during the year and zero otherwise.
- Listed company defined as a dummy variable with value 1 if firm is listed and zero otherwise.
- Number of years with the same auditor (logarithm).
- Number of full-time employees of audit firm exclusively doing the audit work.
- Acid test.
- Cost of debt.
- ROA (and its breakdown into operating margin and asset turnover).
- Financial leverage.
- Ratio of accruals to earnings after taxes.
- Growth expectations based on the book-to-market only for listed companies.
- Losses in the previous year defined as dummy variable with value 1 if the company shows losses in the previous year and zero otherwise.
- Changes in audit legislation is a dummy variable with value 1 if a legislation change occurs in year and zero otherwise.
- Number of days (logarithm) between closing the books and the audit report's presentation.

Additionally, we add the new regressors following:

- Audit fees (logarithm) in the previous year.
- Multiplier effect due to audit's opinion and non-audit fees (internal audit, design, and other services).

The first objective is to achieve the best unbiased ($\beta_0 = 0$) model of audit fees. In that case, the abnormal fees or $Ln(aa_{i,t})$ are equivalent to the residuals of the expression (1), otherwise the constant is also included. We point out that the size of audit firms variable

is excluded from this model since our aim is to test the auditor size has an effect on quality of the audit. This regressor is included in expression (3).

Next, the accruals are modelled as in Dechow et al. (1995). We estimate the following static panel data model based on the literature reviewed. This model is estimated by Ordinary Least Squares (OLS) or Generalised Least Squares (GLS). We employ fixed or random effects respectively depending on the Hausman test result:

$$\frac{R_{i,t}}{A_{i,t}} = \beta_0 \cdot \frac{1}{A_{i,t-1}} + \beta_1 \cdot \frac{NT_{i,t} - NT_{i,t-1}}{A_{i,t-1}} + \beta_2 \frac{NCA^M_{i,t}}{A_{i,t-1}} + \beta_3 \frac{EBIT_{I,t-1}}{A_{i,t-1}} + e_{i,t} \qquad (2)$$

where the subscript i corresponds to the company and t to the financial year audited, R is the estimated accruals as the result of continued operations minus the cash flow of the activity or operations, A is the total assets, NT is the net turnover, NCA^M is the material non-current assets (equipment, production plants, machinery, etc.), $EBIT$ is earnings before interest and taxes, and e are the residuals which measure the abnormal or discretional accruals (as Lim & Tan, 2010; Myers et al., 2003).

Finally, to analyse the audit quality, the proposed model is:

$$\left|e_{i,t}\right| = \alpha_0 + \alpha_1 . D^{big}_{i,t} . Log(aa_{i,t}) + \alpha_2 . D^{med}_{i,t} . Log(aa_{i,t}) + \alpha_3 . D^{small}_{i,t} . Log(aa_{i,t}) + \alpha_4 . w_{i,t} + \alpha_5 . Log(d_{i,t}) + u_{i,t} \qquad (3)$$

where D^{big} is a dummy that takes the value 1 if the audit firm is a Big Four firm and 0 otherwise, D^{med} a dummy which is worth 1 if the auditor is medium-sized, and 0 for the rest of cases, and D^{small} is 1 for small auditors and 0 otherwise; w is the auditor's economic dependence on the client (measured by the ratio of the auditor's income obtained from the client to the auditor's total annual income), aa is the abnormal fees identified above as residuals of expression (1), d is the duration of the audit contract (logarithm of years), e is the abnormal accruals estimate from expression (2) and u are the residuals. Note that we include the asymmetric effect of abnormal fees by audit size (multiplier effect of audit firm size dummy and abnormal fees).

4. Data

This study utilises information from two sources. First, auditing information (held by the regulator) and second, financial data from companies (information included in Financial Statements). The first set of data has been drawn from the Instituto de Contabilidad y Auditoría de Cuentas (ICAC), and the second from the SABI database by using the tax codes of the audited companies.

The sample covers all the audits carried out in Spain for the 2013 to 2018 fiscal years. Table 1 shows the number of companies and their respective audit reports of the sample:

From the results in Table 1, we observe that there are errors in the usual databases and an evident lack of financial data for many companies. Because of this, the final sample is made up of 45% of the companies initially considered (148,000 companies out of the initial 333,000), with companies presenting data for all of the fiscal years under study, while for others only some years are available. A total of 61,527 companies make up the

Table 1. Sample selection.

Selection criteria	2013	2014	2015	2016	2017	2018	Total
(+) Audited companies from ICAC's database	57,917	58,928	58,510	61,743	61,389	58,669	357,156
(-) Companies with the registration date of the audit report prior to the audited year (error inscription)	104	150	57	165	126	117	719
(-) Duplicate tax identification number for the same fiscal year	3,594	3,881	3,680	4,763	3,892	3,458	23,268
(=) Net audited companies from ICAC's database	**54,219**	**54,897**	**54,773**	**56,815**	**57,371**	**55,094**	**333,169**
(-) Companies whose tax identification number from ICAC's database does not exist in the SABI database	9,688	9,954	9,524	9,760	9,804	9,652	58,382
(-) Companies without the necessary information available for our empirical analysis	21,820	20,984	20,084	19,838	18,756	24,873	126,355
(=) Total companies in the final sample	**22,711**	**23,959**	**25,165**	**27,217**	**28,811**	**20,569**	**148,432**

final sample, of which only 14,201 present information for the whole period analysed (six years).

Table 2 shows the quartiles of the variables obtained from the information provided by the ICAC.

We use this statistical representation because some variables are not continuous (dummies, for example) and the companies are not comparable, so using statistical moments (average, variance, etc.) makes interpretation difficult. For this reason, only the quartiles (Q) of the series in each year, in addition to the minimum and maximum, are shown.

The central values of the distributions are very stable over time in Table 2-Panel A, while there are outliers that are significantly small (minimum) and large (maximum). These facts reflect particular audit work, probably depending on the size of the company. The cost of audits in the period studied and for 75% of the sample ($Q3$) does not exceed 12,550 euros and 210 billed hours. The cost of non-audit services was also calculated for the same percentile, and the invoicing for both non-audit services and design are around 40% of their cost.

With respect to the results of Table 2-Panel B more than 75% of the opinions in the sample are positive, with an increasing evolution over time during the period analysed, although it is also true that there is an significant decline of roughly 20% in the 2018 financial year. Additionally, the days elapsed between the end of the audited financial year and the final audit report for 75% of the sample is around 180 days, a period that can be classified as long.

We observe that for 75% of the sample, the years that an auditor performs their work for the same company does not exceed nine years. However, it is also true that another 25% greatly exceeds this period, and that is undoubtedly excessively long to justify the independence of the auditor and the required rotation.

On the other hand, the dummy variable related to the first time that an auditor analyzes a company's accounting shows a clear increase in 2015, 2016, and 2017 with respect to previous years. This trend disappears in 2018, so we may conclude that in 2015–2017 auditor rotation was higher.

The situation described above is probably a picture of the size of the auditors, showing that in the analysed period small audit firms carry out around 68% of total audits, while

Table 2. Descriptive statistics of the sample audit reports.

Variable	Quartiles	2013	2014	2015	2016	2017	2018
Panel A: Fees and hours of audit services							
Audit fees (€)	Min.	220.26	187.52	154.36	125.34	114.65	105.22
	Q1	5,318.99	5,300.00	5,166.00	5,200.00	5,356.68	5,300.00
	Q2	7,741.00	7,715.00	7,550.00	7,575.00	7,750.00	7,589.14
	Q3	12,450.00	12,507.50	12,131.70	12,200.00	12,515.00	12,287.00
	Max.	2,589,902.00	7,791,514.00	2,205,160.00	2,075,485.00	1,919,000.00	1,838,000.00
Audit working hours	Min.	1	1	1	1	2	2
	Q1	90	114	90	90	91	90
	Q2	132	149	132	134	132	132
	Q3	207	177	210	210	210	207
	Max.	2,386	1,622	1,190	1,200	1,230	1,250
Panel B: Opinions of the reports, duration, years of contract, size of audit firms and first contract							
Variable	**Quartiles**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Opinions (number)	Adverse	191	151	150	125	119	35
	Qualified	5,993	5,770	6,067	6,312	5,911	3,714
	Clean	16,527	18,038	18,950	20,780	21,187	16,820
Duration of audit until report is issued (days elapsed between the dates of audited financial statement and the issue of the report)	Min.	1	0.01	1	1	1	1
	Q1	113	90	118	117	117	115
	Q2	150	134	152	151	152	150
	Q3	176	211	180	178	179	172
	Max.	941	848	1,322	956	661	512
Years with the same audit firm (number)	Min.	0	0	0	0	0	0
	Q1	1	1	1	1	1	1
	Q2	4	4	4	4	4	4
	Q3	8	9	9	9	9	9
	Max.	24	24	25	26	27	28
Number of audit by audit firm size	Small	16,109	16,023	17,117	18,113	19,369	13,988
	Medium	510	1,376	1,378	1,891	600	1,380
	Big Four	6,092	6,560	6,672	7,213	7,248	5,201
First time audit firm	Number	3,614	3,969	4,470	4,432	4,718	2,949
Panel C: Mean audit fees, working hours and non-audit fees by audit firm size							
Variable	**Size**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Audit fees (€)	Big Four	15,665.71	16,195.68	15,916.26	16,245.30	16,691.71	16,513.88
	Medium	8,495.00	8,599.12	8,878.54	8,601.35	9,664.18	9,007.06
	Small	6,680.90	6,560.67	6,526.91	6,525.05	6,835.01	6,535.72
Audit working hours	Big Four	222	233	234	242	240	242
	Medium	148	151	159	149	169	159
	Small	117	115	116	116	120	115
Mean fees per hour (€)	Big Four	70.46	69.54	68.03	67.09	69.51	68.26
	Medium	57.40	56.99	55.69	57.69	57.21	56.49
	Small	56.92	56.96	56.28	56.18	57.02	57.03
Non-audit fees (€)	Big Four	3,334.34	3,356.71	3,332.33	3,357.86	3,373.85	3,408.09
	Medium	3,000.00	3,142.18	3,134.03	3,104.91	3,162.33	3,209.04
	Small	3,083.76	3,067.29	3,075.48	3,078.33	3,103.28	3,110.94

the Big Four perform 26%, and the medium-sized barely 6%. This means that there is no doubt that the market is clearly divided into two groups represented basically by the big and small auditing firms. To check this division, Table 2-Panel C shows the average annual cost of services of the audit firms according to their size, from which it can be inferred that the price per billed hour for the Big Four is higher than the price billed by the rest of the auditors.

The sectoral concentration[3] of auditors does not exceed 15% in any case, and therefore, even if there is sectoral specialisation among auditors, it is not relevant. The concentration of turnover per audit firm in a single client decreases over time at all levels, which shows a clear diversification of the business. The concentration in number of clients also decreases over time, but only in 75% of the sample, and with an uptick in 2018. The other 25% clearly focused on a few clients, and even just on one (maximum is 100% in a single client).

Table 3[4] below shows the results for accounting and financial variables of the audited companies, as well as other relevant information related to trade and labour operations from the SABI database.

The information in Table 3-Panel A shows the enormous diversity in size and financial structure among the audited companies, which enhances the results. With respect to the balance sheet, for 75% of the sample the value of total assets is around 26 million euros, while accounts receivable and tangible fixed assets are 60% and 36%, respectively. As for debt, the book leverage shows a sustained coefficient over time of 2.7, although with a significant increase in 2017 (4.01). The acid test shows a recurring value of around 1.83, with the factor of accruals over total assets showing an increased coefficient that varies between 4.8 and 7.5.

Regarding the income statement, Table 3-Panel B again indicates a great diversity in the results of the economic activity carried out by the companies in the sample including, unlike other empirical work, companies with losses. Their weight in the annual total increases from 28% in 2013 to 17% in 2018. For 75% of the sample, the variation in turnover, economic profitability, and operating margin is close to 4%, 9%, and 9.5%, respectively, with a continuous increase (except in the case of the profitability of total assets which falls in 2014). The cost of debt rises to 2.7% with a generalised decline, where the turnover of assets is 1.75, and is very similar for all the years analysed.

Table 3-Panel C shows what was included in the accounting information (Panel A) again, namely, that most companies are medium or small sized, do not have subsidiaries, and therefore do not file consolidated statements. 75% of the sample consists of companies with no more than 98 employees on average.

The listed companies constitute around 1% of the sample with an expected positive growth for more than 75% of them according to book to market value. In addition, during the period under study, companies that have carried out equity transactions that represent a significant percentage of the whole (9%–15%, depending on the year). We use this variable to verify whether this type of transaction has an influence on the audit fees.

Finally, Table 4 shows, on average, the number of companies according to the sectoral grouping of the sample, using the CNAE (Spanish National Classification of Economic Activities) 2009. There is a clear concentration in group 4, with the remaining groups being more or less the same and, there are two groups with a lower number of audited companies (groups 0 and 9). Note that Group 7 includes financial, insurance and real estate activities. Some empirical studies exclude these firms, but this is impossible in our

Table 3. Descriptive statistics of financial information on audited companies.

Descriptive statistics of financial information on audited companies							
Panel A: Balance Sheet information							
Variables	**Quartiles**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Total assets (thousand €)	Min.	389.99	393.50	373.03	378.66	392.94	388.09
	Q1	4,817.50	4,938.05	4,926.37	5,007.89	5,073.49	5,125.22
	Q2	10,047.14	10,290.82	10,147.12	10,208.15	10,533.29	10,623.56
	Q3	26,384.09	26,604.88	25,300.21	25,905.25	26,686.00	27,226.88
	Max.	1,021,489.85	1,029,104.06	1,001,542.62	999,494.05	1,032,200.11	1,127,969.07
Acid test	Min.	0.22	0.23	0.24	0.24	0.03	0.25
	Q1	0.67	0.67	0.69	0.68	0.43	0.68
	Q2	1.09	1.09	1.11	1.11	0.88	1.12
	Q3	1.85	1.82	1.86	1.88	1.67	1.91
	Max.	5.67	5.37	5.66	5.61	5.74	5.87
Book-leverage	Min.	0.01	0.02	0.03	0.04	0.63	0.05
	Q1	0.45	0.45	0.45	0.45	1.20	0.44
	Q2	1.15	1.16	1.15	1.16	2.93	1.12
	Q3	2.72	2.72	2.71	2.72	4.01	2.67
	Max.	9.82	9.61	9.35	9.45	18.88	10.29
Panel B: Income statement information							
Net turnover variation rate (%)	Min.	-22.69%	-21.34%	-20.48%	-19.20%	-20.99%	-18.33%
	Q1	-0.02%	0.08%	0.19%	0.21%	0.24%	0.27%
	Q2	0.47%	1.17%	1.44%	1.53%	1.57%	1.60%
	Q3	1.76%	3.50%	4.03%	4.30%	4.41%	4.48%
	Max.	26.65%	23.45%	25.29%	26.67%	27.00%	26.55%
Return on assets (%)	Min.	-16.29%	-17.84%	-15.58%	-15.38%	-16.63%	-14.15%
	Q1	-0.01%	0.47%	0.95%	1.06%	1.21%	1.28%
	Q2	2.27%	3.39%	3.98%	4.11%	4.38%	4.40%
	Q3	8.22%	7.52%	8.67%	9.22%	9.54%	9.46%
	Max.	39.03%	39.08%	27.23%	28.66%	28.92%	28.56%
Operating margin (%)	Min.	-17.42%	-78.66%	-60.25%	-59.83%	-59.82%	-54.15%
	Q1	-0.17%	0.48%	0.91%	1.01%	1.13%	1.16%
	Q2	2.81%	3.22%	3.73%	3.95%	4.12%	4.04%
	Q3	6.75%	8.67%	9.87%	10.30%	10.59%	10.45%
	Max.	20.80%	53.57%	54.67%	56.03%	58.77%	58.24%

(*Continued*)

Table 3. (Continued).

Accounting cost of debt (%)	Min.	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Q1	0.88%	0.76%	0.68%	0.53%	0.19%	0.44%
	Q2	2.10%	1.90%	1.62%	1.29%	0.70%	1.07%
	Q3	3.60%	3.37%	2.98%	2.45%	1.81%	2.10%
	Max.	15.19%	12.77%	14.14%	11.30%	12.07%	12.06%
Companies with negative result for the year	Number	6,354	5,688	5,052	5,085	4,902	3,401
Panel C: Other relevant information							
Variables	**Quartiles**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Number of employees	Min.	1	1	1	1	1	1
	Q1	17	18	18	18	19	19
	Q2	42	43	44	44	45	46
	Q3	94	97	96	99	101	103
	Max.	74,082	74,228	75,381	79,563	84,485	89,500
Consolidated financial statements	Number	1,233	2,110	2,213	2,375	2,326	1,746
Equity transactions	Number	3,214	3,481	3,369	3,420	2,767	2,086
Listed companies	Number	136	119	134	121	145	141

Table 4. Average company size and audit fees by sectoral group.

Groups	Number of companies	Total Assets	Number of employees	Net Turnover	Audit Fees	Audit Working Hours
0	676	45,531.02	93	22,545.22	9,521.39	161
1	2,450	45,838.37	101	55,301.72	12,061.74	197
2	3,416	53,485.61	141	51,588.52	15,360.07	238
3	1,137	183,942.17	176	90,446.71	13,527.05	213
4	8,778	42,470.95	128	44,676.94	11,649.54	187
5	1,969	61,659.05	206	32,290.29	11,799.36	188
6	2,507	264,823.50	103	41,118.77	16,421.06	235
7	1,608	88,668.04	214	29,666.03	13,786.81	212
8	1,503	31,552.74	453	20,355.98	10,773.93	175
9	696	65,303.02	90	24,794.34	9,598.85	168

Group 0. Agriculture, livestock, forestry, fishing and extractive industry; Group 1. Manufacturing industry; Group 2. Power and water supply, sanitation and waste management; Group 3. Construction; Group 4. Trade, vehicle repair, transportation and storage; Group 5. Hospitality; Group 6. Information and communications; Group 7. Financial, insurance and real estate activities; Group 8. Professional, scientific, technical, administrative and auxiliary services activities; public administration, defence and compulsory social security; education and health activities and social services; Group 9. Artistic, recreational and entertainment activities; other services; activities of households with domestic staff conditions; activities of extraterritorial organisations and agencies.

case since we want to know if the audit fees for listed companies (some of them are financial) are different.

5. Empirical results and discussion

First, we have to estimate accruals and abnormal audit fees. Then, we estimate model (expression (1)) of audit fees to extract the abnormal fees (Log(*aa*)). The results are shown in Table 5. Because the regressor is a lag dependent variable, we estimate a dynamic panel data model using GMM-SYS with random effects (Hausman test of 7.86; p-value: 0.89) without a constant in order to avoid multicollinearity with the dummies of the sector group. We only include the significant values at 1% [**] and 5% [*], calculating the standard errors consistently for autocorrelation and heteroscedasticity. Additionally, Table 5 shows the explanatory power of the model (R^2) as well as the autocorrelation test of order 1 and 2 for possible endogeneity if the null hypothesis (non-autocorrelation) is rejected.

From the results in Table 5, note that the model shows an explanatory power close to 90% (R^2 = 86.25%). We observe novel significant evidence regarding the autoregressive nature of audit fees in Spain (parameter: 0.7822). We find a positive relationship with the size of the audited company, measured by its total assets, (parameter: 0.0667). In addition, the dummy (centred) for the auditor's opinion displays a negative relationship (parameter: −0.0146), which means that the audit fee is higher when the opinion is denied (dummy = −1), and lower if it is favourable (dummy = 1). We also find special rotation, since the effect on fees is negative (parameter: −0.0378) the first time a company is audited but the opposite effect occurs (parameter: 0.0017) as the number of year increases, so we infer that the extra cost of the auditor corresponding to the initial offer is passed on to the following years.

Furthermore, we note that fees vary according to sector; specifically Group 3 (construction with parameter: 0.4549) is the most expensive, while Group 2 (power and water supply, sanitation and waste management with parameter: 0.3816) shows the lowest audit

Table 5. Analysis of audit fees modelling.

Panel A: Results of model	
Variables	**Parameter (t-value)**
Log(Audit fees for year (t-1)	0.7822 (3.518**)
Auditor's opinion	−0.0146 (−4.71**)
Log(Total assets)	0.0667 (5.03**)
Log(Years with the same audit firm)	0.0017 (7.19**)
First time with audit firm	−0.0378 (−8.76**)
[Inventories + Short-term receivables]/Total assets	0.0321 (5.33**)
Corporate operations	0.0119 (2.33*)
Number of subsidiaries$^{0.5}$	0.0041 (4.22**)
Number of employees$^{0.5}$	0.0031 (2.31*)
Listed company	0.1948 (4.32**)
Asset turnover	0.0204 (5.74**)
Log(Duration of audit until report is issued in days)	0.0337 (7.21**)
Group 0	0.4026 (5.11**)
Group 1	0.3974 (5.33**)
Group 2	0.4549 (5.17**)
Group 3	0.3816 (5.37**)
Group 4	0.4002 (5.74**)
Group 5	0.3884 (5.32**)
Group 6	0.3911(5.42**)
Group 7	0.3685 (5.31**)
Group 8	0.3875 (5.82**)
Group 9	0.3714 (5.23**)
R^2	86.25%
AR(1) test on residuals [p-value Standard Normal distribution]	1.3318[0.091]
AR(2) test on residuals [p-value Standard Normal distribution]	1.1472[0.126]

Note: (**) and (*) means statistically significant at 1% and 5%, respectively

fees. Our empirical evidence demonstrates that companies with a higher weight of inventories and short-term receivables over total assets have a higher cost of auditing (parameter: 0.0321), and that the same happens with corporate operations (parameter: 0.0119).

The square root of number of employees and subsidiaries (parameters: 0.0031 and 0.0041, respectively) increases the audit fees. An interesting result is that listed companies show extra audit cost of 1,215 euros[5] (parameter: 0.1948). Finally, from ROA disaggregation, only asset turnover shows a positive effect on audit fees (parameter: 0.0204) and log-days of delay of the audit report from the closing date of the financial year also shows a positive effect (parameter: 0.0337). The others regressors included are not statistically significant, including cost of debt, acid test and multiplier effect auditor's opinion by non-audit fees. In short, the best model to fit Spanish audit fees shows mainly drivers of the audit work complexity and the auditor's opinion.

Table 6. Estimation of abnormal *accruals*.

Variables	Parameter (t-value)
1/Total assets	−2.9480 (−7.74**)
[Net turnover(t)-Net turnover(t-1)]/Total assets	0.0026 (4.67**)
Tangible fixed assets/Total assets	−0.0320 (−2.79*)
EBIT/Total assets	0.9634 (5.92**)
R^2	77.48%
AR(1) test on residuals [p-value Standard Normal distribution]	0.274 [0.3921]
AR(2) test on residuals [p-value Standard Normal distribution]	1.214 [0.112]

(**) and (*) means statistically significant at 1% and 5%, respectively.

Table 7. Statistics of log-abnormal *accruals* and log-abnormal audit fees.

Statistics	Abnormal *Accruals*	Abnormal audit fees
Mean	−0.0032	0.0000
Standard Deviation	0.4396	0.2736
Skewness	1.8793	0.7712
Kurtosis	8.4953	2.2318
Minimum	−5.1950	−3.1104
Maximum	6.8950	3.6517

Table 8. Results for audit quality.

Variables	Parameter (t-value)
Constant	0.0292 (3.66**)
Big Four * Log(Abnormal audit fees)	0.0088 (7.21**)
Medium * Log(Abnormal audit fees)	0.0065 (2.15*)
Small * Log(Abnormal audit fees)	0.0063 (5.15**)
% Sectoral concentration	0.1724 (4.54**)
Log(Audit working hours)	−0.0048 (−6.01**)
R^2	5.86%
AR(1) test on residuals [p-value Standard Normal distribution]	1.105 [0.135]
AR(2) test on residuals [p-value Standard Normal distribution]	1.259 [0.104]

(**) and (*) means statistically significant at 1% and 5%, respectively.

Table 6 shows the results for the model (expression (2)) used to extract the abnormal accruals (*e*). According to the results of the Hausman test (3.96; p-value: 0.41), we apply GLS, because the efficiency of random effects null hypothesis is accepted.

From previous results, the abnormal accruals and abnormal fees are estimated as residuals of expressions 1 and 2 respectively. As result of both previous estimates, Table 7 shows a descriptive statistical summary of abnormal of accruals and audit fees.

Finally, Table 8 shows the estimate of expression (3) regarding the audit quality (research question testing). We use GLS with random effects according to the result of the Hausman test (5.237; p-value: 0.39). A novelty of our model is that it analyzes the effect of abnormal fees but differentiates by size of the audit firm.

From Table 8, note that abnormal fees of the Big Four have the highest effect on abnormal accruals in absolute value (dependent variable) i.e. the audit quality decreases when abnormal fee increases. The Medium and Small firms show a lower similar effect. In addition, sectoral specialisation also presents a negative effect on the audit quality, since the parameter (0.172) supposes a positive relationship, while the number of billed hours (parameter: −0.004) contributes to the increase in quality.

In conclusion, despite the low explanatory power of the model (R^2 = 5.86%), we answer affirmatively to the research question since we show that the size of the auditor has a negative relationship to the audit quality, while the number of billed hours has a positive relationship to that quality.

6. Conclusions

This study evaluates the audit quality relative to the auditor's size. In order to accomplish this, we first search the best model to fit audit fees in Spain based on a sample of more than 61,527 companies audited in the 2013–2018 period within the economic sectors included in the CNAE-2009. From our review of the accounting literature, we have included a large number of potential regressors in this model.

Our results show that the fees billed corresponding to additional services (consulting) have no direct effect on audit prices. Additionally, we do not find empirical evidence of a relationship between the audit risk and audit fees.

Conversely, the previous year's audit cost (autoregressive effect), the present audit cost, the size of audited company, the length of audit contract, the audit concentration in the client and the client sector all increase the audit fees. Also, the complexity of the audit work increases the audit fees; specifically, the companies with higher values of realisable assets, number of employees, subsidiaries, equity operation and qualification (listed) show higher audit costs. Moreover, the client sector increases the audit fees (construction and energy show the highest and lowest prices, respectively). Additionally, when the company is audited for the first time by the auditor, the audit fee decreases. However, as stated above, this cost increases with the audit contract duration. Furthermore, we observe an increase of the audit fees when the opinion is unfavourable and a decrease when it is favourable.

From this audit fees model (R^2 = 86.25%) we obtain abnormal audit fees and together with abnormal accruals estimates, we study the determinants of audit quality. In our sample, we observe that 75% of audit firms billed fees of under 12,500 euros and 210 hours per contract. The average price per hour by big audit firms (Big Four) is 20% higher than for the rest of the audit companies. This situation is repeated with respect to consulting services, although in this case the difference is around 8%. So, the question of overpriced of audit work supposes higher audit quality.

We find that higher number of hours billed for audit work improves quality, while sector concentration decreases the quality. Further, we include, for first time in accounting literature, the conditional effect of the abnormal fees on the auditor size and find that the size decreases the quality. The extra cost of the bigger audit firms does not mean a better quality of work, since abnormal accruals increase.

Therefore, using discretionary accruals as measures of audit quality instead of accounting conservatism, we find evidence opposing Cano-Rodríguez (2010). Our results also differ from Monterrey Mayoral and Sánchez-Segura (2007a), as we find a significant multiplicative effect using abnormal audit fees.

The results described could have applications in the decision-making of the agents involved in the Spanish accounting audit market, both for the auditors themselves and for the regulatory bodies and the audited companies. Furthermore, future research should consider other definitions of audit quality and testing our results.

Notes

1. 'Big Four' or Big-4 is the term generally used to refer to the biggest world firms in the consulting and auditing sector, and which currently consist of: Deloitte, PricewaterhouseCoopers (PwC), Ernst & Young (EY) and KPMG.
2. These authors insert an appendix with a review of literature on affection.
3. Other information on concentration (concentration of fees on total income, sector concentration of the audit company, and the audit company's concentration per client) may be requested from the authors.
4. Due to space constraints, Table 3 does not include information on the following variables, which may be requested from the authors: Panel A, realisable, fixed assets, and accruals; Panel B, asset turnover; Panel C, number of subsidiaries and Book/Market.
5. This value is exponential of the coefficient, since the dependent variable is express as a logarithm (see expression (1)).

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