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The value of audit quality in public and private companies: evidence from Spain

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Abstract This paper compares the value of audit quality, proxied by the selection of a big N auditor, to the external claimholders of private and public companies. Although the combination of a lower ownership concentration of public companies, the greater demand for financial information quality about these companies and their higher litigation risk can result in the expectation that audit quality should be more valuable for public than for private companies, the greater information asymmetry between the managers and the external stakeholders and the unavailability of alternative mechanisms for monitoring the managers can make external audit more valuable for the external claimholders of private companies. In this paper, we test these two competing views by analysing if banks and lenders take into account auditor selection in the formation of the cost of debt. Our results support the second view: we find that only private companies obtain a lower cost of debt when they are audited by a high-quality auditor. These results are robust to both endogeneity and unobserved firm-specific heterogeneity.

Keywords Audit quality · Agency problems · Big N auditors · Private companies · Cost of debt

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1 Introduction

This paper analyses the value of external audit quality to the claimholders of private and public companies by testing two alternative views.

The first view hypothesizes that, although audit quality can be valuable to both private and public companies, this value is expected to be higher for the claimholders of public companies. Three reasons support this argument. (1) The agency problems that arise from the separation of ownership and control are usually more important among public than among private firms because the ownership of the capital is often less concentrated in the hands of the managers of public companies (Chaney et al. 2004). Consequently, the demand for monitoring and bonding mechanisms that reduce these agency problems, such as external auditing, is expected to be higher for public than for private companies. (2) According to the information hypothesis, external auditing can also be demanded because it improves the quality of the public financial information of the company. However, capital providers to private companies are expected to demand a lower level of public financial information quality, because they often have insider access to corporate information (Ball and Shivakumar 2005; Van Tendeloo and Vanstraelen 2008). (3) Furthermore, the insurance hypothesis posits that the demand for external auditing is also related to the potential litigation costs for the managers of the company, because the auditor and auditee are jointly liable to third parties for the losses produced by accounting misstatements. Because the potential litigation risks are much lower for private firms than for public firms, we can expect that the demand for external auditing for insurance purposes is also lower among private companies than among public companies (Pierre and Anderson 1984; Palmrose 1997).

In summary, according to this first viewpoint, audit quality is expected to be less valuable for private companies, because of their lower agency costs, their lower demand for financial information quality and their lower litigation risk.

Alternatively, there are also reasons for expecting audit quality to be more valuable for private companies than for public companies. These reasons are the following. (1) The information asymmetry between managers and external claimholders is much larger in private companies than in public companies, because the public financial information in private companies is usually less detailed, less timely and of poorer quality. Therefore, the improvement in the quality of the financial information of private companies can be much more relevant (and, hence, more valuable) than the same improvement in the case of public companies. (2) Furthermore, for public companies, there is a wide range of alternative corporate mechanisms that can be used in substitution of audit quality (Choi and Wong 2007). These alternative mechanisms, however, are not usually employed by private companies.

In summary, although the demand for financial information quality and bonding mechanisms that mitigate the agency problems is expected to be higher among public companies, the greater availability of financial information and the existence of alternative corporate governance mechanisms can contribute to make audit quality less valuable for public companies. Conversely, the greater information asymmetries with external claimholders, the scarcity of financial information and

the lack of alternative mechanisms can make audit quality more valuable for private companies.

The aim of this paper is to study which of these two alternative viewpoints prevails, by analysing how the selection of a high-quality auditor—proxied by the appointment of a big N auditor[1]—influences the cost of debt in public and private companies. To achieve this goal, we have used a sample of public and private Spanish companies. The selection of this sample is justified in various ways: (1) in Spain, external audit is mandatory for all the listed companies and all the medium and large non-listed companies; and (2) external debt is the main source of finance for Spanish firms, especially in the case of private firms.

Our results indicate that the cost of debt of private companies falls significantly when the firm is audited by a big N auditor. However, we fail to find any difference between the cost of debt of big N and non-big N clients for public companies. These results indicate that the value of audit quality is more evident for private firms, supporting the second viewpoint. These results are robust to firm-specific heterogeneity and the possible endogenous nature of the explanatory variables.

This paper contributes to the extant knowledge in various ways. First, we contribute to the literature on corporate governance by adding evidence on private companies, which have not been widely studied to date. The importance of this is highlighted by the fact that most of the economies of the European Union and the market for audit services is composed of private companies (Van Tendeloo and Vanstraelen 2008: 449). Our second contribution is that we provide evidence on the value of audit quality as a control mechanism for the external claimholders of private firms (specifically, for banks and lenders). Additionally, our contribution is not limited to the finding that audit quality is valuable for private companies, as we also compare this value with that for public companies. Our results point to the absence of a clear influence of auditor selection on the cost of debt of public companies, indicating that audit quality is more clearly priced in private than in public companies.

The remainder of the paper is organized as follows. In Sect. 2, we review the theoretical background and formulate the hypotheses. Section 3 describes the research design. In Sect. 4, the results are reported. Finally, in Sect. 5, the summary and conclusions are presented.

2 Theoretical background

In this section, we review the three hypotheses that explain the motivations for demanding external audit quality (Wallace 1987, 2004): the stewardship (monitor-

[1] We use in this paper the term 'big N auditor' rather than the more common 'Big 8/6/5/4' because after the demise of Arthur Andersen, the number of Big Auditors fell from five to four. In this paper, Arthur Andersen, Coopers & Lybrand, Deloitte & Touche, Ernst & Young, KPMG Peat Marwick and PriceWaterhouseCoopers are considered 'Big N Auditors'. The remaining audit firms are non-Big Auditors.

ing) hypothesis, the information hypothesis and the insurance hypothesis. Additionally, we discuss how these motivations vary between private and public companies, in order to develop hypotheses about the relative value of audit quality for these two sets of firms.

2.1 The stewardship (monitoring) hypothesis

This hypothesis is based on agency theory (Jensen and Meckling 1976): the separation of ownership and control motivates the owners to incur costs to monitor the activity of the managers. One of these controls is the hiring of an external auditor who certifies the accuracy of the financial information provided by the managers (Seow 2001). Therefore, the stewardship (monitoring) hypothesis considers external auditing as a mechanism that can contribute to control the conflict of interests among firm managers, shareholders and other external claimholders by enhancing the credibility of publicly reported financial information (Chow 1982).

Given this role for external auditing, the utility of audit quality can be expected to be higher in those environments where the agency problems are more important. Thus, the previous literature has shown that the probability of hiring a high-quality auditor increases when the firms face external capital needs (Johnson and Lys 1990; Copley et al. 1995) or financial problems (Datar et al. 1991; Choi and Wong 2007).

If we compare the situation of private and public companies, the agency problems between managers and owners are likely to be less important in private companies, because ownership of these companies is typically more concentrated than for public companies, and the separation between ownership and control is much more subtle (Fama and Jensen 1983; Beatty and Harris 1998; Ball and Shivakumar 2005; Coppens and Peek 2005). Given that the agency problems of public companies are typically greater than those of private companies, we can expect that the demand for bonding and monitoring mechanisms (such as the appointment of a high-quality auditor) is expected to be greater for the external claimholders of the public firms. Consequently, bonding and monitoring mechanisms—audit quality among them—are expected to be more valuable to public firms than to private firms.

There are, however, other reasons that indicate that audit quality can be more valuable for the claimholders of private companies than for those of public companies. Thus, although the agency problem between stockholders and managers is expected to be lower among private firms, it is not likely that the agency problems between other principals (such as banks, suppliers, customers, employees, etc.) and the managers are fully absent in private firms (Coppens and Peek 2005). Therefore, audit quality can still be valuable for these other principals in private companies.

Additionally, the demand for monitoring mechanisms in public companies is often satisfied using other mechanisms that complement audit quality (as, for example, tying the managers' compensation to firm performance or value, or implementing other internal corporate governance mechanisms, such as the board of directors or the audit committee), but these mechanisms are infrequent among private companies. Moreover, public companies are also under the supervision of

market authorities, who can also provide investors with a protection that is not available for private companies. These internal corporate governance mechanisms and the external public surveillance of market authorities provide additional protection to external claimholders that can act as substitutes for the protection given by external auditing, thereby reducing the incremental value of audit quality for public companies.

In conclusion, the agency costs in public companies can be mitigated by internal corporate governance mechanisms other than auditing, or by the surveillance of market authorities. For private companies, however, these substitutes are not usually available, so audit quality can be the only mechanism employed to mitigate the agency costs. Based on this argument, audit quality can be more valuable for private firms than for public companies.

2.2 The information hypothesis

A second reason for demanding external auditing is that it enhances the information value of financial information (Seow 2001). Therefore, the demand for auditing quality is linked to the demand for financial information quality.

However, the demand for financial information quality can be expected to be weaker for private companies than for public companies. Thus, given the identification between ownership and control, shareholders will not need public financial statements for monitoring the economic activity of the company, because they have access to internal information. The financial statements are then formulated to attend more to other reporting incentives, such as taxation or dividend policy, than to the reduction of the information asymmetry (Ball and Shivakumar 2005 p. 84). As a consequence, the accounting reports of private companies are less informative about the economic evolution of the company and are more likely to be affected by earnings manipulation (Coppens and Peek 2005; Burgstahler et al. 2006).

The poorer quality of the disclosed financial information can motivate external stakeholders to demand alternative sources of information, on an "as needed" basis (Ball and Shivakumar 2005; Burgstahler et al. 2006). This information, although unaudited, can be more useful than the annual reports because it is timelier and specifically designed for the decision-making process. In conclusion, if external stakeholders base their decisions more on this privately obtained information than on the information content of the public financial statements, they will not demand a higher level of quality for publicly reported financial information.

Additionally, some authors find that audit quality is typically lower for private companies than for public companies, because auditors are less motivated to provide higher quality audits for non-listed companies. Various reasons lead one to expect this lower quality for private companies (Seow 2001), as follows. (1) Non-listed firms are smaller than listed companies, and they are more likely to contract non-auditing services with the auditor, even the preparation of the company accounts. (2) Because of the scarcity of information for private firms, the manager is often the auditor's primary source of information. This source is then tainted by the

manager's perceptions. (3) Auditor's risk exposure is much lower, because misstatements in the audit report are much less likely to be discovered (private firms' audit reports are much less scrutinized than those of public firms), and, even if these misstatements are discovered, the consequences for the auditor are expected to be much less important, because the litigation and the reputation risks are typically lower for private companies.

Various empirical results support this lower audit risk for private companies. Thus, while the research on listed companies shows almost unanimously that big N auditors provide higher quality audits by reducing the level of discretionary accruals on their clients' financial reports (Becker et al. 1998; Francis et al. 1999; Chung et al. 2005) and by encouraging conditional conservatism (Basu et al. 2001; Chung et al. 2003), the evidence obtained for private companies does not show a clear quality differentiation between big and non-big N auditors (see, for instance, Sercu et al. 2002; Vander Bauwhede and Willekens 2004; Van Tendeloo and Vanstraelen 2008).

Therefore, if auditors provide lower quality for private companies, the improvement in the information value produced by external auditing (and, therefore, the value of external auditing) will be lower for non-listed than for listed companies.

Despite the former arguments, there are also reasons that support a higher value of audit quality for private companies. The first reason is the higher information asymmetry between external stakeholders and managers/owners in private companies. Public companies are usually required to reveal financial information quite frequently and with greater detail. Additionally, this information is under the surveillance of market authorities and is analysed by an important number of potential users and financial analysts, who can eventually make public their conclusions. Public companies also possess incentives to voluntarily disclose information in order to influence stock prices, and, moreover, stock prices themselves are a valuable measure of firm performance.

Summarizing, public firms are located in an environment of abundant information. In this environment, the audit report will not produce a significant increase in the amount of available relevant information.

However, the requirements of financial information disclosure for private firms are much less strict, the number of analysts that follow the firm is lower, and the incentives for the voluntary disclosure of information less frequent. Moreover, non-accounting-based information that can be employed to evaluate firm performance (such as stock prices) is non-existent or very difficult to obtain for private companies. Consequently, given this scarcity of information about the financial situation of the firm, the audit report is likely to be a significant piece of information for the external stakeholders of private firms.

A second reason that supports this viewpoint is the lower level of quality of the financial information of private firms (Ball and Shivakumar 2005; Burgstahler et al. 2006). This low quality implies that private firms' stakeholders face a higher risk of being misled by the manipulation of the information, suggesting that monitoring by a high-quality auditor is more important for private firms (Fortin and Pittman 2007).

2.3 The insurance hypothesis

Besides the mitigation of agency problems and the reduction of uncertainty about the financial statements, firms can also benefit from the hiring of a big N auditor because these auditors can serve as an insurance against the losses suffered as a result of an audit misstatement (Fortin and Pittman 2007; Seow 2001; Wallace 1987, 2004). This demand for insurance will be higher in those environments with greater litigation risk. This litigation risk is expected to be higher among public than among private companies, because public companies are usually of larger size and are more publicly notorious than private companies. Thus, although this insurance protection has been detected for public companies (Pittman and Fortin 2004), it has not been evidenced for private companies (Pierre and Anderson 1984; Palmrose 1997; Fortin and Pittman 2007).

Consequently, the value of selecting a high quality auditor can increase for public companies because of the insurance protection, but this increase would not be so evident for private companies.

2.4 The Spanish context

Spain is a code-law regime, with remarkable institutional differences compared with the USA or other common-law countries. The stock market is less developed and banks represent the major source of business finance; bank loans measured as a ratio of the claims of deposit money banks to GDP in the year 2000 were 1.012 and 0.493 in Spain and the United States, respectively (Rajan and Zingales 2003). Consequently, banks and lenders are among the most important users of financial information in both public and private companies. Moreover, Spanish banks possess a dominant position with respect to the capital of public companies, which allows them to appoint members to the board of directors and obtain internal information about the company (Arnedo et al. 2007).

However, although the legal protection and judicial enforcement are very weak in Spain (La Porta et al. 1998), ownership concentration is lower among public firms and they are under tight social, political, and media supervision, which leads to important reputation costs for managers and auditors.

Regarding the Spanish audit market, auditing has been mandatory for all listed companies and all medium and large unlisted companies since the implementation of the 1988 *Ley de Auditoría* (Audit Law) in 1990. The audit regulation about auditor independence can be considered as relatively lenient: although the law establishes that the duration of the first contract with the auditor must range between a minimum of three and a maximum of 9 years, once this first contract has expired, it can be renewed on a yearly basis.[2] In other words, auditor rotation is not compulsory and the company can renew the contract with the same auditor indefinitely. The firm can, however, break their contract with the auditor quite easily, because there is no requirement for providing information to shareholders about the reason for changing auditors (Gómez-Aguilar and Ruíz-Barbadillo 2003).

[2] In 2007, the yearly basis changed to a three-year basis.

The institutional system of control of the auditing activity in Spain can also be considered of poor quality. It was initially delegated to professional bodies, but the *Instituto de Contabilidad y Auditoría de Cuentas* (ICAC) (Institute of Accounting and Auditing) subsequently recognized that they had been working poorly (Iríbar 2002) and they recovered direct responsibility after the 2002 Audit Law reform. Currently, the ICAC and the professional bodies are still debating how to implement a more efficient control system.

2.5 Hypotheses

In this paper, we use the appointment of a big N auditor as a proxy for audit quality. The relation between audit firm size and audit quality is justified from an economic point of view by DeAngelo (1981). According to DeAngelo (1981), audit quality is a function of auditors' competence and independence, and both characteristics are expected to be positively related to the size of the audit firm. Accordingly, big N auditors are expected to be more competent because they have more resources that can be dedicated to staff training and the development of industry expertise (Craswell et al. 1995), as well as to investing in information technology (Krishnan 2003). Regarding independence, big N auditors are less willing to lose their independence because a single client will be less important for a big N auditor than for a non-big N auditor. Moreover, the expected reputation losses and litigation costs in the case of audit mistakes are also higher for big N auditors because they have greater reputational capital and are more likely to be sued because of their "deeper pockets" and higher insurance coverage (Kim et al. 2003; Francis 2004).

Although there are other available measures of audit quality (such as, for example, the market share of the audit firm, its industry expertise, the audit fees and effort, etc.), we have chosen the size of the auditor because it is the most widely used proxy for audit quality in the auditing literature, which facilitates a comparison of our results with those of previous studies.

As we have discussed before, audit quality can play an important governance role by mitigating agency costs, by enhancing the quality of financial information, and by providing insurance protection. Therefore, we expect audit quality to be valued positively by the external claimholders of both private and public companies. Accordingly, our hypotheses are as follows:

Hypothesis 1 The private firms that are audited by a big N auditor obtain, on average, a lower cost of debt than those private firms audited by a non-big N auditor.

Hypothesis 2 The public firms that are audited by a big N auditor obtain, on average, a lower cost of debt than those public firms audited by a non-big N auditor.

However, although audit quality is expected to be valuable for both private and public companies, this paper also tries to determine if it is more or less valuable for private companies than for public companies. As we have previously stated, there are two opposing viewpoints about this issue: on the one hand, private companies have fewer agency problems, their external stakeholders' demand for public

financial information of high quality is lower, and their litigation risk is also lower than for public companies. According to this viewpoint, audit quality is valued more highly by the external claimholders of public companies than by those of private companies. On the other hand, the scarcity of public financial information, the high probability of earnings management and the lack of alternative governance mechanisms can make the value of audit quality higher for private companies. To what extent these opposing views prevail is still an open empirical question. We, however, state our hypothesis according to the first viewpoint for expositional convenience:

Hypothesis 3 The reduction in the cost of debt obtained by the selection of a big N auditor is higher for public companies than for private companies.

3 Research design

3.1 Data base and sample

The data for private companies have been obtained from the *Sistema de Análisis de Balances Ibéricos* (SABI) database (Iberian Balances Analysis System database) updated to June 2006. This database comprises the Spanish and Portuguese portion of the Bureau Van Dijk's Amadeus database. The financial data for companies reported in SABI are gathered from the Spanish Mercantile Registry (where all the Spanish companies are required to file their financial statements). The data for the public companies have been obtained from the *Comisión Nacional del Mercado de Valores* (CNMV) database (Stock Market National Commission database), where all the companies with stocks or bonds quoted in a Spanish financial market must file their financial statements.

We initially select those non-financial companies with available data to compute all the variables in any year from 2000 to 2005, inclusive. To eliminate the influence of extreme observations, all the non-dummy variables were truncated at percentiles 1 and 99. The remaining observations were grouped into industries using the Spanish *Clasificación Nacional de Actividades Económicas* (CNAE) (National Classification of Economic Activities) two-digit code. Industries with less than 50 observations were also eliminated from the sample. The final sample is composed of 61,058 observations, from 19,432 different companies, grouped in 56 industries.

The distribution of the total number of observations between listed and unlisted companies and between big and non-big N clients can be found in Table 1.

3.2 Empirical model

To assess the relevance of audit quality for private and public companies, as well as to compare the relevance of these two groups of companies, we estimate the following model:

Table 1 Sample distribution

Year		Non-big N auditor		Big N auditor		Total
2000	Listed	31	29.52%	74	70.48%	105
	Non-listed	6,903	71.86%	2,703	28.14%	9,606
2001	Listed	31	28.44%	78	71.56%	109
	Non-listed	7,804	71.32%	3,138	28.68%	10,942
2002	Listed	28	29.79%	66	70.21%	94
	Non-listed	8,754	71.71%	3,454	28.29%	12,208
2003	Listed	25	28.09%	64	71.91%	89
	Non-listed	8,953	72.40%	3,413	27.60%	12,366
2004	Listed	26	30.95%	58	69.05%	84
	Non-listed	7,840	73.71%	2,796	26.29%	10,636
2005	Listed	9	16.98%	44	83.02%	53
	Non-listed	3,502	73.48%	1,264	26.52%	4,766
Total	Listed	150	28.09%	384	71.91%	534
	Non-listed	43,756	72.30%	16,768	27.70%	60,524

This table reports the number of observations distributed by year, type of auditor and their listed or non-listed status. The proportions indicated are computed over the total of each row, indicating the market share of big N and non-big N auditors for each period and type of client

$$\begin{aligned} Cost\,of\,Debt_{it} = {} & \alpha_0 + \alpha_1 \cdot Listed_{it} + \alpha_2 \cdot Cost\,of\,Debt_{it-1} + \alpha_3 \cdot Listed_{it} \cdot Cost\,of\,Debt_{it-1} \\ & + \alpha_4 \cdot Big_{it} + \alpha_5 \cdot Listed_{it} \cdot Big_{it} + \alpha_6 \cdot Size_{it} + \alpha_7 \cdot Listed_{it} \cdot Size_{it} \\ & + \alpha_8 \cdot \mathrm{Pr}ofitability_{it} + \alpha_9 \cdot Listed_{it} \cdot \mathrm{Pr}ofitability_{it} + \alpha_{10} \cdot Coverage_{it} \\ & + \alpha_{11} \cdot Listed_{it} \cdot Coverage_{it} + \alpha_{12} \cdot Leverage_{it} + \alpha_{13} \cdot Listed_{it} \cdot Leverage_{it} \\ & + \alpha_{14} \cdot Growth_{it} + \alpha_{15} \cdot Listed_{it} \cdot Growth_{it} + \alpha_{16} \cdot Current_{it} \\ & + \alpha_{17} \cdot Listed_{it} \cdot Current_{it} + \alpha_{18} \cdot Collateral_{it} + \alpha_{19} \cdot Listed_{it} \cdot Collateral_{it} \\ & + Industry_i + Time_t + \varepsilon_{it} \end{aligned} \tag{1}$$

Sub-index i denotes the firm; sub-index t denotes the period.

$Listed_{it}$	dummy variable that equals 1 if the firm is listed and 0 otherwise
$Cost\ of\ Debt_{it}$	interest expense of firm i for year t, over average cost of bearing debt between t − 1 and t
$Cost\ of\ Debt_{it-1}$	lagged value of Cost of $\mathrm{Debt_{it}}$
Big_{it}	dummy variable that equals 1 if the firm is audited by a big N auditor, and 0 otherwise
$Size_{it}$	natural logarithm of total assets (in thousand euros) at t
$Profitability_{it}$	net income for firm i and year t over lagged assets
$\mathrm{Coverage_{it}}$	ratio of interest coverage, computed as earnings before interest, extraordinary items, depreciation and amortization over interest expenses
$Leverage_{it}$	total debt over total assets

$Growth_{it}$	change in sales from year t − 1 to year t over assets at year t − 1
$Current_{it}$	current ratio, computed as current assets over current liabilities
$Collateral_{it}$	ratio of fixed assets to total assets
$Industry_i$	industry-specific effects for firm i
$Time_t$	time-specific effects for period t

To assess if audit quality is relevant for the external claimholders of the company, our explained variable is the *Cost of Debt*$_{it}$. This variable proxies the average rate of interest paid by the firm in period t. The first explanatory variable ($Listed_{it}$) indicates if the firm filed their financial reports with the CNMV in that year. The coefficient obtained for this variable will indicate if public companies audited by non-big N auditors obtain any type of interest reduction because of their listed status. The greater information requirements and the stronger corporate governance mechanisms of public companies lead one to expect the existence of such a reduction, so we expect a negative value for the coefficient of this variable ($\alpha_1 < 0$). Additionally, variable $Listed_{it}$ is also entered in the model interacting with all the other variables, with the intention of controlling the potential differences in the influence of the different variables produced by the listed or non-listed status of the company.

The rate of interest is likely to be positively autocorrelated over time, because it will depend, at least partly, on the cost of long-term debt commitments contracted in the previous years. In order to control this autocorrelation, the lagged value of variable *Cost of Debt*$_{it}$ is included as an explanatory variable. A positive influence is expected for this variable ($\alpha_2 > 0$). Regarding the interaction of this variable with the dummy variable $Listed_{it}$, there is no a priori reason to expect this autocorrelation to be stronger or weaker among listed companies, so we cannot predict the sign of its coefficient.

The next explanatory variable (Big_{it}) represents the type of auditor. The coefficient for this variable will indicate the interest rate reduction that can be obtained by those private companies that are audited by a big N auditor, compared with the private companies audited by non-big N auditors. If the coefficient is significantly negative ($\alpha_4 < 0$), it will indicate that banks and lenders allow a lower cost of debt for privately owned big N auditors' clients, supporting hypothesis 1.

The sum of the former coefficient and the coefficient of the interaction between the type of auditor and the listed status ($\alpha_4 + \alpha_5$) shows the influence that the selection of a big N auditor has on the cost of debt for public companies. If this sum is significantly negative ($\alpha_4 + \alpha_5 < 0$), hypothesis 2 is supported. The value of the coefficient of the interaction between the type of auditor and the listing status (α_5) will indicate if hypothesis 3 is supported or rejected. If α_5 is significantly negative (positive), it will indicate that the interest rate reduction obtained by the publicly owned firms audited by big N auditors is higher (lower) than the interest rate obtained by the privately owned clients of big N auditors, supporting (rejecting) hypothesis 3.

The remaining variables are included to control the influence of other firm characteristics on the cost of debt. The variable $Size_{it}$ is included because it has been found to be inversely related to credit risk by previous studies (Blackwell et al.

1998; Pittman and Fortin 2004). Consequently, we expect the coefficient α_4 to be significantly negative. We employ the variable $Profitability_{it}$ to control for firm performance, and we expect that more-profitable firms will obtain a lower cost of debt ($\alpha_8 < 0$). The $Coverage_{it}$ ratio indicates the firm ability to service its debt, so we expect it to be negatively related to the cost of debt ($\alpha_{10} < 0$). Leverage, however, increases the default risk and the agency costs, so we expect that highly leveraged firms will present higher costs of debt ($\alpha_{12} < 0$). The variable $Growth_{it}$ has two possible impacts on the cost of debt (Kim et al. 2005): on the one hand, high-growth firms can be considered riskier because of their higher fluctuations in earnings; on the other hand, they can be perceived as less likely to default. Therefore, we include this variable without making any hypothesis about the sign of its coefficient. Regarding $Current_{it}$, firms with a low value of this ratio may be suffering from liquidity problems, and they may be forced to use more-expensive credit. Therefore, we expect a negative influence of this ratio on the cost of debt. Finally, we include the variable $Collateral_{it}$ to control for the possibility of using the tangible assets of a firm as collateral for its debts, which reduces the cost of debt. A negative relation between the cost of debt and $Collateral_{it}$ is therefore expected. All these control variables are also included in the model interacting with the dummy variable $Listed_{it}$. The coefficients of these interactions will capture the differences (if any) in the influence of these controls on the cost of debt for public companies. We do not, however, make any explicit prediction about a different influence of these control variables for public companies and private companies.

Finally, the model also takes into account the industry and the time-specific effects by including two sets of dichotomous variables: industry and time dummies. The first set of dummies captures the unobserved and time-invariant effects that are common to the companies of the same industry, while the second set captures those time-specific effects that are constant across companies, for example, the macroeconomic variables that influence the cost of debt, and particularly, economy-wide interest rates.

3.3 Estimation methods

The estimation of model (1) by ordinary least squares (OLS) can be affected by two important problems. The first problem is omitted variables bias. This problem arises because the formation of the cost of debt is likely to be influenced by several firm-specific characteristics that cannot be introduced in the model because they are not observable, especially for private companies.

These characteristics include the quality of the corporate governance mechanisms. In this sense, Anderson et al. (2004) show that the cost of debt is reduced by the independence and the size of the board, as well as by the existence of fully independent audit committees. Additionally, Ashbaugh-Skaife et al. (2006) prove that board independence, board stock ownership, and board expertise contribute to increase the credit rating of the company. Finally, the potential implication of banks and other financial institutions in the corporate governance structures of the companies is also likely to have an important influence on the cost of debt.

However, and despite wide-ranging evidence of the influence of the quality of other corporate governance mechanisms on the cost of debt, the lack of information about these mechanisms for private companies makes it difficult to include them in the model as explanatory variables. This difficulty is shared by other companies' characteristics, such as the existence of non-recordable intangible assets (customer fidelity, know-how, etc.), the possible existence of guarantees or co-borrowers, etc.

This unobserved firm-specific heterogeneity problem can be overcome using panel data methodology. This methodology eliminates the effect of the firm-specific characteristics, assuming that they remain constant over time. In our opinion, the unobserved characteristics mentioned above (quality of other corporate governance mechanisms, the existence of non-recorded intangibles, etc.) can be considered as time invariant because they are likely to be stable over time.

The second problem that affects the estimation of the model is the possible endogenous nature of the explanatory variables, because the OLS and the static panel data methods produce inconsistent estimates of the parameters in the presence of endogeneity. Endogeneity is a common problem in empirical accounting research (Chenhall and Moers 2007), and particularly when the type of auditor is included as a variable (see, for example, Kim et al. 2003; Chaney et al. 2004). If the possible endogenous nature of the auditor is not controlled, the causality of the relation between the type of auditor and the dependent variable is questionable, because this relation can be produced by two different causes: it can be a real effect of the type of auditor on the cost of debt, or it can be the influence on the cost of debt of other variables that, simultaneously, determine the type of auditor selected by the company.

Additionally, the model presents other sources of endogeneity different from the type of auditor. Thus, the presence of the lagged dependent variable in the model produces endogeneity (Bond 2002, p.7). Moreover, the dependent variable is likely to be jointly determined with some of the explanatory variables.

Because of these two problems, we estimate model (1) using two estimation methods: OLS and dynamic panel methods. Dynamic panel methods produce unbiased estimates of the coefficients of the model in the presence of both unobserved heterogeneity and potential endogeneity of the variables. In this paper, we have employed Arellano and Bond's difference generalized method of moments to estimate our model. The details about the estimation of the dynamic panel data model are presented in the "Appendix".

4 Results

4.1 Descriptive results

Table 2 reports the descriptive statistics for variables $Cost\ of\ Debt_{it}$, $Size_{it}$, $Profitability_{it}$, $Coverage_{it}$, $Leverage_{it}$, $Grow_{it}$, $Current_{it}$, and $Collateral_{it}$ for the total sample and the subgroups created by the different values of variables Big_{it} and $Listed_{it}$. The table also reports the median comparison test to assess the significance of the differences between the subgroups.

Table 2 Descriptive statistics

		$Cost\ of\ debt_{it}$	$Size_{it}$	$Profitability_{it}$	$Coverage_{it}$	$Leverage_{it}$	$Grow_{it}$	$Current_{it}$	$Collateral_{it}$
Total	Mean	0.0489	9.4949	0.0450	20.3724	0.6428	0.1077	1.4655	0.2298
	SD	0.0456	1.0828	0.0705	55.6402	0.2069	0.5124	0.8078	0.1901
	p25	0.0231	8.7147	0.0088	2.6552	0.4994	−0.0537	1.0134	0.0747
	p50	0.0376	9.2742	0.0316	5.8196	0.6678	0.0608	1.2375	0.1873
	p75	0.0584	10.0671	0.0714	14.6364	0.8007	0.2178	1.6629	0.3377
$Listed_{it} = 0$	Mean	0.0489	9.4770	0.0451	20.4397	0.6438	0.1087	1.4631	0.2291
	SD	0.0457	1.0616	0.0705	55.8121	0.2067	0.5136	0.8053	0.1897
	p25	0.0231	8.7113	0.0088	2.6586	0.5007	−0.0538	1.0130	0.0743
	p50	0.0376	9.2659	0.0316	5.8259	0.6689	0.0615	1.2362	0.1863
	p75	0.0583	10.0447	0.0715	14.6578	0.8015	0.2191	1.6599	0.3367
$Listed_{it} = 1$	Mean	0.0493	11.5280	0.0393	12.7438	0.5317	−0.0092	1.7384	0.3181
	SD	0.0448	1.4677	0.0683	29.4666	0.1989	0.3350	1.0181	0.2129
	p25	0.0226	10.6170	0.0050	2.0873	0.3721	−0.0476	1.0888	0.1489
	p50	0.0390	11.7595	0.0286	5.0125	0.5337	0.0139	1.4511	0.2809
	p75	0.0630	12.7066	0.0658	13.0930	0.6654	0.0864	2.1324	0.4676
$Pearson\ Chi^2$		1.1807	344.50*	2.057	2.873+	138.74*	77.85*	45.39*	64.66*
$Big_{it} = 0$	Mean	0.0524	9.2390	0.0450	18.4325	0.6438	0.1151	1.4719	0.2249
	SD	0.0471	0.8861	0.0654	51.0842	0.2028	0.5135	0.8053	0.1818
	p25	0.0258	8.6156	0.0100	2.6614	0.5045	−0.0544	1.0207	0.0782
	p50	0.0403	9.0875	0.0311	5.6180	0.6719	0.0650	1.2359	0.1849
	p75	0.0618	9.7063	0.0685	13.5474	0.8013	0.2277	1.6559	0.3275

Table 2 continued

		$Cost\ of\ debt_{it}$	$Size_{it}$	$Profitability_{it}$	$Coverage_{it}$	$Leverage_{it}$	$Grow_{it}$	$Current_{it}$	$Collateral_{it}$
$Big_{it} = 1$	Mean	0.0402	10.1500	0.0449	25.3382	0.6403	0.0887	1.4492	0.2423
	SD	0.0403	1.2520	0.0823	65.6236	0.2171	0.5090	0.8140	0.2091
	p25	0.0170	9.1975	0.0044	2.6343	0.4881	−0.0524	0.9887	0.0644
	p50	0.0308	10.0003	0.0334	6.5135	0.6560	0.0513	1.2432	0.1938
	p75	0.0490	10.9671	0.0791	17.7248	0.7992	0.1947	1.6798	0.3652
Pearson Chi^2		1,200.00*	5,000.00*	14.78*	95.80*	34.15*	53.59*	1.90*	12.40*

Cost of $Debt_{it}$ interest expense of firm i for year t, over average cost bearing debt between t − 1 and t. $Size_{it}$ natural logarithm of total assets (in thousand euros) at year t. $Profitability_{it}$ net income for firm i and year t over lagged assets. $Coverage_{it}$ ratio of interest coverage, computed as earnings before interest, extraordinary items, depreciation and amortization over interest expenses. $Leverage_{it}$ total debt over total assets. $Growth_{it}$ change in sales from year t − 1 to year t over assets at year t − 1. $Current_{it}$ current ratio, computed as current assets over current liabilities. $Collateral_{it}$ ratio of fixed assets to total assets. $Listed_{it}$ dummy variable equal to 1 if the firm is listed and 0 otherwise. Big_{it} dummy variable equal to 1 if the firm is audited by a big N auditor, and 0 otherwise. *Pearson* Chi^2 non-parametric test on the equality of the medians. The chi-square test is computed with a continuity correction. *SD* Standard deviation. *p25*, *p50*, *p75* percentiles 25, 50 and 75, respectively

\+ significance at the 0.1 level

* significance at the 0.05 level

The comparison between the groups of listed and non-listed companies shows that there are no significant differences in the rate of interest and the profitability ratio. The remaining variables, however, show significant differences between listed and non-listed companies. Thus, listed companies are larger and present higher current and collateral ratios. They present, however, a lower interest coverage ratio (albeit significant only at the 10% level), are less leveraged, and exhibit a lower median rate of growth.

Regarding the differences between the clients of big N and non-big N auditors, the median comparison test shows that the former bear a lower cost of debt than the latter. Thus, the average cost for the companies audited by a big N auditor is 122 basis points lower than the average cost of a company audited by a non-big N (the difference between the medians is 95 basis points). This result is consistent with the positive value of audit quality, although the lower cost of debt may be a result of other differences between both sets of firms: big N auditors' clients are typically larger, and they have higher profitability, interest coverage and collateral ratios. However, they have lower leverage and growth ratios. No significant difference is observed for the current ratio.

4.2 OLS estimation

The results of the pooled OLS estimation of model (1) are reported in the first panel of Table 3.

The variable $Listed_{it}$ has a significantly negative value, indicating that listed companies have a lower cost of debt than non-listed companies, as expected. Also as expected, there is a positive relationship between the current and the lagged values of the dependent variable, indicating a strong influence of previous debt commitments on the current cost of debt. The interaction of this variable with the listing status is, however, significantly negative, indicating that the autocorrelation of the interest rate is lower among public companies than private companies.

Regarding the influence of the type of auditor on the cost of debt, panel B of Table 3 summarizes the values of the reductions obtained by private and public companies that select a high-quality auditor, as well as the difference between these two reductions. Regarding private companies, the results indicate that the variable Big_{it} has a significant and negative influence on the cost of debt, showing that the selection of a high-quality auditor by private companies is rewarded by banks and lenders with an average reduction of 22 basis points in the cost of debt, which supports hypothesis 1. The same reduction for public companies can be obtained by adding coefficient α_5 to the former value. The result of this operation is a reduction in the cost of debt of 24 basis points for the public companies. However, this value is not statistically different from zero. Therefore, this result does not support the existence of an interest rate reduction produced by the selection of a big N auditor among public companies, and leads to the rejection of hypothesis 2.

Finally, the difference between the reduction in the cost of debt for private and for public companies is measured by coefficient α_5. Because this coefficient is not statistically different from zero, we conclude that there is no significant difference between the two interest reductions, thereby rejecting hypothesis 3.

Table 3 Results of the pooled OLS estimation of model (1)

	Coefficient	Estimates	*t* test	*p*-value
Panel A. Estimates of model (1)				
Constant	α_0	0.0322	0.00	1.000
Listed_{it}	α_1	−0.0397	−2.81	0.005
Cost of Debt_{it-1}	α_2	0.6235	216.57	0.000
$\text{Listed}_{it} \times$ Cost of Debt_{it-1}	α_3	−0.1203	−4.23	0.000
Big_{it}	α_4	−0.0022	−6.87	0.000
$\text{Listed}_{it} \times \text{Big}_{it}$	α_5	−0.0002	−0.05	0.962
Size_{it}	α_6	−0.0003	−2.10	0.036
$\text{Listed}_{it} \times \text{Size}_{it}$	α_7	0.0052	4.46	0.000
$\text{Profitability}_{it}$	α_8	0.0000	0.01	0.989
$\text{Listed}_{it} \times \text{Profitability}_{it}$	α_9	−0.0285	−1.27	0.203
Coverage_{it}	α_{10}	−0.0001	−41.39	0.000
$\text{Listed}_{it} \times \text{Coverage}_{it}$	α_{11}	−0.0001	−2.84	0.004
Leverage_{it}	α_{12}	−0.0109	−11.63	0.000
$\text{Listed}_{it} \times \text{Leverage}_{it}$	α_{13}	−0.0160	−1.81	0.070
Growth_{it}	α_{14}	0.0095	35.83	0.000
$\text{Listed}_{it} \times \text{Growth}_{it}$	α_{15}	0.0148	3.15	0.002
Current_{it}	α_{16}	0.0011	4.85	0.000
$\text{Listed}_{it} \times \text{Current}_{it}$	α_{17}	0.0008	0.47	0.641
Collateral_{it}	α_{18}	−0.0050	−6.00	0.000
$\text{Listed}_{it} \times \text{Collateral}_{it}$	α_{19}	−0.0170	−2.25	0.024
F test		812.75		
Adjusted R^2		0.5154		
Panel B. Interest rate reductions				
Private big N auditors' clients versus Private non-big N auditors' clients	α_4	−0.0022	−6.87	0.000
Public big N auditors' clients versus Public non-big N auditors' clients	$\alpha_4 + \alpha_5$	−0.0024	−0.69	0.492
Private big N auditor's clients reduction versus Public big N auditors' clients reduction	α_5	−0.0002	−0.05	0.962

The first panel of this table reports the results of the estimation of model (1) using ordinary least squares over the pooled sample. The dependent variable is the $Cost\ of\ Debt_{it}$ interest expense of firm i for year t, over average cost bearing debt between t − 1 and t. The explanatory variables are the following. $Listed_{it}$ dummy variable equal to 1 if the firm is listed and 0 otherwise. This variable is also introduced interacting with all the other explanatory variables. $Cost\ of\ Debt_{it-1}$ lagged value of the dependent variable. Big_{it} dummy variable equal to 1 if the firm is audited by a big N auditor, and 0 otherwise. $Size_{it}$ natural logarithm of total assets (in thousand euros) at year t. $Profitability_{it}$ net income for firm i and year t over lagged assets. $Coverage_{it}$ ratio of interest coverage, computed as earnings before interest, extraordinary items, depreciation and amortization over interest expenses. $Leverage_{it}$ total debt over total assets. $Growth_{it}$ change in sales from year t − 1 to year t over assets at year t − 1. $Current_{it}$ current ratio, computed as current assets over current liabilities. $Collateral_{it}$ ratio of fixed assets to total assets. Although we have estimated model (1) controlling for the industry and time-specific effects, we have not tabulated the values of the coefficients for these two sets of dummies for the sake of simplicity

The second panel reports the values obtained for the interest rate reductions of selecting a big N auditor for private and public companies, as well as the comparison between these two reductions

Regarding the influence of the control variables, the variable $Size_{it}$ is negatively related to the cost of debt, as expected. However, this influence disappears for public companies, as indicated by the positive value of the coefficient α_7. The profitability ratio, however, has no significant influence on the cost of debt, regardless of whether the company is public or private. The interest coverage, however, has the expected negative value, with this influence being stronger for public companies. Contrary to expectations, $Leverage_{it}$ shows a negative relation to the cost of debt, with this relation being stronger for public companies. Although this result may be surprising initially, it has also been documented by previous papers such as that of Francis et al. (2005). The coefficient of the variable $Growth_{it}$ is significantly positive, indicating that high-growth companies are perceived as riskier, especially among public companies. The current ratio is also positively related to the cost of debt, against expectations. Finally, according to expectations, those companies with a higher collateral ratio obtain a lower interest rate, with this reduction being greater for public companies.

4.3 Dynamic panel estimation

The results obtained with the dynamic panel estimation method are reported in Table 4. The obtained results for the influence of audit quality on the cost of debt are qualitatively similar to those obtained with the OLS estimation method. Regarding the reduction obtained by private companies, we find that the variable Big_{it} presents a negative and significant coefficient, thereby indicating that private companies that are audited by a high-quality auditor obtain a lower cost of debt. This result gives support to hypothesis 1. However, this audit quality interest rate reduction is considerably higher than that obtained with the OLS method (271 basis points compared with the 22 basis points obtained with the OLS). The sum of the coefficients α_4 and α_5 is also negative; however, as in the OLS results, it is not significant. This result does not support the existence of a cost of debt reduction for public companies, thereby rejecting hypothesis 2. Finally, coefficient α_5 is also non-significant, indicating that there is no significant difference between the reductions for private and public companies. In addition to this non-significant value, the existence of a significant reduction for private companies and the lack of a similar reduction for public companies leads to the rejection of hypothesis 3.

The results obtained for the control variables, however, present some differences compared with those obtained with the OLS method. For example, the variable $Listed_{it}$ becomes insignificant, indicating that there is no statistical difference between the cost of the debt of private and public companies. The variable $Size_{it}$ has a significantly positive value, contrary to expectations and to the result using the OLS estimation method. The coefficient for the variable $Leverage_{it}$, however, is significantly positive in accordance with expectations, but contrary to the OLS results. The other control variables exhibit similar results with the two methods, with the exception being that the variable $Collateral_{it}$ becomes insignificant when difference generalized method of moments (GMM) is employed.

Table 4 Results of the difference GMM estimation of model (1)

	Coefficient	Estimates	*t* test	*p*-value
Panel A. Estimates of model (1)				
$Listed_{it}$	α_1	0.0470	1.28	0.202
Cost of $Debt_{it-1}$	α_2	0.3832	6.58	0.000
$Listed_{it} \times$ Cost of $Debt_{it-1}$	α_3	−0.0704	−0.64	0.519
Big_{it}	α_4	−0.0271	−3.04	0.002
$Listed_{it} \times Big_{it}$	α_5	0.0149	1.05	0.294
$Size_{it}$	α_6	0.0141	9.88	0.000
$Listed_{it} \times Size_{it}$	α_7	−0.0017	−0.63	0.528
$Profitability_{it}$	α_8	−0.0035	−0.35	0.729
$Listed_{it} \times Profitability_{it}$	α_9	−0.0408	−0.46	0.649
$Coverage_{it}$	α_{10}	−0.0002	−11.51	0.000
$Listed_{it} \times Coverage_{it}$	α_{11}	−0.0003	−1.83	0.068
$Leverage_{it}$	α_{12}	0.0170	2.17	0.030
$Listed_{it} \times Leverage_{it}$	α_{13}	−0.0522	−1.80	0.071
$Growth_{it}$	α_{14}	0.0075	5.90	0.000
$Listed_{it} \times Growth_{it}$	α_{15}	0.0060	0.89	0.371
$Current_{it}$	α_{16}	0.0036	2.11	0.035
$Listed_{it} \times Current_{it}$	α_{17}	−0.0000	−0.00	0.999
$Collateral_{it}$	α_{18}	−0.0036	−0.45	0.656
$Listed_{it} \times Collateral_{it}$	α_{19}	−0.0153	−0.61	0.545
Z_1		22.90 (19)		
Z_2		48.20 (4)		
Arellano–Bond test AR(2)		−0.66		
Hansen's test		216.93 (197)		
Panel B. Interest rate reductions				
Private big N auditors' clients versus Private non-big N auditors' clients	α_4	−0.0271	−3.04	0.002
Public big N auditors' clients versus Public non-big N auditors' clients	$\alpha_4 + \alpha_5$	−0.0122	−0.99	0.321
Private big N auditor's clients reduction versus Public big N auditors' clients reduction	α_5	0.0149	1.05	0.294

The first panel of this table reports the results of the estimation of model (1) using ordinary least squares over the pooled sample. The dependent variable is the *Cost of Debt*$_{it}$ interest expense of firm i for year t, over average cost bearing debt between t − 1 and t. The explanatory variables are the following. *Listed*$_{it}$ dummy variable equal to 1 if the firm is listed and 0 otherwise. This variable is also introduced interacting with all the other explanatory variables. *Cost of Debt*$_{it-1}$ lagged value of the dependent variable. *Big*$_{it}$ dummy variable equal to 1 if the firm is audited by a big N auditor, and 0 otherwise. *Size*$_{it}$ natural logarithm of total assets (in thousand euros) at year t. *Profitability*$_{it}$ net income for firm i and year t over lagged assets. *Coverage*$_{it}$ ratio of interest coverage, computed as earnings before interest, extraordinary items, depreciation and amortization over interest expenses. *Leverage*$_{it}$ total debt over total assets. *Growth*$_{it}$ change in sales from year t − 1 to year t over assets at year t − 1. *Current*$_{it}$ current ratio, computed as current assets over current liabilities. *Collateral*$_{it}$ ratio of fixed assets to total assets. Although the model is estimated using time dummies to control for the time-specific effects, we have not tabulated the values of their coefficients for the sake of simplicity. Z_1 Wald test of joint significance of the reported coefficients. Degrees of freedom are in parentheses. Z_2 Wald test of joint significance for the time-dummy coefficients. Degrees of freedom are in parentheses. *Arellano − Bond test AR(2)* Arellano and Bond serial correlation test of order two using residuals in first differences. *Hansen test* Hansen test of over-identifying restrictions. Degrees of freedom are in parentheses

The second panel reports the values obtained for the interest rate reductions of selecting a big N auditor for private and public companies, as well as the comparison between these two reductions

5 Summary, conclusions and limitations

Audit quality can be considered as a corporate governance mechanism that helps to mitigate agency problems, to reduce the information asymmetry between internal and external stakeholders of the company, and to provide insurance protection against the losses produced by audit report errors. In this paper we tested if audit quality is valued by banks and lenders of private companies to a greater degree that those of public companies. We presented two competing viewpoints about the relative importance of audit quality in private companies. The first viewpoint suggests that audit quality plays a weaker governance role for private companies because the agency problems are less important, the demand for external accounting information of high quality is lower, and the litigation risk is also lower than for public companies. The second viewpoint suggests that audit quality is more valuable for private than for public companies, because, for private companies, there is a wider information asymmetry between internal and external stakeholders, and because there are fewer alternative governance mechanisms that could serve as substitutes for external auditing.

Our empirical results primarily rejected the first viewpoint: while the selection of a big N auditor reduces the cost of debt for private companies, it has no impact on the cost of debt for public companies. Consequently, the results do not indicate that audit quality is more valuable for public companies than for private companies.

The obtained results also provide some support for the second viewpoint: the negative relation between the cost of debt and the selection of a high-quality auditor for private companies indicates that audit quality is a valuable governance mechanism for the external stakeholders of private companies. The lack of such a relation for public companies also indicates that this governance mechanism is less relevant for public companies, possibly because of the weaker information asymmetry and the wider use of other corporate governance mechanisms. However, this support for the second viewpoint must be considered with caution, because the results indicate that the effect of audit quality on the cost of debt is not significantly different for private and public companies. These results are robust to the effect of firm-specific heterogeneity and the possible endogenous nature of the explanatory variables.

In brief, our results reject the first viewpoint (audit quality is more valuable for public companies than for private companies), and partly support the second viewpoint (audit quality is more valuable for private companies than for public companies). These results are consistent with previous papers that show that the value of audit quality is higher in those contexts with a lower level of stakeholders' protection (Choi et al. 2008).

These results are, nonetheless, subject to some limitations. One of these limitations is that they are specific to the Spanish institutional environment. Previous studies (Choi and Wong 2007; Francis and Wang 2008) document that the behaviour of the big N auditors can vary with respect to institutional variables such as investor protection or the level of litigation risk. Therefore, a potential extension of this study would be to study this difference in a multinational setting, employing samples from countries with different levels of investor protection.

A second limitation is the variable employed as a proxy of audit quality. Although the selection of a big N auditor has been widely employed in previous studies as a proxy for audit quality, other measures could be also employed to test the robustness of the results, such as the auditor's market share, their industry expertise, auditor tenure, etc.

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Appendix

In this appendix, we describe the procedures followed in the estimation of the model using dynamic panel data methods. There are two dynamic panel data methods available for this estimation: the difference generalized method of moments (difference GMM) proposed by Arellano and Bond (1991) and the system generalized method of moments (system GMM) proposed by Blundell and Bond (1998). In the difference GMM, the model is first-differenced to eliminate the firm-specific effects, estimating the differenced equation using all the available lags of the explanatory variables in levels as instruments. These lags are probably valid instruments because they are likely to be correlated with differenced variables but uncorrelated with the differenced error terms, unless the error terms are serially correlated. Therefore, it is necessary to test the absence of this serial correlation, using Arellano and Bond's test of second-order autocorrelation in the differenced residuals (Arellano and Bond 1991).

The system GMM adds the level equation to the regression. This addition increases the number of instruments, thereby increasing the efficiency of the method. It additionally requires, however, that the relation between the changes in the lagged dependent variable and firm-specific firm effects to be stationary.

The estimation strategy used in this paper is the following: we initially select the system GMM method because it has higher efficiency. However, we control whether the conditions required for the validity of this method are fulfilled: we employ the difference-in-Sargan test for the instruments in levels to test if the stationary condition is fulfilled, and the Arellano and Bond test to analyse if errors are serially correlated.

Following a conservative strategy for the estimation of the model, all the variables are initially considered to be predetermined, with the exception of the time dummies that are considered exogenous.[3] We have initially employed the four first lags of the predetermined variables as instruments. To test if the model is over-

[3] Explanatory variables can be considered endogenous, predetermined or exogenous. Endogenous variables are those that are correlated with the current error term and earlier shocks. For these variables, lagged values from $t-2$ and longer lags are valid instruments. Predetermined variables are not correlated with the current error term, but they are correlated with earlier shocks. For these variables, lagged values from $t-1$ are valid instruments. Finally, exogenous variables are unrelated to the current error term and earlier shocks. For these variables, the complete time series can be employed as valid instruments (Bond 2002).

identified and to detect the source of such over-identification, we have employed the difference-in-Sargan tests for each lag of each variable, removing from the model those lags that produced over-identification of the model. Finally, the one-step estimator with errors robust to heteroskedasticity and arbitrary patterns of autocorrelation within individuals is employed to obtain the estimates of the model.

Although this model solves the problem of omitted variables bias and the endogeneity problems, it also presents an important drawback. A minimum of five consecutive valid observations per individual is required to test for the absence of serial correlation in the residuals (Arellano and Bond test). To fulfil this requirement, we eliminate all the companies that do not meet the required five consecutive observations, reducing the sample to 14,403 observations, corresponding to 4,336 different companies.

Following the design estimation strategy, we initially estimate model (1) using the system GMM approach. However, this estimation involves a significant value for Hansen's over-identification test. The difference-in-Sargan tests indicate that the instruments for the level equation were the source of the over-identification of the model, indicating that the stationary condition required for the validity of the System GMM is not fulfilled. Consequently, the model is estimated using the Arellano and Bond difference GMM. Additionally, the first lags of the lagged cost of debt also produce a significant value for the difference-in-Sargan tests. After removing these lags, the model produces a non-significant value of the Hansen test and the Arellano and Bond test, supporting the validity of the model.

The results reported in this paper correspond to the last step of this analysis. The results of the estimation of the model in the previous steps (with the GMM estimation method and with all the initial lags) are not tabulated, but they are available upon request.

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