

Analysis of process-induced deformations and residual stresses in curved composite parts considering transverse shear stress and thickness stretching

Original

Analysis of process-induced deformations and residual stresses in curved composite parts considering transverse shear stress and thickness stretching / Zappino, E., Zobeiry, N., Petrolo, M., Vaziri, R., Carrera, E., Poursartip, A.. - In: COMPOSITE STRUCTURES. - ISSN 0263-8223. - STAMPA. - 241:(2020). [10.1016/j.compstruct.2020.112057]

Availability:

This version is available at: 11583/2799892 since: 2020-03-03T08:03:52Z

Publisher:

Elsevier

Published

DOI:10.1016/j.compstruct.2020.112057

Terms of use:

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

Publisher copyright

Elsevier postprint/Author's Accepted Manuscript

© 2020. This manuscript version is made available under the CC-BY-NC-ND 4.0 license
<http://creativecommons.org/licenses/by-nc-nd/4.0/>. The final authenticated version is available online at:
<http://dx.doi.org/10.1016/j.compstruct.2020.112057>

(Article begins on next page)

Debt Maturity and SMEs: Do Auditor's Quality and Ownership Structure Matter?

Isabel Feito-Ruiz , Clara Cardone-Riportella & Elisa Ughetto

Abstract

This study analyses the two corporate governance mechanisms that affect the debt maturity structure of Small and medium-sized enterprises (SMEs) listed on the Alternative Investment Market (AIM): Big 4 auditors and the firms' ownership structure. Analysing 227 listed SMEs (1998-2016) and applying both cross-sectional and panel data estimations, we find that: i) there is a positive and significant relationship between Big 4 auditors and debt maturity; ii) firms with more ownership concentration have a higher fraction of long-term debt in their capital structure; iii) while family firms are, on average, associated with shorter debt maturities, when they are audited by a Big 4 their debt maturity lengthens.

Keywords: Audit quality, Ownership structure, Debt maturity structure, Alternative Investment Market (AIM).

JEL Codes: G15; G30; G32; M42.

1. INTRODUCTION

Small and medium-sized enterprises (SMEs) are key players in the global economy and the wider ecosystem of firms, contributing to economic and social well-being. One of the critical factors for their survival and growth is access to external financing (Chua et al., 2011; Li et al., 2019). SMEs face more credit constraints than large firms, because of their limited credit history, under-collateralisation and lower quality and quantity of information on their economic and financial status (Beck and Demirguc-Kunt, 2006; Carpenter and Petersen, 2002; Ughetto, 2008). If credit is granted, lenders typically provide short-term debt to finance day-to-day business operations, disregarding negotiations over long-term debt. This critically affects SMEs' debt maturity structure, a problem which is especially acute for growing SMEs (Cowling et al., 2020).

The difficulties in accessing credit (especially long-term one) are more exacerbated after the Global Financial Crisis (GFC), leading to a significant deterioration in the credit conditions for SMEs (Demirgüç-Kunt et al., 2020). As SME lending suffered during the crisis, public authorities took specific measures to provide them with alternatives to bank-based financing. Among these, the development of alternative stock markets dedicated to young and growing companies received an important impetus. A pioneering example is the Alternative Investment Market (AIM) in the UK. The AIM has grown tremendously since its inception and represents an ideal setting to explore how the imperfections of capital markets affect SMEs' access to credit. In this paper, we focus on the interplay between debt maturity and firm-level governance mechanisms, which represents one specific dimension related to the difficulties SMEs face in accessing debt financing.

The choice of the debt maturity structure (i.e. long-term debt over total debt) results from two main mechanisms that shape the relationship between firms and lenders: agency

problems induced by information asymmetries. A typical monitoring device to align borrowers' interests to lenders' is the short-term debt. Negotiation of debt in the short-term limits the opportunistic behaviour of managers and realigns their conduct to the debtholders' interest. Short-term debt is primarily employed by lenders when firms are informationally opaque, as in SMEs, and when conflicts of interests among stakeholders are severe (Arslan and Karan, 2006; Chang et al., 2009).

Despite the importance of boosting economic growth and the growing recognition that long-term credit matters for SMEs, enabling them to thrive in a competitive environment, there has been little analysis of whether tools other than short-term debt may substitute or complement corporate control mechanisms in SMEs.

Therefore, we examine two main dimensions that likely affect a firm's debt maturity structure, and that may act as an alternative monitoring system for short-term debt to discipline managers: the auditor's quality (proxied by large international and prestigious auditing firms, i.e. KPMG, Deloitte, PricewaterhouseCoopers and Ernst & Young, known as the Big 4) and the firms' ownership structure. The intuition behind our analysis is that lenders impose less monitoring on borrowers for short-term debt when firms appoint a Big 4 auditor and when the ownership structure is concentrated or with a large shareholder.

We base our research question on two main strands of literature that have analysed the role of external auditors in reducing information asymmetries (Chang et al., 2009; Fan and Wong; 2005; Hope et al., 2008) and the extent to which strong corporate governance induces lenders to invest in a firm (Ashbaugh and Warfield, 2003; Guedhami et al., 2009; Leuz et al., 2009). While the literature has suggested that Big 4 auditors alleviate information asymmetries (Beisland et al., 2015; Fan and Wong, 2005), little work has been done on the importance of auditors' quality to financial decisions (El Ghoul et al., 2016b; Karjalainen, 2011; Kim et al., 2011) and

particularly, debt maturity structure (Chang et al., 2009; El Ghouli et al., 2016a). Additionally, mixed empirical evidence regarding the impact of the ownership structure on balance between long-term and short-term debt is provided (Arslan and Karan, 2006; Datta et al., 2005; Garcia-Teruel and Martinez-Solano, 2010; Mande et al., 2012; Marchica, 2008 among others).

This article addresses the research gaps by investigating the combined effect of auditors' quality and ownership structure on firms' debt maturity. Therefore, we build and integrate, disparate strands of literature (Hay et al., 2006 Hay, 2013) to address the question of whether Big 4 auditors and ownership structure are complementary or substitute corporate control mechanisms in the replacement of short-term debt. Under the complementarity approach, ownership structure and audit should be complementary control mechanisms, such that the quality of one mechanism reinforces the other and vice versa. However, according to the substitution approach, when one control mechanism is already in place, the need for the other is reduced.

We also enrich the analysis by disentangling different types of ownership (i.e., family, institutional investors and non-financial firms). To the best of our knowledge, no empirical work has investigated the combined effect of auditor's quality and ownership concentration on firms' debt maturity structure, focusing on different types of ownership.

We believe that exploring the interplay between audit quality, ownership structure, and debt maturity is important for SMEs. Previous studies have mainly focused on large and listed firms. However, there is a lack of empirical evidence regarding SMEs, mainly due to the lack of reliable data, as they are usually not listed on capital markets¹. We address our research questions about the AIM, which lists both SMEs and large firms. Although scholarly interest in the AIM has grown recently (Christensen et al., 2020; Gerakos et al., 2013), empirical

¹ SME financing through capital markets is still very small, with the exception of two pioneer countries, the UK and Canada, which have opened alternative investment markets for SMEs in the last decades. There are from 2 to 48 listed firms in Latin American, non-OECD countries, and from 14 to 187 listed firms in OECD countries (Briozzo et al., 2019).

research has not established a research base on the relationship between debt maturity, use of the Big 4 auditor and the firms' ownership structure in that specific context. We highlight this by examining a sample of 227 firms listed on the AIM over the period 1998–2016.

The results support our intuition that the presence of a Big 4 and a concentrated ownership structure substitute for short-term debt as a monitoring mechanism in the AIM market, acting as complementary tools and jointly contributing to lengthening debt maturity. Firms with these characteristics have a higher fraction of long-term debt in their capital structure. Additionally, when a Big 4 firm audits family firms (which are, on average, associated with shorter debt maturities), their debt maturity lengthens. Results are robust when we control for endogeneity problem (Lennox et al., 2011) of the Big 4 auditor's choice.

The paper is organised as follows. Section 2 presents the theoretical background in the light of previous research. Section 3 describes the data and methodology used. Section 4 discusses the main results. Section 5 concludes the paper.

2. THEORETICAL BACKGROUND

Early theoretical studies have explained firms' debt maturity structure by market imperfections such as agency conflicts (Myers, 1977), information asymmetry (Diamond, 1991) and taxes (Brick and Ravid, 1985). Particularly, agency theory posits that short-term debt acts as an external monitoring tool to reduce managers' discretion over the firm's free cash flow (Jensen, 1986; Rajan and Winton, 1995; Stulz, 2000). Empirical studies have confirmed theoretical predictions that the debt maturity structure reflects the monitoring intensity that lenders impose on borrowing firms. They confirmed that short-term debt reduces agency conflicts between creditors and managers, often responsible for the underinvestment problem (Barclay and Smith (1995) for the US market or Ozkan (2000) for the UK market, among

others). However, reportedly, this monitoring device based on periodic credit renewals may lead firms to be subject to suboptimal debt maturity structures, with the possibility of higher liquidity risk (Johnson, 2003). Accordingly, it is worthwhile investigating the existence of other mechanisms that may act as alternative monitoring devices to short-term debt. In this section, we understand the factors that affect firms' debt maturity analysing the contribution of audit quality and ownership structure.

2.1 Debt maturity and audit quality

The main role of external auditors is to enforce accounting rules and provide credibility to firms' disclosures. The higher the auditors' reputation, the stronger is this effect. Large international and prestigious auditing firms, currently known as Big 4², have more power for litigation and to offer higher quality services, compared to other auditing firms.³ Therefore, the quality of auditing has been empirically associated with the Big 4 auditor (Francis, 2004; Knechel et al., 2008; Krishnan and Schauer, 2000; Lennox et al., 2011)⁴.

It is outlined that a higher audit quality reduces the agency problems induced by information asymmetries between informed managers and uninformed lenders because it adds credibility to the firms' financial statements (for example, adding precision to firms' earning reports, DeAngelo, 1981; Balvers et al., 1988; Francis and Wilson, 1988; Lardon and Deloof, 2014). For lenders, the borrowers being audited by a Big 4 firm, is a guarantee that financial information is fair and financial statements are not distorted by managers. When firms appoint

² Big 4 auditors are KPMG, Deloitte, PricewaterhouseCoopers and Ernst & Young.

³ Some research supports the contention that strong institutions at country level are a necessary condition for generating differential audit quality at the firm level (El Ghoul et al., 2016a; Francis and Wang, 2008). In contrast, other studies find that the role of Big 4 auditors improving transparency is concentrated in countries with weak legal institutions (Choi and Wong, 2007; Choi et al., 2008; Fan and Wong, 2005; Kim et al., 2011).

⁴ We acknowledge that Big 4 appointment is only one proxy of auditing quality (being largely a function of the size of the auditee) and other proxies such as qualified audit opinion, going-concerns options and accruals have been used in the literature (see for instance Menon and Williams, 2016), as well as the financial reporting quality (De Meyere et al., 2018).

Big 4 auditors, information asymmetries are reduced, and the use of short-term debt as a monitoring device that enables creditors to evaluate the borrowers' creditworthiness periodically and to retain a bargaining position over the renegotiation of the loan terms is relaxed (Dechow et al., 2010; Hartarska, 2009; Li et al., 2019).

The alleviation of agency problems at the firm level induced by higher-quality audits supports firms to obtain finance at a higher frequency, lower cost and with longer borrowing terms (El Ghouli et al., 2016a)⁵. Clients of high-quality auditors are rewarded with longer debt maturities (El Ghouli et al., 2016a), greater access to debt and better credit conditions, such as lower cost of capital by lenders (Graham et al., 2008; Hartarska, 2009; Karjalainen, 2011; Kim et al., 2011; Knechel et al., 2008)⁶.

El Ghouli et al. (2016a) analyse a large sample of public firms from 42 countries and find that the fraction of long-term debt in a firm's capital structure increases with a Big 4 auditor, especially in countries with strong legal institutions. Van Caneghem and Van Campenhout (2010) find that both the quantity and quality (i.e. guaranteed by Big 4 auditing services) of financial statement and information are positively related to Belgian SMEs' leverage. Similarly, De Meyere et al. (2018) find that better financial reporting quality increases the debt maturity of private firms in Belgium. Kim et al. (2011), using a sample of private Korean firms with either no audit or voluntary audits, provide evidence of the value of an external audit in the pricing of private debt. They find that private companies with voluntary audits pay significantly lower interest rates on their debt than private companies with no audit. Karjalainen (2011) analyses the relevance of both perceived audit quality and audit outcomes in the pricing of debt

⁵ It has been pointed out that when banks know firms well, they can depend less on the external monitoring provided by Big 4 auditors to reduce agency costs (Diamond 1991; Kim et al., 2011; Rajan and Winton, 1995).

⁶ Auditor's quality is thus an alternative tool to short-term debt to reduce internal agency conflicts as well (Chang et al., 2009; Fan and Wong, 2005; Hope et al., 2008).

capital for privately-held Finnish firms. Results show that privately held firms with Big 4 auditors and those with multiple auditors have a lower cost of debt than other firms, similar to the results of Pittman and Fortin (2004). Robin et al. (2017) find that high-quality auditors encourage more favourable debt covenant terms and, subsequently, reduce the probability of covenant violations. The likelihood that the lender will recover losses depends upon the auditor's ability to pay. Larger auditors, such as Big 4 or national auditors, are likely to be able to compensate the lender better if a lawsuit is decided in favour of the lender (Menon and Williams, 2016).

2.2 Debt maturity and ownership structure

Lenders often need strong governance to invest in a firm (Ashbaugh and Warfield, 2003; Guedhami et al., 2009; Leuz et al., 2009). A concentrated ownership structure and a large shareholder base typically act as corporate control mechanisms that reduce the conflict of interest between insiders and outsiders (Shleifer and Vishny, 1986). Monitoring costs on managers' actions can be easily sustained with a large shareholder or a concentrated ownership structure, thus alleviating agency problems (Fama and Jensen, 1983). Consequently, this acts as a signalling mechanism to the market that the management is closely monitored (Friend and Lang, 1988) and makes lenders less reliant on short-term debt (Martins et al., 2017; Shleifer and Vishny, 1986). Furthermore, firms with a higher ownership concentration and a large shareholder may have greater risk aversion and a long-term orientation, which facilitate the alignment of interests with lenders, given that there is less risk of financial distress or bankruptcy (Chrisman et al., 2018). Thus, most theoretical insights suggest that a large shareholder or a concentrated ownership structure may act as substitutes of short-term debt to impose monitoring on borrowers.

The empirical literature exploring this has, however, provided mixed results. For the US market, Datta et al. (2005) document an inverse relationship between managerial stock ownership and corporate debt maturity. Managers with low equity ownership prefer a longer debt maturity to avoid external control, and they shift to short-term debt as long as their ownership increases. Similar results are found by Guney and Ozkan (2005) in the UK. The authors argue that firms prefer short-term debt when the expected agency costs of managerial ownership are higher.

A non-linear relationship between insider ownership and debt maturity in the UK is tested by Marchica (2008). The author illustrates that consistent with the alignment effect, managers tend to lengthen debt maturity when they have low levels of ownership to avoid the costs of liquidity risk. For higher levels of concentration, when the entrenchment effect prevails, the relationship between insider ownership and debt maturity turns negative. Similar results are found in the Spanish context by Garcia-Teruel and Martinez-Solano (2010). The authors observe a non-monotonic relationship between long-term debt and managerial ownership. Low levels of managerial ownership have a positive effect on debt maturity and turn negative for higher levels of ownership concentration. This is explained by the large shareholders' preference for short-term debt to avoid close monitoring by debtholders (Cho et al., 2014) or the risk of losing control (Pindado et al., 2015). Similarly, Castro Martins et al. (2017) show that a longer debt maturity is associated with lower levels of ownership concentration in Brazil and Chile. This evidence supports the idea, originally posited by Shleifer and Vishny (1986), in which the conflict of interest between controlling and minority shareholders (agency conflicts type II) may emerge with more concentrated ownership structures. Then, the concentration of ownership does not act as a substitute for short-term debt, and the expropriation effect may dominate. Accordingly, controlling shareholders may signal their intention to mitigate agency costs by using shorter debt maturity to the market.

Partially different evidence is provided by Arslan and Karan (2006) and Castro Martins et al. (2020). Arslan and Karan (2006) show that a concentrated ownership structure and a large shareholder are directly (although moderately) related to corporate debt maturity in Turkey. However, the maturity structure shortens when firms have more growth opportunities, despite having a large controlling shareholder or a concentrated ownership structure. In a recent worldwide study, Castro Martins et al. (2020) claim that the ownership concentration has a negative impact on debt maturity in countries with weak shareholder and creditor protection, though, as the protection increases in a country, this relationship tends to be positive.

3. DATA AND METHODOLOGY

3.1 Data collection and sample

We analyse 227 firms listed on the London Stock Exchange's AIM over 1998–2016. AIM provides a wide range of businesses (at different stages of development, from an early-stage (e.g. Venture Capital-backed) to more established ones) the opportunity to access capital to pursue their growth ambitions and raise their international profile. Since its launch in 1995, more than 3,000 companies across all sectors have been admitted into AIM. It has been estimated that the overall economic impact of UK AIM companies is equivalent to £25 billion in GDP and 731,000 jobs (LSE, AIM 20 key statistics, 2017)⁷.

The AIM operates under a self-regulated environment where the application of certain standards is voluntary (Feito-Ruiz et al., 2016). AIM's regulatory regime was designed specifically for growing SMEs. Companies joining AIM have to bear lower costs and less regulatory requirements than in other regulated markets. They are not required to have a

⁷ <https://www.lseg.com/markets-products-and-services/our-markets/london-stock-exchange/equities-markets/raising-equity-finance/aim/aim-20/aim20-key-statistics>

particular financial track record or trading history⁸. For example, AIM firms do not apply the Combined Code on Corporate Governance, which sets the standards for listed firms (Mallin and Ow-Yong, 1998; 2012). AIM firms are also more flexible in applying the new European Auditor Law (2014/56/UE), which establishes that firms have to change their auditor every ten years to fulfil the Corporate Governance standards.

We initially extracted a total of 971 firms listed on the AIM market over the period 1998–2016 from the LSE website. From this initial sample, we excluded those firms lacking the Stock Exchange Daily Official List (SEDOL) code, without which it was not possible to match accounting and ownership information. The data on auditors, ownership and financials were derived from commercial databases, such as Capital IQ (for auditors and board data), Datastream (for accounting information) and Amadeus (for ownership information). Following previous studies (Arslan and Karan, 2006; Billet et al., 2007; El Ghouli et al., 2016a), we excluded financial firms and utilities whose debt maturity structure is not comparable with industrial firms and other service firms from the sample. The final sample consists of 1,155 firm-year observations, representing 227 firms listed on the AIM over the period 1998–2016. Table 1A in the Appendix shows the industry distribution of sample firms according to the ICB classification. Firms operating in the Support Services sector represent 14.53%, followed by Software & Computer Services (14.09%) and Media (8.4%).

⁸ The regulatory structure of the AIM is established by the LSE, independently from the EU Investment Services Directive (Gerakos et al., 2013). LSE delegates oversight of AIM firms to nominated advisors (NOMADS) (Mendoza, 2008). The financial reporting enforcement regime (FRRP) introduced proactive and selective monitoring of published financial statements for UK listed companies, this in turn affecting company financial reporting quality, auditing fees and shareholder wealth (Christesen et al., 2019).

3.2 Variables

To empirically test the effect of having a Big 4 auditor and the ownership structure on debt maturity, we propose the following model:

$$\text{Debt Maturity}_{ij} = \alpha + \beta_1 \text{Big 4}_{ij} + \beta_2 \text{Ownership}_{ij} + \beta_3 \text{Controls}_{ij} + \phi \text{IndustryDummy} + \varphi \text{YearDummy} + \varepsilon_{ij}$$

Table 1 reports the definition of the variables employed in the analysis, together with the data source. The dependent variable is DEBT MATURITY. We use the long-term debt ratio (long-term debt/total debt) to gauge the debt maturity structure of analysed firms (Arslan and Karan, 2006; Casino-Martinez et al. 2019; Custódio et al., 2013; Datta et al., 2005; Demirgüç-Kunt and Maksimovi, 1999; Díaz-Díaz et al., 2016; El Ghouli et al., 2016a; Marchica, 2008, among others). Debts of over one-year maturity are classified as long-term debts.

Our main independent variables include measures of audit quality and ownership structure, as tools to reduce agency costs and information asymmetries. Audit quality is proxied by whether the firm is audited by one of the world's largest audit firms, called the Big 4 (i.e. KPMG, Deloitte, PricewaterhouseCoopers and Ernst & Young). Following prior research (Chang et al., 2009; Kim et al., 2011), we use a dummy variable, which takes the value of one if the firm is audited by a Big 4 auditing firm and zero otherwise (BIG 4).

We introduce alternative measures of ownership structure and concentration to test their effect on debt maturity. OWNERSHIP_MAIN_SH is the percentage of ownership held by the largest shareholder, and OWNERSHIP_MAIN_SH_SQ is the quadratic variable to test any non-linear relationship. Alternatively, we define HIGH_CONCENTRATION_d as a dummy variable that takes the value of 1 when the largest shareholder holds a high level of ownership (falling in the 2nd, 3rd and 4th quartiles of the distribution) and 0 otherwise. To establish the identity of shareholders, we classify them into four groups: (i) an individual or family, (ii)

institutional investors (including financial firms), (iii) non-financial firms, (iv) others. This distinction allows us to specify different variables for different types of ownership. We introduce the dummy variable `FAM_d`, which is equal to 1 if the largest shareholder is a family member and holds more than 25% of the ownership. We consider the 25% threshold in the family firms following the definition employed by the European Group of Owner-Managed and Family Enterprises (GEEF) and the board of the Family Business Network (FBN). Similarly, when shareholders are institutional investors or companies, we have the following variables: `INV_d` (dummy equal to 1 if the largest shareholder is an institutional investor and holds more than 25% of the shares) and `COMP_d` (dummy equal to 1 if the largest shareholder is a company and holds more than 25% of the ownership). We also run regressions with other specifications of family ownership. `OWNERSHIP_FAM` denotes the percentage of family ownership in the firm by the largest shareholder (holding more than 25% of ownership). `BLOCK_FAM_d` is a dummy variable that is equal to 1 if the top three shareholders are family members and hold (in sum) more than 25% of the firm ownership. Similarly, `OWNERSHIP_INV` denotes the percentage of institutional investors' ownership in the firm by the largest shareholder (holding more than 25% of ownership), and `BLOCK_INV_d` is a dummy equal to 1 if the top three shareholders are institutional investors and hold more than 25% percent of the shares in sum. When shareholders are companies, `OWNERSHIP_COMP` denotes the percentage of company ownership in the firm by the largest shareholder (holding more than 25% of ownership) and `BLOCK_COMP_d` is a dummy equal to 1 if the top three shareholders are companies and hold in sum more than 25% percent of the ownership.

We include several controls at firm-level in our estimates that, according to previous studies, may contribute to explain firms' debt maturity. We compute leverage (`LEV`) as total debt divided by total assets. As a measure of profitability, we compute return on assets (`ROA`),

defined as EBITDA divided by the book value of total assets. EARN_VOLATILITY is defined as the standard deviation of the EBITDA to total assets. TANG is a variable that reflects the incidence of tangible assets over total assets. We also control for firm size and age. SIZE is measured in the regression analysis as the logarithm of total assets. Typically, larger firms face lower information asymmetries, which can facilitate long-term debt financing (Titman and Wessels, 1988). We, therefore, expect that size is positively related to debt maturity. Empirical studies generally support this expected relationship (Datta, 2005; Marchica, 2008). However, other studies have found the opposite effect (Scherr and Hulburt, 2001). AGE is measured as the log of the firms' age plus one (Chang et al., 2009) in the regressions. This variable, which is used to control for the firm's level of experience and accumulated resources, is expected to exert a positive influence on the long-term debt (Scherr and Hulburt, 2001).

We also control for the financial strength and the growth opportunities of sample firms. Growth opportunities are proxied by the Market-to-Book ratio (MARKET-TO-BOOK), which compares the company's current market value to its book value. When the market recognises the value of firms' growth opportunities, the Market-to-Book ratio should be higher than 1. Following Arslan and Karan (2006), Graham (1996) and Jun and Jen (2003), we employ the Altman Z-score to measure firms' financial strength (see Table 1 for the calculations). We define a binary variable FINANC_STRENGTH that takes the value of one if the firm reports an Altman (1968) Z-score higher than 2.99 and 0 otherwise⁹. We expect that firms showing fewer financial problems (higher Z-score values) may reduce their debt maturity (Arslan and Karen, 2006).

⁹ We apply the same threshold used by Altman (1968): if the value of the Z score is above 2.99, the company is placed in the 'Safe Zone', being lower the risk that it falls into financial distress.

Finally, we introduce the effective tax rate and the spread as additional controls. Tax rate (TAX) is defined as total tax charge divided by pre-tax profits; the term structure measure (SPREAD) is approximated by the difference between the yields on 10-year government bonds and three-month treasury bills (Barclay and Smith, 1995; Castro Martins et al., 2017; García-Teruel and Martínez-Solano, 2010; Marchica, 2008 among others). According to prior studies, we predict a negative relation between long-term debt and the effective tax rate (Kane et al., 1985) and a positive relation between long-term debt and the term structure (Brick and Ravid, 1985).

Lastly, when running two-stage regressions to control for the Big 4 auditor choice, we include additional determinants of the probability to be audited by a Big 4 firm, the size of the board of directors and the number of years the firm is relying on the service of the auditing firm. The variable BOARD_SIZE is defined as the number of directors on the board¹⁰. Larger boards can force managers to choose a debt maturity structure that facilitates frequent monitoring (Harford et al., 2008). AUDIT_TENURE is the number of years the audit company is auditing the firm.

[Insert Table 1 here]

3.3 Descriptive statistics

Table 2 (Panel A) illustrates the main descriptive statistics (mean, median, standard deviation, minimum and maximum). Table 2 (Panel B) illustrates the results of a t-test of differences conducted to statistically compare the means of the considered variables between two groups of firms: firms audited by a Big 4 auditing firm and firms not audited by a Big 4. Panel C provides the mean comparison t-test of debt maturity by disentangling among different size, leverage, and ownership sub-samples. Particularly, we report the quartiles for total assets,

¹⁰ This variable does not vary over time, because of the lack of information over the years.

leverage, and percentage of ownership held by the largest shareholder. Table 6A in the Appendix reports the pairwise correlation matrix. All variables are winsorised using a 1% cut-off for each tail to reduce the impact of outliers (Dixon, 1960). Variables are assigned the values corresponding to the 1st and 99th percentiles of their distribution to all observations that fall beyond them.

[Insert Table 2 here]

The average incidence of long-term debt is 50% for the overall sample. Debt maturity has a mean value of 0.57 for firms audited by a Big 4 auditor and 0.47 for those not audited by a Big 4 auditor. This difference is statistically significant at the 1% level, indicating that firms with a Big 4 auditor have a higher incidence of long-term debt over total debt, consistent with our expectations. If we consider the sub-samples of size according to total asset quartiles, we observe that this difference is just significant for the sub-sample of large firms in the 3rd quartile (panel C).

Overall, 31% of sample firms are audited by Big 4 firms. On average, the largest shareholder in our sample firms holds 20% of the shares. La Porta et al. (1999), Faccio and Lang (2002), Khan et al. (2015) among others argue that it is sufficient for the largest shareholder to hold at least 20% of the shares to have effective control over the company. On average, 74% of the firms have a major shareholder with a high percentage of ownership in our sample. The mean value of HIGH_CONCENTRATION_d is higher when the auditor is a Big 4 (78.6%) than when it is a non-Big 4 (72.3%), this difference being statistically significant at the 10% level. Also, firms audited by a Big 4 auditor show a greater debt maturity when they have the largest shareholder with higher levels of ownership (4th quartile) (see Panel C).

Table 2 illustrates that a family holds 11.5% of sample firms, with more than 25% of ownership. This value is lower (8.2%) for the sub-sample of firms audited by a Big 4 auditing

firm than for the sub-sample of firms audited by a non-Big 4 (13%). The t-test rejects the null hypothesis of equal means in the value between the first and the second sub-sample at the 5% significance level. This result is consistent with the fact that family firms could be more reluctant to hire Big 4 auditors (Niskanen et al., 2010). Additionally, firms audited by a Big 4 auditor have a higher debt maturity when the largest shareholder is a family firm or an institutional investor with more than 25% of ownership (panel C).

The mean value of leverage is 0.19. Firms audited by a Big 4 have a higher debt maturity when they show higher levels of leverage, and this difference is significant for those with leverage classified in the 3rd and 4th quartile (see panel C). Table 2 (panel A) shows that, on average, the ROA for sample firms is negative and takes the value of -0.05, this being positive and higher for firms audited by Big 4 auditing firms (0.03) than for firms audited by non-Big 4 auditing firms (-0.08). This difference is statistically significant at 5% level. The volatility of the firm's earnings shows an average value of 50%. The volatility of firm earnings is significantly higher, on average, for those firms audited by non-Big 4 firms (64%) compared to that reported for the Big 4 sample (20%). On average, tangible assets represent 74% of total assets, this ratio being higher for those firms audited by Big 4 (76%) than by non-Big 4 (72%). Also, in this case, the difference is statistically significant at the 10% level.

The mean value of total assets for sample firms is £58,834 million. When we compare firms audited by Big 4 auditors and non-Big 4, we observe that the mean of total assets is higher for the sub-sample of firms audited by a Big 4 than for the non-Big 4 sub-sample, which are £99,141 million, and £40,948 million respectively. The difference in the means between the two groups is significant at the conventional levels, consistent with the argument that larger firms may suffer more of agency conflicts and thus have more incentives to hire Big 4 auditing firms. Table 2 shows that the AIM firms are on average, 25.53 years old and that firms audited

by Big 4 companies are older (34.32 years) than those audited by non-Big 4 companies (21.6 years). Again, this difference is statistically significant at the 1% significance level.

The average market-to-book ratio for AIM companies is 1.78. Table 2 (panel A) shows that, on average, 8.9% of sample firms can be considered as financially strong firms. The tax is on average 16.7% and the spread 1.176. Tax payments are higher for Big 4 (20.3%) than for non-Big 4 firms (15.1%).

On average, AIM firms have 6.18 directors on the board (Table 2, panel A). While, on average, auditing firms provide their service to sample firms for 8.48 years, firms audited by a Big 4 present a higher value (10.12) than those audited by a non-Big 4 (7.7). This difference is statistically significant at 1% level (Table 2, panel B).

To conclude, from the descriptive statistics we observe that firms with Big 4 auditors present a higher debt maturity, are less likely to be family firms, have a greater size, are older, more profitable, have more tangible assets, have a lower earnings volatility, higher tax payments and the tenure of their auditors is higher.

4. MAIN RESULTS

4.1 Debt maturity, audit quality and ownership structure

Table 3 illustrates the effect of auditors' choice and ownership structure on debt maturity using Ordinary Least Squares (OLS). Model 1 is the baseline model and includes the Big 4 variable and firms' characteristics as controls, as well as industry and year dummies. In models 2 and 3, we test the effect of the percentage of ownership held by the major shareholder and of its squared value (OWNERSHIP_MAIN_SH and OWNERSHIP_MAIN_SH_SQ). In model 4, we include the variable HIGH_CONCENTRATION_d.

The BIG4 variable has a positive and significant effect on debt maturity in all model specifications without interactions (at 10% significance levels), indicating that being audited by well-known auditors could reduce agency conflicts and information asymmetries, thus increasing the debt maturity. This variable is also economically significant since an increase in one standard deviation increases the debt maturity by 3.5% of its means. This result supports our expectation, and it is consistent with El Ghoul et al. (2016a), among others. Regarding ownership variables, Model 2 shows a positive effect of the variable OWNERSHIP_MAIN_SH, which is also economically significant. An increase in one standard deviation of the percentage of ownership held by the largest shareholder increases the debt maturity by 6.51% of its means (model 2). Model 3 shows that there is a curvilinear effect of the variable OWNERSHIP_MAIN_SH. Lower levels of ownership held by the main shareholder are associated with a lower debt maturity, and higher levels with a higher debt maturity, but this effect is not statistically significant. In model 4, HIGH_CONCENTRATION_d has a positive and significant effect (at 1% significance level) on debt maturity, consistent with the argument that a higher ownership concentration reduces agency conflicts and contributes to lengthening debt maturity. An increase in one standard deviation of the variable increases the debt maturity by 12.22% of its means.

In models (5)–(7), we include the interaction term between Big 4 and the ownership structure variables used in previous models to analyse whether these two tools are complementary or substitute corporate governance mechanisms. In Model 5, the interaction between Big 4 and OWNERSHIP_MAIN_SH is positive and statistically significant (at 10% level), meaning that when companies display higher levels of ownership concentration and are audited by Big 4 agency conflicts and information asymmetries are reduced. This result is also

economically significant, because an increase in one standard deviation of the interaction term increases the debt maturity by 3.23% of its means.

Regarding controls, firm's leverage (LEV) is positively and significantly associated with debt maturity, because firms with higher debts may borrow on longer terms due to their higher liquidity risk (Diamond, 1991). Firm size (SIZE) positively affects the fraction of long-term debt in a firm's capital structure, which is consistent with the argument that larger firms face lower information asymmetries, which can facilitate long-term debt financing (Titman and Wessels, 1988). Firms' financial strength (FINANC_STRENGTH) has a negative impact on debt maturity, meaning that such firms are less affected by the risks of short-term debt (Arslan and Karan, 2006).

[Insert Table 3 here]

4.2 Debt maturity, audit quality and type of ownership

The type of controlling shareholder may affect debt maturity decisions. Firms with more concentrated ownership like family firms have, on average, greater risk aversion and longer-term orientation because risky choices may severely affect family wealth (Gomez-Mejia et al., 2011). These aspects facilitate the alignment of interests with lenders. Accordingly, family firms have easier and cheaper access to debt, especially long-term debt (Anderson et al., 2003; Chrisman et al., 2018). Diaz-Díaz et al. (2016) analyse a sample of 4,365 unlisted Spanish large firms and SMEs (from 2004 to 2013) to study the effect of family control on firms' debt maturity structure. They find that family firms get better access to long-term debt, even when exercising control by pyramid structures. However, debts may exacerbate family conflicts in firms where ownership is split in equal proportions among family members (Schulze et al., 2003) and this reduces the willingness to bear additional risk through debt, as the socioemotional wealth perspective suggests (Gomez-Mejia et al., 2011).

Institutional investors as main shareholders are often viewed as beneficial in firm-lender relationships, due to their high involvement in corporate governance they act as ‘delegated monitors’ of the firm (Jensen, 1993). However, the effectiveness of their monitoring activities could be questionable if managers opt for policies aligned with the interests of institutional shareholders, but possibly detrimental to debtholders (Bebchuk et al., 2017; Bebchuk and Hirst, 2019; Schmidt and Fahlenbrach, 2017). Prior research has documented that firms’ institutional ownership may have some adverse effects on the cost of debt (Aslan and Kumar, 2012) and the increase of debt covenants (Zhang and Zhou, 2018). Recently, researchers have highlighted the effects of institutional investors’ heterogeneity (e.g. their investment horizon) on the intensity of delegated monitoring, which affects the cost of equity capital or cost of debt (Attig et al., 2013).

In Table 4, we include the type of shareholders as explanatory variables. In models 1 to 3, we specify ownership held by family firms, institutional and company shareholders. On average, we observe a longer debt maturity when the largest shareholder is a company (whatever the specification used). However, when the largest shareholder is a family member and holds more than 25% of the ownership (FAM_d), debt maturity is shorter (although not statistically significant), which is consistent with the preference of family firms for short-term debt.

Models 4 to 6 include the interaction terms between Big 4 auditor and the type of shareholder. We observe that the interaction term between Big 4 auditor and family firms (Big 4*FAM_d) is positive and significant at 1% level, while the individual variable on family firms negative, as in model 1. This result seems to indicate that while family firms are, on average, associated with shorter debt maturities if a Big 4 audits them, their debt maturity lengthens. Therefore, based on these results, we can assume that a complementary effect between Big 4

auditor and ownership concentration exists, even when the type of shareholder is a family firm. The effect is consistent when other specifications of family ownership are considered.

[Insert Table 4 here]

4.3 Debt maturity, audit quality and ownership structure. Controlling for endogeneity.

The decision of choosing a Big 4 auditor could be endogenous, given that agency conflicts and asymmetric information problems within the firms, and other firms' characteristics, could condition this decision. To control for this possible endogeneity problem, we apply a two-stage least square (2SLS) panel data estimation (Table 5) as follows.

First stage: $BIG_{ij} = \alpha + \beta_1 Ownership_{ij} + \beta_2 Controls_{ij} + \phi IndustryDummy + \varphi YearDummy + \varepsilon_{ij}$

Second stage: $Debt\ Maturity_{ij} = \alpha + \beta_1 Big\ 4_{ij} + \beta_2 Ownership_{ij} + \beta_3 Controls_{ij} + \phi IndustryDummy + \varphi YearDummy + \varepsilon_{ij}$

The first step is a probit model that estimates the determinants of choosing a Big 4 auditor instead of a non-Big 4. The selection of the variables used in the first step estimation was based on prior studies focusing on auditor's choice (e.g. El Ghoul et al. 2016a; Hsu et al. 2018 and Lin and Liu, 2009). The second step analyses the effect of the main variables of interest (the Big 4 and the ownership variables) on debt maturity. In the first stage regression, we observe that firms with higher leverage and larger and older firms with higher growth opportunities prefer to choose a Big 4 auditor instead of a non-Big 4. However, there is a negative impact of financial strength on the Big 4 choice. The longer the auditor served the firm (AUDIT_TENURE), the higher is the likelihood that a Big 4 auditor is selected. In the second stage regression, results show that the Big 4 variable is positively and significantly related to debt maturity in all estimated models. The ownership and the high concentration variables have both a positive and significant effect on debt maturity (at 5% significance level). The fraction

of long-term debt in a firm's capital structure is higher for firms with higher leverage (LEV) and financial strength (FINAC_STRENGTH).

[Insert Table 5 here]

To check the complementary effect of the Big 4 auditor and the ownership concentration variables, after controlling for the possible endogeneity problem of the Big 4 auditor choice, we apply the Heckman model (Table 6). As in Table 5, the first stage shows the determinants of hiring a Big 4 and the second stage shows the determinants of debt maturity when a firm hires a Big 4 auditor. In Table 6, we observe that the effect of family ownership (FAM_d) on debt maturity (second stage) becomes positive when the auditor is a Big 4 supporting the previous complementary effect observed in Table 4. The institutional investor variable (INV_d) also has a positive and significant effect. The rest of the results are consistent with previous regressions. The lambda is significant for all models.

[Insert Table 6 here]

Previous studies also argue that firms choose the level of their leverage and the maturity of their debt simultaneously, which implies that the OLS regressions could be problematic (Barclay et al., 2003) regarding endogeneity. In Table 7, we estimate the generalised method of moments (GMM) that considers the joint determination of maturity and leverage, simultaneously considering Big 4 auditors as endogenous. This methodology, based on Arellano and Bond (1991), allowed us to control for problems of endogeneity by using instruments and presents important benefits. These include panel data suggestions that individuals, firms, states or countries are heterogeneous. The Sargan statistic and tests for the first and second-order serial correlation are reported. The insignificant Hansen tests across all specifications confirm the validity of the instrument. The m1 and m2 statistics consistently indicate serial correlation of order one (as expected) but not of order two. The results are

consistent with previous Tables, showing that Big 4 and ownership concentration have a positive and significant effect on debt maturity.

[Insert Table 7 here]

5. ALTERNATIVE SPECIFICATIONS AND ROBUSTNESS CHECKS

In the Appendix, we report a set of alternative specifications and robustness tests. The first test is aimed at ascertaining whether the GFC has implications for the debt maturity structure of our sample firms. The difficulties faced by SMEs in accessing credit have been exacerbated after the crisis (Almeida et al., 2011; Demirgüç-Kunt et al., 2020), making it even more difficult for such firms to secure long-term debt (Casino-Martinez et al., 2019; D’Amato, 2020; González, 2015). Thus, in Table 2A, we introduce a dummy variable for the GFC, which takes the value one from 2008–2012. We do not find any significant impact of this variable, while all other results are holding¹¹.

Considering the differences observed in the size of the firm, in Table 3A, we re-run the models presented in Table 3 for different sub-samples of firm size (expressed in total asset quartiles). We observe that the effect of Big 4 auditor on debt maturity is conditioned by firm size. Big 4 is positively and significantly associated with debt maturity just for the 2nd quartile of total assets (i.e. for medium-large firms). In Table 4A, we divide the sample into subsamples according to high leverage (2nd. 3rd and 4th quartile) and low leverage (1st quartile). We find that Big 4 is positive in most of the models, although insignificant for both subsamples.

As a robustness check we run a tobit model (Tables 5A). Given that the dependent variable DEBT_MATURITY is truncated at 0 and 1, the tobit estimation could be appropriated. The results show that our core evidence is unaffected by this technique.

¹¹ We also experimented, in an unreported analysis, by comparing the results before and after the crisis period. Still, we do not find any significant impact of the crisis period on AIM firms’ debt maturity.

6. CONCLUSION

In this paper, we have addressed the question of whether ownership structure and the presence of a Big 4 may act as substitutes for short-term debt as monitoring devices to reduce information asymmetries and agency problems. The issue has been explored in a sample of 227 firms, listed on the AIM over the period 1998–2016. We have focused on the effect of two corporate governance mechanisms—the auditor’s quality (i.e., Big 4 auditors) and the ownership structure (i.e. ownership concentration and presence of a large shareholder) on firms’ debt maturity. AIM represents an ideal setting to test the effect of corporate governance mechanisms on firms’ debt maturity because it is characterised by a strong legal and institutional quality and most of the firms are SMEs with high growth opportunities.

Unlike previous studies, we have investigated the combined effect of auditors’ quality and ownership structure on debt maturity, disentangling between different types of ownership. Overall, the evidence lends support to the argument that a concentrated ownership structure and a Big 4 are complementary monitoring tools that jointly help to solve information asymmetry and agency problems. These corporate control mechanisms act together as substitutes for short-term debt and contribute to lengthening debt maturity. Our results are coherent with the previous literature that studied the effect of these two mechanisms on debt maturity, separately.

The analysis shows that a positive and significant relationship is found between Big 4 auditor and debt maturity, consistent with the idea that audit quality contributes to alleviating information asymmetries and agency conflicts in these firms. The result reveals the complementarity effect that firms with more ownership concentration, which are audited by a Big 4 firm, have a longer-term debt maturity structure. Family firms are, on average, associated with shorter debt maturities, except when they choose a Big 4 auditor. However, looking at the

determinants of auditor's choice, we find that family firms are reluctant to hire Big 4 auditors. These results are robust when we control for the possible endogeneity problem of Big 4 auditor's choice.

Our findings offer several implications for SMEs and policymakers. Efforts to access credit should consider that audit quality and a less dispersed ownership structure are important determinants of debt maturity. Therefore, SMEs with high audit quality and more concentrated ownership may emphasise less on other corporate governance mechanisms to reduce information asymmetries and agency problems, as these two components represent credible signals for lenders indicating sound corporate governance and high-quality accounting information. Our results suggest that sound auditing, delivered by reputable firms, constitutes a part of good corporate governance that bolsters the confidence of lenders. In other words, a auditors' reputation substitutes for the fledgling reputation of firms with short credit histories, like SMEs. However, the complementary role played by audit quality and high levels of ownership concentration suggests that firms wishing to access long-term debt should focus on both dimensions. There is a trade-off for SMEs between the costs of implementing quality corporate governance systems and the benefits of easier access to debt markets.

From the perspective of policymakers, taking direct action, for example, through programs or public policies aimed at increasing access to long-term credit, might be a second-best policy choice. Comparatively, policies to sustain the emerging alternative investment markets and to promote the reform of corporate governance practices of SMEs have a more beneficial effect when seeking long-term credit from debt markets. These programs must have distinct national and regional features.

This study furthers the current understanding of the different governance mechanisms that may act as alternative monitoring devices to short-term debt. However, further research on

the topic is required. One challenge for research is to extend the analysis to the implications for privately held firms, by building large panel datasets with detailed information on ownership structures and governance variables matched with accounting data for SMEs. This would provide a more nuanced portrait of the interplay between debt maturity, ownership structures and audit quality. It might also be interesting to perform this analysis by comparing different settings with similar characteristics (e.g. countries where SMEs have high concentration of ownership structures, such as the predominance of families as controlling shareholders), that may represent the baseline for comparing SMEs operating in other institutional settings (e.g. where there is a greater variance in governance practices, enforcement by auditors, ownership concentration, investor protection, and accounting standards and policies).

7. REFERENCES

- Almeida, H., Campello, M., Laranjeira, B., & Weisbenner, S. 2011. Corporate Debt Maturity and the Real Effects of the 2007 Credit Crisis. *Critical Finance Review*, 1: 3-58.
- Altman, E.I. 1968. Financial Ratios, Discriminant Analysis and the Prediction of Corporation Bankruptcy. *The Journal of Finance*, 23: 589–609.
- Anderson, R.C., Mansi, S.A. & Reeb, D.M. 2003. Founding Family Ownership and the Agency Cost of Debt. *Journal of Financial Economics*, 68: 263-285.
- Arellano, M. & Bond, S. 1991. Some Test of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies*, 58: 277-297.
- Arslan, Ö. & Karan, M.B. 2006. Ownership and Control Structure as Determinants of Corporate Debt Maturity: a Panel Study of an Emerging market. *Corporate Governance: An International Review*, 14 (4): 312–324.
- Ashbaugh, H. & Warfield, T.D. 2003. Audits as a Corporate Governance Mechanism: Evidence from the German Market. *Journal of International Accounting Research*, 2(1): 1–21.
- Aslan, H. & Kumar, P. 2012. Strategic Ownership Structure and the Cost of Debt. *The Review of Financial Studies*, 25, (7): 2257–2299.
- Attig, N., El Ghouli, S., Guedhami, O. & Rizeanu, S. 2013. The Governance Role of Multiple Large Shareholders: Evidence from the Valuation of Cash Holdings. *Journal of Management Governance*, 17 (2): 419-451.
- Balvers, R.J., McDonald, B. & Miller, R.E., 1988. Underpricing of New Issues and the Choice of Auditor as a Signal of Investment Banker Reputation. *The Accounting Review*, 63: 605–622.
- Barclay, M.J., Marx, L.M. & Smith, C.W., 2003. The Joint Determination of Leverage and Maturity. *Journal of Corporate Finance*, 9: 149–167.

- Barclay, M.J. & Smith C.W. 1995. The Maturity Structure of Corporate Debt. *Journal of Finance*, 50: 609–631.
- Bebchuk, L. A., Cohen, A., & Hirst, S. 2017. The Agency Problems of Institutional Investors. *Journal of Economic Perspectives*, 31(3): 89-102.
- Bebchuk, L. A., & Hirst, S. 2019. Index Funds and the Future of Corporate Governance: Theory, Evidence, and Policy. *Columbia Law Review*, 119: 2029-2146
- Beck, T., & Demirguc-Kunt, A. 2006. SMEs: access to finance as a growth constraint. *Journal of Banking and Finance*, 30: 2931–2943.
- Beisland, L.A., Mersland, R. & Strøm, R.Ø. 2015. Audit Quality and Corporate Governance: Evidence from the Microfinance Industry. *International Journal of Auditing*, 19: 218–237.
- Billet, M., Dolly King, TR.H. & Mauer, D.C. 2007. Growth Opportunities and the Choice of Leverage, Debt Maturity, and Covenants. *The Journal of Finance*, 62 (2): 697–730.
- Brick I., & Ravid A. 1985. On the Relevance of Debt Maturity Structure. *Journal of Finance*, 40:1423–1437.
- Briozzo, A., Cardone-Riportella, C. & García-Olalla, M. 2019. Corporate Governance Attributes and Listed SMEs' Capital Structure: Evidence from Different Economic Environments. *Corporate Governance: The International Journal of Business in Society*, 19 (4): 735-750.
- Carpenter, R., & Petersen, B. 2002. Is the growth of small firms constrained by internal finance? *Review of Economics and Statistics*, 84(2): 298–309.
- Casino-Martínez, A., López-Gracia, J., Mestre-Barberá, R., & Peiró-Giménez, A. 2019. An Agency Approach to Debt Maturity of Unlisted and Listed Firms in the European Setting. *European Management Journal*, 37(3): 339-352.
- Castro Martins, H., Schiehl, E. & Soares Terra, P.R. 2017. Country-level Governance Quality, Ownership Concentration, and Debt Maturity: A Comparative Study of Brazil and Chile. *Corporate Governance: An International Review*, 25: 236-254.
- Castro Martins, H., Schiehl, E. & Soares Terra, P.R. 2020. Do Shareholder Protection and Creditor Rights have Distinct Effects on the Association between Debt Maturity and Ownership Structure? *Journal of Business Finance & Accounting*, 47: 708-729.
- Chang, X., Dasgupta, S. & Hilary, G. 2009. The Effect of Audit Quality on Financing Decisions. *The Accounting Review*, 84 (4): 1085-1117.
- Cho, S.S., El Ghouli, S., Guedhami, O., & Suh, J. 2014. Creditor Rights and Capital Structure: Evidence from International Data. *Journal of Corporate Finance*, 25: 40–60.
- Choi, J.H., & Wong, T.J. 2007. Auditors' Governance Functions and Legal Environments: An International Investigation. *Contemporary Accounting Research*, 24 (1): 13–46.
- Choi, J.H., Kim, J.B., Liu, X. & Simunic, D. 2008. Audit Pricing, Legal Liability Regimes, and Big4 Premiums: Theory and Cross-country Evidence. *Contemporary Accounting Research*, 25 (1): 55-99.
- Chrisman, J.J., Chua, J.H., Le Breton-Miller, I., Miller, D. & Steier, L.P. 2018. Governance Mechanisms and Family Firms. *Entrepreneurship Theory and Practice*, 42(2): 171-186.
- Christensen, H.B., Liu, L.Y., & Maffett, M.G. 2020. Proactive Financial Reporting Enforcement and Shareholder Wealth. *Journal of Accounting and Economics*, 69 (2-3): 101267.
- Chua, J.H., Chrisman, J.J., Kellermanns, F. & Wu, Z. 2011. Family Involvement and New Venture Debt Financing. *Journal of Business Venturing*, 26: 472-488.
- Cowling, M., Lee, N., Ughetto, E. 2020. The Price of a Disadvantaged Location: Regional Variation in the Supply and Price of Short-term Credit in the UK. *Journal of Small Business Management*, 58 (3): 648-668.

- Custódio, C., Ferreira, M.A. & Laureano, L. 2013. Why are US Firms Using more Short-term Debt? *Journal of Financial Economics*, 108 (1): 182-212.
- D'Amato, A. 2020. Capital Structure, Debt Maturity, and Financial Crisis: Empirical Evidence from SMEs. *Small Business Economics*, 55: 919-941.
- Datta, S., Iskandar-Datta, M. & Raman, K. 2005. Managerial Stock Ownership and the Maturity Structure of Corporate Debt. *The Journal of Finance*, 60 (5): 2333–2350.
- DeAngelo, L.E. 1981. Auditor Size and Audit Quality. *Journal of Accounting and Economics*, 3: 183–199.
- Dechow, P.M., Ge, W. & Schrand, C. 2010. Understanding Earnings Quality: A Review of the Proxies, their Determinants and their Consequences. *Journal of Accounting and Economics*, 50 (2–3): 344–401.
- De Meyere, M., Vander Bauwhede, H., Van Cauwenberge, P. 2018. The Impact of Financial Reporting Quality on Debt Maturity: the Case of Private Firms. *Accounting and Business Research*, 48(7): 759-781.
- Demirgüç-Kunt, A., Martinez Peria, M.S., Tressel, T. 2020. The Global Financial Crisis and the Capital Structure of Firms: Was the Impact more Severe among SMEs and Non-Listed Firms? *Journal of Corporate Finance*, 60: 295-336.
- Demirgüç-Kunt, A. & Maksimovic, V. 1999. Institutions, Financial Markets, and Firm Debt Maturity. *Journal of Financial Economics*, 54 (3): 295-336.
- Diamond, D.W. 1991. Debt Maturity Structure and Liquidity Risk. *Quarterly Journal of Economics*, 106 (3): 709-737.
- Díaz-Díaz, N.L., García-Teruel, J.P. & Martínez-Solano, P. 2016. Debt Maturity Structure in Private Firms: Does the Family Control Matter? *Journal of Corporate Finance*, 37: 393-411.
- Dixon, W.J. 1960. Simplified Estimation from Censored Normal Samples. *Annals of Mathematical Statistics*, 31 (2): 385–391.
- El Ghoul, S., Guedhami, O., Pittman, J.A. & Rizeanu, S. 2016a. Cross Country Evidence on the Importance of Auditor Choice to Corporate Debt Maturity. *Contemporary Accounting Research*, 33 (2): 718-51.
- El Ghoul, S., Guedhami, O., & Pittman, J.A. 2016b. Cross-Country Evidence on the Importance of Big Four Auditors to Equity Pricing: The Mediating Role of Legal Institutions. *Accounting, Organizations and Society*, 54: 60-81.
- European Auditor Law (2014/56/UE) <http://eur-lex.europa.eu/legal-content/ES/TXT/?uri=CELEX:32014L0056>
- Faccio, M. & Lang, L.H.P. 2002. The Ultimate Ownership of Western European Corporations. *Journal of Financial Economics*, 65: 365–395.
- Fama, E.F. & Jensen, M.C. 1983. Separation of Ownership and Control. *Journal of Law and Economics*, 26 (2): 301-325.
- Fan, O P.H. & Wong, T.J. 2005. Do External Auditors Perform a Corporate Governance Role in Emerging Markets? Evidence from East Asia. *Journal of Accounting Research*, 43 (1): 35-72.
- Feito-Ruiz, I., Cardone-Riportella, C. & Menéndez-Requejo, S. 2016. Reverse Takeover: The Moderating Role of Family Ownership. *Applied Economics*, 48 (42): 4051-4065.
- Francis, J. & Wang, D. 2008. The Joint Effect of Investor Protection and Big4 Audits on Earning Quality around the World. *Contemporary Accounting Research*, 25 (9): 157-191.
- Francis, J. R. 2004. What do we Know about Audit Quality? *The British Accounting Review*, 36 (4): 345–368.

- Francis, J. R. & Wilson, E. R. 1988. Auditor Changes: A Joint Test of Theory relating to Agency Costs and Auditor Differentiation. *The Accounting Review*, 63: 663–682.
- Friend, I. & Lang, I.H.P. 1988. An Empirical Test on the Impact of Managerial Self-Interest on Corporate Capital Structure. *Journal of Finance*, 42: 271–282.
- García-Teruel, P.J., Martínez-Solano, P. 2010. Ownership Structure and Debt Maturity: New Evidence from Spain. *Review of Quantitative Finance and Accounting*, 35: 473-491.
- Gerakos, J., Lang, M. & Maffett M.G. 2013. Post-listing Performance and Private Sector Regulation: The Experience of London's Alternative Investment Market. *Journal of Accounting and Economics*, 56 (2/3): 189–215.
- Gomez-Mejia, L.R., Cruz, C., Berrone, P., & DeCastro, J. 2011. The Bind that Ties: Socioemotional Wealth Preservation in Family Firms. *Academy of Management Annals*, 5 (1): 653–707.
- González, V.M. 2015. The Financial Crisis and Corporate Debt Maturity: the Role of Banking Structure. *Journal of Corporate Finance*, 35: 310-328.
- Graham, J.R., 1996. Debt and the Marginal Tax Rate. *Journal of Financial Economics*, 41: 41-73.
- Graham, J.R., Li, S. & Qiu, J. 2008. Corporate Misreporting and Bank Loan Contracting. *Journal of Financial Economics*, 89 (1): 44-61.
- Guedhami, O., Pittman, J. A. & Saffar, W. 2009. Auditor Choice in Privatized Firms: Empirical Evidence on the Role of State and Foreign Owners. *Journal of Accounting & Economics*, 48 (2–3): 151–71.
- Guney, Y. & Ozkan, A. 2005. New Insights on the Importance of Agency Costs for Corporate Debt Maturity Decisions. *Applied Financial Economics Letters*, 1: 233–238.
- Harford, J., Li, K. & Zhao, X. 2008. Corporate Boards and the Leverage and Debt Maturity Choices. *International Journal of Corporate Governance*, 1 (1): 3-27.
- Hartarska, V. 2009. The Impact of Outside Control in Microfinance. *Managerial Finance*, 35 (12): 975–89.
- Hay, D., Knechel, W.R. & Wong, N. 2006. Audit Fees: A Meta-Analysis of the Effect of Supply and Demand Attributes. *Contemporary Accounting Research*, 23 (1): 141–191.
- Hay, D. 2013. Further Evidence from Meta-Analysis of Audit Fee Research. *International Journal of Auditing*, 17 (2): 162–176.
- Hope, O.K., Kang, T., Thomas, W. & Yoo, Y.K. 2008. Culture and Auditor choice: A Test of the Secrecy Hypothesis. *Journal of Accounting & Public Policy*, 27 (5): 357–373.
- Hsu, H.H., Lin, C.H. & Tsao, S.M. 2018. Founding Family and Auditor Choice: Evidence from Taiwan. *Corporate Governance: An International Review*, 26 (2): 118-142.
- Jensen, M.C. 1993. The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems. *The Journal of Finance*, 48 (3): 831-880.
- Jensen, M.C. 1986. Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, 76: 323-329.
- Johnson, S. 2003. Debt Maturity and the Effects of Growth Opportunities and Liquidity Risk on Leverage. *Review Financial Studies*, 16: 209-236.
- Jun, S.G. & Jen, F.C. 2003. Trade-off Model of Debt Maturity Structure. *Review of Quantitative Finance and Accounting*, 20 (1): 5–34
- Kane, A., Marcus, A.J. & McDonald, R.L. 1985. Debt Policy and the Rate of Return Premium to Leverage. *Journal of Financial and Quantitative Analysis*, 20: 479-499.
- Karjalainen, J. 2011. Audit Quality and Cost of Debt Capital for Private Firms: Evidence from Finland. *International Journal of Auditing*, 15: 88-108.

- Khan, A., Badrul Muttakin, M., Siddiqui, J. 2015. Audit Fees, Auditor Choice and Stakeholder Influence: Evidence from a Family-Firm Dominated Economy. *The British Accounting Review*, 47(3): 304-320.
- Kim, J.B., Simunic, D.A. Stein, M.T. & Yi, C.H. 2011. Voluntary Audits and the Cost of Debt Capital for Privately Held Firms: Korean Evidence. *Contemporary Accounting Research*, 28 (2): 585-615.
- Knechel, W.R., Niemi, L. & Sundgren, S. 2008. Determinants of Auditor Choice: Evidence from a Small Client Market. *International Journal of Auditing*, 12 (1): 65–88.
- Krishnan, J. & Schauer, P.C. 2000. The Differentiation of Quality among Auditors: Evidence from the Not-for-Profit Sector. *Auditing: A Journal of Practice and Theory*, 19 (2): 9–25.
- La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. 1999. Corporate Ownership Around the World. *Journal of Finance*, 54(2): 471-517.
- La Porta, R., López de Silanes, F., Shleifer, A. & Vishny, R. 2002. Investor Protection and Corporate Valuation. *Journal of Finance*, 57(3): 1147-1170.
- Lardon, A. & Deloof, M. (2014). Financial Disclosure by SMEs Listed on a Semi-Regulated Market: Evidence from the Euronext Free Market, *Small Business Economics*, 42: 361-385.
- Lennox, C.S., Francis, J. R., & Wang, Z. 2011. Selection Models in Accounting Research. *The Accounting Review*, 87(2): 589–616.
- Leuz, C., Lins, K.V. & Warnock, F.E. 2009. Do Foreigners invest less in Poorly Governed Firms? *Review of Financial Studies*, 22 (8): 3245–3285.
- Li, J., Wu, Z., Zhang, I. 2019. Family Involvement, External Auditing, and the Cost of Debt: Evidence from U.S. Small Firms. *Journal of Small Business Management*, <https://doi.org/10.1111/jsbm.12519>
- Mallin, C. & Ow-Yong, K. 1998. Corporate Governance in Small Companies. The Alternative Investment Market. *Corporate Governance: An International Review*, 6 (4): 224-232.
- Mallin, C. & Ow-Yong, K. 2012. Factors influencing Corporate Governance Disclosures: Evidence from Alternative Investment Market (AIM) Companies in the UK. *The European Journal of Finance*, 18 (6): 515-533.
- Mande, V., Park, YK. & Son, M. 2012. Equity or Debt Financing: Does Good Corporate Governance Matter? *Corporate Governance: An International Review Corporate*, 20 (2): 195–211.
- Marchica, M.T. 2008. On the Relevance of Ownership Structure in Determining the Maturity of Debt EFA 2007. *Ljubljana Meetings Paper*.
- Martins, H.C., Schiehl, E. & Terra, P.R.S. 2017. Country-level Governance Quality, Ownership Concentration, and Debt Maturity: A Comparative Study of Brazil and Chile. *Corporate Governance: An International Review*, 25 (4): 236-254.
- Mendoza, J., 2008. Securities Regulation in Low-tier Listing Venues: the Rise of the Alternative Investment Market. *Fordham Journal of Corporate and Financial Law*, 12: 257–328.
- Menon, K. & Williams, D.D., 2016. Audit Report Restrictions in Debt Covenants. *Contemporary Accounting Research*, 33(2), 682–717.
- Myers, S.C. 1977. Determinants of Corporate Borrowing. *Journal of Financial Economics*, 5: 147-175.
- Niskanen, M., Karjalainen, J. & Niskanen J. 2010. The Role of Auditing in Small, Private Family Firms: is it about Quality and Credibility? *Family Business Review*, 23(3): 230-245.
- Ozkan, A. 2000. An Empirical Analysis of Corporate Debt Maturity Structure. *European Financial Management*, 6: 197-212.

- Pindado, J., Requejo, I. & de la Torre, C. 2015. Does Family Control shape Corporate Capital Structure? An Empirical Analysis of Eurozone Firms. *Journal of Business Finance & Accounting*, 42: 965-1006.
- Pittman, J.A., Fortin, S. 2004. Auditor Choice and the Cost of Debt Capital for Newly Public Firms. *Journal of Accounting and Economics*, 37: 113-136.
- Rajan, R., & Winton, A. 1995. Covenants and Collateral as Incentives to Monitor. *Journal of Finance*, 50 (4): 1113–1146.
- Robin, A., Wu, Q. & Zhang, H. 2017. Auditor Quality and Debt covenants. *Contemporary Accounting Research*, 34 (1): 154-185.
- Scherr, F.C. & Hulburt, H.M. 2001. The Debt Maturity Structure of Small Firms. *Financial Management*, 30 (1): 85-111.
- Schmidt, C., & Fahlenbrach, R. 2017. Do Exogenous Changes in Passive Institutional Ownership affect Corporate Governance and Firm Value? *Journal of Financial Economics*, 124(2): 285-306.
- Schulze, W.G., Lubatkin, M.H., & Dino, R.N. 2003. Exploring the Agency Consequences of Ownership Dispersion among the Directors of Private Family Firms. *Academy of Management Journal*, 46(2): 179–203.
- Shleifer, A. & Vishny, R.W. 1986. Large Shareholders and Corporate Control. *Journal of Political Economy*, 94 (3): 461-488.
- Shleifer, A. & Vishny, R.W. 1997. A Survey of Corporate Governance. *The Journal of Finance*, 52: 737-783.
- Stulz, R. 2000. Does Financial Structure matter for Economic Growth? A Corporate Finance Perspective. *International Review of Finance*, 1 (1): 11-38.
- Titman, S. & Wessels, R.. 1988. The Determinants of Capital Structure Choice. *The Journal of Finance*, 43 (1): 1–19.
- Ughetto, E. 2008. Does finance matter for R&D investment? New evidence from a panel of Italian firms, *Cambridge Journal of Economics*, vol.32(6), pp.907-925
- Van Caneghem, T. & Van Campenhout, G. 2010. Quantity and Quality of Information and SME Financial Structure. *Small Business Economics*, 39 (2): 341–358.
- Zhang, X., & Zhou, S. 2018. Bond Covenants and Institutional Blockholding. *Journal of Corporate Finance*, 96: 136-152.

8. TABLES

Table 1. Description of the variables

<i>Dependent Variable</i>		<i>Source</i>	
DEBT MATURITY	Long-term debt to total debt	DataStream	
<i>Independent Variables</i>		<i>Notation</i>	<i>Source</i>
Audit Quality	Dummy variable that is equal to one if the firm is client of one of the Big4 audit international firms (i.e. KPMG, Deloitte, PricewaterhouseCoopers and Ernst & Young) and 0 otherwise	BIG4	Capital IQ
	The natural logarithm of audit fees	AUDIT_FEE	Datastream
	Financial accruals is calculated as financial accruals in year t minus financial accruals in year t-1 deflated by average total asset.	FIN_ACC	Datastream
Ownership & Concentration	The percentage of ownership held by the major shareholder	OWNERSHIP_MAIN_SH	Amadeus
	Dummy variable that is equal to one if the percentage of ownership held by the major shareholder is in the 2 nd , 3 rd and 4 th quartiles and 0 otherwise.	HIGH_CONCENTRATION_d	Amadeus
	Dummy variable that is equal to 1 if the largest shareholder is a family member and holds more than 25% of the ownership and 0 otherwise	FAM_d	Amadeus
	Dummy variable that is equal to 1 if the largest shareholder is an institutional investor and holds more than 25% of the ownership and 0 otherwise	INV_d	Amadeus
	Dummy variable that is equal to 1 if the largest shareholder is a company and holds more than 25% of the ownership and 0 otherwise	COMP_d	Amadeus
	The percentage of family ownership in the firm by the largest shareholder (holding more than 25% of ownership)	OWNERSHIP_FAM	Amadeus
	The percentage of institutional investors' ownership in the firm by the largest shareholder (holding more than 25% of ownership)	OWNERSHIP_INV	Amadeus
	The percentage of company ownership in the firm by the largest shareholder (holding more than 25% of ownership)	OWNERSHIP_COMP	Amadeus
Dummy variable that is equal to 1 if the top three shareholders are family members and hold (in sum) more than 25% of the firm ownership and 0 otherwise	BLOCK_FAM_d	Amadeus	

	Dummy variable that is equal to 1 if the top three shareholders are institutional investors and hold (in sum) more than 25% of the firm ownership and 0 otherwise	BLOCK_INV_d	Amadeus
	Dummy variable that is equal to 1 if the top three shareholders are companies and hold (in sum) more than 25% of the firm ownership and 0 otherwise	BLOCK_COMP_d	Amadeus
<i>Control Variable</i>			<i>Source</i>
Leverage	Total debt divided by total assets	LEV	Datastream
Profitability	EBITDA divided by total assets	ROA	Datastream
Earning volatility	Standard deviation of ROA	EARN_VOLATILITY	Datastream
Tangible assets	Tangible assets divided by total assets	TANG	Datastream
Firm Size	Logarithm of total assets	SIZE	Datastream
Firm Age	Logarithm number of years since the firm's inception year	AGE	Datastream
Growth Opportunities	Market value to book value ratio	MARKET_TO_BOOK	Datastream
Financial Strength (Z-score_secure)	Dummy variable that takes the value of 1 if the Altman Z-Score is higher than 2.99 and 0 otherwise. Z-score is calculated as follows: $Z=1.2*WCTA+1.4*RETA+3.3*EBITTA+0.6*BVRTD+1*STA$ (WCTA=working capital/total assets; RETA=retained earnings /total assets; EBITTA=ebit/total assets; BVRTD=market value of equity/total liabilities; STA=sales/total assets)	FINANC_STRENGTH	Datastream
Tax	Total tax charge divided by pre-tax profits.	TAX	Datastream
Spread	Difference between the yields on 10-year government bonds and three-month Treasury bills	SPREAD	OECD
Number of Board Directors	Number of board directors	BOARD_SIZE	Capital IQ
Audit tenure	Number of years the auditor is providing the service to the firm	AUDIT_TENURE	Capital IQ

Table 2. Descriptive Statistics

The Table shows the mean and median value, the standard deviation, minimum and maximum values of the considered variables (PANEL A). The Table also reports the mean comparison t-test (pearson's χ^2 test) conducted to statistically compare the means of the considered variables between two groups of firms: firms audited by a Big4 auditing firm and firms not audited by a Big4 (PANEL B). Panel C provides the t-test of differences of debt maturity by disentangling among different sub-samples of firm size. All variables are winsorized at 99% and 1% levels. For the sake of brevity, variable definitions are provided in Table 1.

Panel A.

Variable	Obs.	Mean	Median	Std. Dev	Min	Max
Firms' characteristics						
DEBT_MATURITY	1.155	0.503	0.503	0.363	0	1
BIG4	1.155	0.307	0.307	0.462	0	1
OWNERSHIP_MAIN_SH	1.155	0.198	0.198	0.158	0.001	1
HIGH_CONCENTRATION_d	1.155	0.742	0.742	0.438	0	1
FAM_d	1.155	0.115	0.115	0.319	0	1
INV_d	1.155	0.0476	0.0476	0.213	0	1
COMP_d	1.155	0.0727	0.0727	0.260	0	1
LEV	1.155	0.192	0.192	0.294	0	3.714
ROA	1.155	-0.0458	-0.0458	0.579	-12.75	1.165
EARN_VOLATILITY	1.155	0.501	0.501	2.631	0.00912	37.68
TANG	1.155	0.738	0.738	0.248	0.0224	1
SIZE	1.155	58.834	58.834	94.110	196	846.888
AGE	1.155	25.53	25.53	31.12	1	123
MARKET_TO_BOOK	1.155	1.788	1.788	1.283	0.190	5.480
FINANC_STRENGTH	1.155	0.0892	0.0892	0.285	0	1
TAX	1.155	0.167	0.167	0.177	0	0.664
SPREAD	1.155	1.176	1.176	1.389	-0.991	2.925
BOARD_SIZE	1.155	6.181	6.181	5.522	0	20
AUDIT_TENURE	1.155	8.448	8.448	3.647	1	15

Panel B.

Variable	Big4=1		Big4=0		Diff (t-test)
	Obs.	Mean	Obs.	Mean	
Firms' characteristics					
DEBT_MATURITY	355	0.574	800	0.472	(p=0.0000)***
OWNERSHIP_MAIN_SH	355	0.198	800	0.199	(p=0.5972)
HIGH_CONCENTRATION_d	355	0.786	800	0.723	(p=0.0282)**
FAM_d	355	0.0817	800	0.130	(p=0.0176)**
INV_d	355	0.0479	800	0.0475	(p=0.9773)
COMP_d	355	0.0958	800	0.0625	(p=0.0446)*
LEV	355	0.193	800	0.192	(p=0.9769)
ROA	355	0.0340	800	-0.0812	(p=0.0018)**
EARN_VOLATILITY	355	0.195	800	0.636	(p=0.0085)***
TANG	355	0.764	800	0.727	(p=0.0179)**
SIZE	355	99.141	800	40.948	(p=0.0000)***
AGE	355	34.32	800	21.63	(p=0.0000)***
MARKET_TO_BOOK	355	1.815	800	1.776	(p=0.6329)
FINANC_STRENGTH	355	0.0817	800	0.0925	(p=0.5524)
TAX	355	0.203	800	0.151	(p=0.0000)***
SPREAD	355	1.191	800	1.169	(p=0.8079)
BOARD_SIZE	355	6.065	800	6.232	(p=0.6341)
AUDIT_TENURE	355	10.12	800	7.704	(p=0.0000)***

Panel C.

Variable	All		Big4=1		Big4=0		Diff (t-test)
	Obs.	Mean	Obs.	Mean	Obs.	Mean	
DEBT MATURITY							
ALL	1155	0.50	355	0.57	800	0.47	(p=0.0000)***
1 st Quartile Total Assets	289	0.44	34	0.52	255	0.43	(p=0.1960)
2 nd Quartile Total Assets	289	0.43	55	0.46	234	0.42	(p=0.4243)
3 rd Quartile Total Assets	289	0.55	103	0.64	186	0.50	(p=0.0015)***
4 th Quartile Total Assets	289	0.60	163	0.59	125	0.62	(p=0.3659)
1 st Quartile Leverage	289	0.44	79	0.44	210	0.44	(p=0.9989)
2 nd Quartile Leverage	289	0.46	76	0.52	213	0.45	(p=0.1165)
3 rd Quartile Leverage	289	0.51	98	0.60	191	0.47	(p=0.0016)***
4 th Quartile Leverage	289	0.59	102	0.69	186	0.54	(p=0.0004)***
1 st Quartile Ownership	289	0.43	74	0.51	215	0.41	(p=0.0307)**
2 nd Quartile Ownership	289	0.55	105	0.57	184	0.54	(p=0.3774)
3 rd Quartile Ownership	289	0.51	94	0.55	195	0.49	(p=0.1266)
4 th Quartile Ownership	288	0.52	82	0.65	206	0.47	(p=0.0001)***

Table 3. Debt maturity, audit quality and ownership structure

The Table shows the determinants of long-term debt using ordinary least squares (OLS). Dependent variable: DEBT_MATURITY defined as long-term debt over total debt. For the sake of brevity, variable definitions are provided in Table 1. We also include interaction terms between Big4 auditor and ownership variables from model (5) to model (7). All variables are winsorized at 99% and 1% levels.

Indep. Var.	(1) OLS Debt Maturity	(2) OLS Debt Maturity	(3) OLS Debt Maturity	(4) OLS Debt Maturity	(5) OLS Debt Maturity	(6) OLS Debt Maturity	(7) OLS Debt Maturity
BIG4	0.0577** (2.15)	0.0581** (2.17)	0.0580** (2.16)	0.0549** (2.05)	0.0046 (0.11)	0.0140 (0.23)	0.0429 (0.87)
OWNERSHIP_MAIN_SH		0.1652** (2.34)	-0.0068 (-0.04)		0.0899 (1.10)	-0.0322 (-0.15)	
OWNERSHIP_MAIN_SH_SQ			0.2349 (0.99)			0.1710 (0.61)	
HIGH_CONCENTRATION_d				0.0829*** (3.38)			0.0786*** (2.76)
BIG4*OWNERSHIP_MAIN_SH					0.2677* (1.80)	0.1920 (0.45)	
BIG4*OWNERSHIP_MAIN_SH_SQ						0.0835 (0.16)	
BIG4*HIGH_CONCENTRATION_d							0.0157 (0.29)
LEV	0.1462*** (3.69)	0.1314*** (3.28)	0.1233*** (3.01)	0.1436*** (3.64)	0.1293*** (3.23)	0.1226*** (3.00)	0.1438*** (3.64)
ROA	0.0248 (1.17)	0.0231 (1.09)	0.0233 (1.10)	0.0215 (1.02)	0.0232 (1.10)	0.0234 (1.10)	0.0216 (1.02)
EARN_VOLATILITY	-0.0047 (-1.13)	-0.0046 (-1.12)	-0.0046 (-1.12)	-0.0051 (-1.23)	-0.0046 (-1.11)	-0.0046 (-1.12)	-0.0051 (-1.23)
TANG	0.0316 (0.60)	0.0256 (0.49)	0.0277 (0.53)	0.0228 (0.44)	0.0337 (0.64)	0.0355 (0.68)	0.0233 (0.44)
SIZE	0.0461*** (4.37)	0.0452*** (4.30)	0.0448*** (4.26)	0.0459*** (4.37)	0.0452*** (4.30)	0.0450*** (4.27)	0.0458*** (4.37)
AGE	0.0054 (0.39)	0.0019 (0.14)	0.0008 (0.06)	0.0031 (0.23)	0.0012 (0.09)	0.0001 (0.01)	0.0031 (0.23)
MARKET_TO_BOOK	0.0188* (1.88)	0.0161 (1.60)	0.0152 (1.51)	0.0184* (1.85)	0.0166* (1.65)	0.0158 (1.57)	0.0184* (1.85)
FINANC_STRENGTH	-0.1692*** (-3.94)	-0.1758*** (-4.09)	-0.1788*** (-4.15)	-0.1638*** (-3.83)	-0.1814*** (-4.22)	-0.1840*** (-4.26)	-0.1639*** (-3.83)
TAX	0.0597 (0.89)	0.0572 (0.86)	0.0575 (0.86)	0.0552 (0.83)	0.0595 (0.89)	0.0598 (0.90)	0.0547 (0.82)
SPREAD	-0.0200 (-1.10)	-0.0224 (-1.23)	-0.0227 (-1.25)	-0.0217 (-1.20)	-0.0232 (-1.28)	-0.0232 (-1.28)	-0.0219 (-1.21)
Constant	0.0675 (0.46)	0.0678 (0.46)	0.0983 (0.65)	0.0259 (0.18)	0.0806 (0.55)	0.1023 (0.68)	0.0296 (0.20)
Observations	1.155	1.155	1.155	1.155	1.155	1.155	1.155
R-squared	0.16	0.17	0.17	0.17	0.17	0.17	0.17
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes

T-statistics are in parentheses *** p<0.01. ** p<0.05. * p<0.10

Table 4. Debt maturity, audit quality and ownership structure (Type of shareholder)

The Table shows the determinants of long-term debt using ordinary least squares (OLS). Dependent variable: DEBT_MATURITY defined as long-term debt over total debt. For the sake of brevity, variable definitions are provided in Table 1. We also include interaction terms between Big4 auditor and type of shareholder variables from model (4) to model (6). All variables are winsorized at 99% and 1% levels.

Indep. Var.	(1) OLS Debt Maturity	(2) OLS Debt Maturity	(3) OLS Debt Maturity	(4) OLS Debt Maturity	(5) OLS Debt Maturity	(6) OLS Debt Maturity
BIG4	0.0547** (2.04)	0.0501* (1.87)	0.0639** (2.29)	0.0272 (0.93)	0.0061 (0.14)	0.0454 (1.25)
FAM_d	-0.0484 (-1.41)			-0.1129*** (-2.90)		
INV_d	-0.0044 (-0.09)			-0.0394 (-0.67)		
COMP_d	0.1020** (2.44)			0.1164** (2.18)		
OWNERSHIP_FAM		0.0167 (0.19)			-0.1141 (-1.18)	
OWNERSHIP_INV		0.2043* (1.77)			0.1939 (1.53)	
OWNERSHIP_COMP		0.3334*** (3.85)			0.3720*** (3.29)	
BLOCK_FAM_d			0.0063 (0.22)			-0.0459 (-1.38)
BLOCK_INV_d			0.0423 (1.61)			0.0549* (1.73)
BLOCK_COMP_d			0.0874** (2.23)			0.0909* (1.84)
BIG4*FAM_d				0.2706*** (3.40)		
BIG4*INV_d				0.1207 (1.07)		
BIG4*COMP_d				-0.0245 (-0.29)		
BIG4*OWNERSHIP_FAM					0.6254*** (2.97)	
BIG4*OWNERSHIP_INV					0.1118 (0.39)	
BIG4*OWNERSHIP_COMP					-0.0339 (-0.19)	
BIG4*BLOCK_FAM_d						0.2324*** (3.38)
BIG4*BLOCK_INV_d						-0.0527 (-0.96)
BIG4*BLOCK_COMP_d						-0.0014 (-0.02)
LEV	0.1316*** (3.29)	0.1188*** (2.94)	0.1616*** (3.21)	0.1238*** (3.11)	0.1160*** (2.88)	0.1587*** (3.17)
ROA	0.0249 (1.17)	0.0256 (1.21)	0.0260 (1.17)	0.0260 (1.23)	0.0263 (1.25)	0.0267 (1.21)
EARN_VOLATILITY	-0.0047 (-1.13)	-0.0047 (-1.15)	-0.0031 (-0.63)	-0.0046 (-1.12)	-0.0048 (-1.17)	-0.0032 (-0.67)
TANG	0.0277 (0.53)	0.0249 (0.48)	-0.0007 (-0.01)	0.0371 (0.71)	0.0359 (0.69)	0.0068 (0.12)
SIZE	0.0441*** (4.19)	0.0421*** (4.00)	0.0376*** (3.31)	0.0428*** (4.06)	0.0428*** (4.07)	0.0380*** (3.35)
AGE	0.0072 (0.52)	0.0038 (0.28)	0.0009 (0.06)	0.0093 (0.68)	0.0060 (0.44)	0.0036 (0.25)
MARKET_TO_BOOK	0.0167* (1.67)	0.0135 (1.35)	0.0141 (1.31)	0.0155 (1.56)	0.0123 (1.23)	0.0128 (1.19)
FINANC_STRENGTH	-0.1740*** (-4.06)	-0.1815*** (-4.23)	-0.1509*** (-3.32)	-0.1675*** (-3.91)	-0.1736*** (-4.04)	-0.1386*** (-3.04)
TAX	0.0533 (0.80)	0.0577 (0.87)	0.0652 (0.93)	0.0373 (0.56)	0.0418 (0.63)	0.0522 (0.75)
SPREAD	-0.0202 (-1.11)	-0.0230 (-1.27)	-0.0111 (-0.53)	-0.0214 (-1.19)	-0.0248 (-1.37)	-0.0149 (-0.71)
Constant	0.0864 (0.59)	0.0904 (0.62)	0.1415 (0.88)	0.1080 (0.73)	0.0827 (0.56)	0.1429 (0.89)
Observations	1.155	1.155	1.055	1.155	1.155	1.055
R-squared	0.17	0.18	0.18	0.18	0.19	0.19
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes

T-statistics are in parentheses *** p<0.01. ** p<0.05. * p<0.10

Table 5. Debt maturity, audit quality choice and ownership structure (controlling endogeneity, 2SLS)

The Table shows the determinants of auditor's choice (1st stage) and the determinants of long-term debt (2nd stage) following the two least squares (2SLS) panel data estimation. Dependent variable: BIG4 defined as a dummy variable that takes the value of 1 if the auditor is a Big4 (1st stage) and DEBT_MATURITY defined as long-term debt over total debt (2nd stage). For the sake of brevity, variable definitions are provided in Table 1. All variables are winsorized at 99% and 1% levels.

Indep.Var.	(1) 1° Stage Big4 (t-1)	(2) 2° Stage Debt Maturity	(3) 1° Stage Big4 (t-1)	(4) 2° Stage Debt Maturity	(5) 1° Stage Big4 (t-1)	(6) 2° Stage Debt Maturity	(7) 1° Stage Big4 (t-1)	(8) 2° Stage Debt Maturity
BIG4		0.3902* (1.94)		0.3992* (1.82)		0.4016* (1.83)		0.4015* (1.88)
OWNERSHIP_MAIN_SH			-0.0899 (-1.09)	0.1734** (2.29)	-0.0346 (-0.16)	0.1028 (0.53)		
OWNERSHIP_MAIN_SH_SQ					-0.0750 (-0.27)	0.0982 (0.40)		
HIGH_CONCENTRATION_d							0.0440 (1.52)	0.0568** (2.29)
LEV	0.0954** (2.08)	0.1432*** (3.02)	0.1036** (2.23)	0.1319*** (2.72)	0.1059** (2.24)	0.1281*** (2.61)	0.0930** (2.03)	0.1411*** (2.95)
ROA	-0.0322 (-1.28)	0.0307 (1.42)	-0.0319 (-1.27)	0.0293 (1.36)	-0.0318 (-1.27)	0.0293 (1.36)	-0.0330 (-1.31)	0.0283 (1.31)
EARN_VOLATILITY	-0.0051 (-1.05)	-0.0060 (-1.09)	-0.0052 (-1.07)	-0.0058 (-0.99)	-0.0052 (-1.07)	-0.0058 (-0.99)	-0.0051 (-1.05)	-0.0060 (-1.04)
TANG	0.0283 (0.51)	-0.0454 (-0.73)	0.0309 (0.56)	-0.0540 (-0.83)	0.0304 (0.55)	-0.0533 (-0.82)	0.0271 (0.49)	-0.0496 (-0.77)
SIZE	0.1149*** (11.74)	-0.0012 (-0.05)	0.1157*** (11.79)	-0.0046 (-0.17)	0.1158*** (11.79)	-0.0050 (-0.18)	0.1141*** (11.64)	-0.0039 (-0.15)
AGE	0.0331** (2.40)	-0.0181 (-1.07)	0.0344** (2.48)	-0.0190 (-1.06)	0.0348** (2.50)	-0.0194 (-1.08)	0.0322** (2.33)	-0.0186 (-1.06)
MARKET_TO_BOOK	0.0428*** (3.77)	0.0057 (0.51)	0.0441*** (3.86)	0.0049 (0.44)	0.0444*** (3.87)	0.0045 (0.41)	0.0418*** (3.68)	0.0057 (0.52)
FINANC_STRENGTH	-0.1220*** (-2.61)	-0.0938** (-2.14)	-0.1194** (-2.55)	-0.0962** (-2.20)	-0.1190** (-2.54)	-0.0971** (-2.21)	-0.1180** (-2.52)	-0.0893** (-2.04)
TAX	0.0573 (0.73)	-0.0119 (-0.18)	0.0569 (0.73)	-0.0037 (-0.06)	0.0571 (0.73)	-0.0041 (-0.06)	0.0559 (0.72)	-0.0086 (-0.13)
SPREAD	-0.0141 (-0.56)	-0.0438 (-1.61)	-0.0127 (-0.51)	-0.0497* (-1.84)	-0.0127 (-0.50)	-0.0489* (-1.81)	-0.0157 (-0.63)	-0.0500* (-1.84)
BOARD_SIZE	-0.0008 (-0.36)		-0.0011 (-0.47)		-0.0011 (-0.48)		-0.0009 (-0.40)	
AUDIT_TENURE	0.0269*** (7.58)		0.0266*** (7.49)		0.0265*** (7.45)		0.0270*** (7.63)	
Constant	-1.2015*** (-9.41)	0.5272** (2.25)	-1.1999*** (-9.40)	0.5409** (2.21)	-1.2077*** (-9.22)	0.5533** (2.27)	-1.2156*** (-9.51)	0.5192** (2.15)
Observations	1.102	1.102	1.102	1.102	1.102	1.102	1.102	1.102
# Firms	224	224	224	224	224	224	224	224
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald Chi2	54.29	54.29	53.88	53.88	54.15	54.15	46.77	56.77

T-statistics are in parentheses *** p<0.01. ** p<0.05. * p<0.10

Table 6. Debt maturity, audit quality choice and ownership structure (controlling endogeneity, Heckman Model)

The Table shows the determinants of auditor's choice (1st stage) and the determinants of long-term debt (2nd stage) following the Heckman (1979) model in two steps. Dependent variable: BIG4 defined as a dummy variable that takes the value of 1 if the auditor is a Big4 (1st stage) and DEBT_MATURITY defined as long-term debt over total debt (2nd stage). For the sake of brevity, variable definitions are provided in Table 1. All variables are winsorized at 99% and 1% levels.

Ind.Var	(1) 2° Stage Debt Maturity	(2) 1° Stage Big4 (t-1)	(3) 2° Stage Debt Maturity	(4) 1° Stage Big4 (t-1)	(5) 2° Stage Debt Maturity	(6) 1° Stage Big4 (t-1)	(7) 2° Stage Debt Maturity	(8) 1° Stage Big4 (t-1)
OWNERSHIP_MAIN_SH	0.1632 (1.28)	0.2442 (0.83)	0.6869* (1.89)	-0.1153 (-0.14)				
OWNERSHIP_MAIN_SH_SQ			-0.6764 (-1.54)	0.4846 (0.48)				
HIGH_CONCENTRATION_d					0.0435 (0.94)	0.2060** (2.06)		
FAM_d							0.1142* (1.75)	-0.1204 (-0.79)
INV_d							0.1875** (2.16)	-0.0008 (-0.00)
COMP_d							-0.0269 (-0.41)	0.3671** (2.12)
LEV	0.2887*** (3.23)	0.0901 (0.44)	0.3216*** (3.55)	0.0738 (0.35)	0.3250*** (3.77)	0.0913 (0.46)	0.3217*** (3.77)	0.0546 (0.27)
ROA	0.1814* (1.87)	-0.2458** (-2.28)	0.1714* (1.76)	-0.2468** (-2.29)	0.1819* (1.88)	-0.2483** (-2.32)	0.1910** (1.97)	-0.2558** (-2.37)
EARN_VOLATILITY	0.0834 (0.99)	-0.2191 (-1.46)	0.0829 (0.99)	-0.2234 (-1.49)	0.0805 (0.97)	-0.2027 (-1.37)	0.0844 (1.02)	-0.2520* (-1.65)
TANG	-0.1029 (-1.11)	0.0897 (0.45)	-0.1110 (-1.21)	0.0892 (0.45)	-0.1043 (-1.13)	0.1137 (0.57)	-0.0990 (-1.09)	0.0748 (0.38)
SIZE	-0.0540* (-1.95)	0.4101*** (10.78)	-0.0462* (-1.67)	0.4091*** (10.74)	-0.0510* (-1.89)	0.4094*** (10.75)	-0.0424 (-1.62)	0.4028*** (10.52)
AGE	-0.0069 (-0.31)	0.0901* (1.83)	-0.0011 (-0.05)	0.0872* (1.76)	-0.0048 (-0.22)	0.0885* (1.80)	0.0025 (0.12)	0.0949* (1.93)
MARKET_TO_BOOK	-0.0258 (-1.26)	0.0986** (2.48)	-0.0189 (-0.91)	0.0961** (2.40)	-0.0218 (-1.08)	0.1017** (2.57)	-0.0146 (-0.73)	0.0990** (2.50)
FINANC_STRENGTH	-0.1138* (-1.65)	-0.4984*** (-2.86)	-0.1076 (-1.57)	-0.4994*** (-2.87)	-0.1021 (-1.49)	-0.4772*** (-2.73)	-0.1383** (-2.01)	-0.5069*** (-2.87)
TAX	0.0879 (0.69)		0.0854 (0.67)		0.0837 (0.66)		0.0873 (0.68)	
SPREAD	0.0219 (0.43)		0.0128 (0.25)		0.0238 (0.47)		0.0150 (0.30)	
BOARD_SIZE		-0.0075 (-0.88)		-0.0074 (-0.86)		-0.0089 (-1.05)		-0.0069 (-0.81)
AUDIT_TENURE		0.0932*** (7.11)		0.0936*** (7.13)		0.0936*** (7.14)		0.0945*** (7.17)
Lambda		-0.2579*** (-3.16)		-0.2338*** (-2.87)		-0.2504*** (-3.21)		-0.2147*** (-2.79)
Constant	1.4671*** (3.62)	-5.6031*** (-10.32)	1.2858*** (3.10)	-5.5412*** (-9.95)	1.4014*** (3.55)	-5.6905*** (-10.42)	1.2710*** (3.32)	-5.5467*** (-10.20)
Observations	1.112	1.112	1.112	1.112	1.112	1.112	1.112	1.112
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald Chi2	50.18	50.18	53.88	53.88	50.62	50.62	58.54	58.54

T-statistics are in parentheses *** p<0.01. ** p<0.05. * p<0.1

Table 7. Debt maturity, audit quality and ownership structure (GMM)

The Table shows the determinants of long-term debt using General Method of Model (GMM). The Table also reports the interaction terms between Big4 auditor and the ownership structure variables from model (5) to model (7). Dependent variable: DEBT_MATURITY defined as long-term debt over total debt. For the sake of brevity, variable definitions are provided in Table 1. All variables are winsorized at 99% and 1% levels.

	(1) GMM	(2) GMM	(3) GMM	(4) GMM	(5) GMM	(6) GMM	(7) GMM
Indep. Var.	Debt Maturity	Debt Maturity	Debt Maturity	Debt Maturity	Debt Maturity	Debt Maturity	Debt Maturity
BIG4	0.0730* (1.88)	0.1020*** (2.71)	0.0920** (2.42)	0.0429 (0.98)	0.0812* (1.78)	-0.0704 (-0.99)	0.0471 (1.03)
OWNERSHIP_MAIN_SH		0.0419 (0.74)	-0.1795 (-1.36)		-0.0053 (-0.07)	-0.5967*** (-2.76)	
OWNERSHIP_MAIN_SH_SQ			0.3069* (1.89)			0.9206*** (3.42)	
HIGH_CONCENTRATION_d				0.0396** (2.41)			0.0333* (1.93)
BIG4*OWNERSHIP_MAIN_SH					0.0851 (0.72)	1.7630*** (4.08)	
BIG4*OWNERSHIP_MAIN_SH_SQ						-2.3028*** (-4.45)	
BIG4*HIGH_CONCENTRATION_d							0.0079 (0.48)
LEV	0.1011*** (11.53)	0.2027*** (5.37)	0.1984*** (4.77)	0.1042*** (12.58)	0.2166*** (5.49)	0.1768*** (4.68)	0.1002*** (11.14)
ROA	0.0408*** (6.10)	0.0550*** (6.92)	0.0547*** (6.63)	0.0499*** (7.54)	0.0580*** (7.02)	0.0517*** (6.37)	0.0451*** (6.18)
EARN_VOLATILITY	-0.0021 (-1.37)	0.0009 (0.55)	0.0006 (0.35)	-0.0047** (-2.54)	0.0015 (0.84)	0.0025 (1.18)	-0.0046** (-2.49)
TANG	0.0152 (0.36)	-0.0521 (-1.15)	-0.0498 (-1.10)	-0.0178 (-0.36)	-0.0396 (-0.85)	-0.0367 (-0.79)	0.0034 (0.07)
SIZE	0.0509*** (4.74)	0.0501*** (4.79)	0.0500*** (4.76)	0.0570*** (5.26)	0.0520*** (4.89)	0.0481*** (4.51)	0.0525*** (4.54)
AGE	-0.0100 (-0.70)	-0.0160 (-1.11)	-0.0186 (-1.26)	-0.0115 (-0.79)	-0.0190 (-1.29)	-0.0068 (-0.44)	-0.0053 (-0.38)
MARKET_TO_BOOK	-0.0027 (-0.36)	0.0010 (0.12)	0.0006 (0.07)	-0.0024 (-0.31)	0.0013 (0.15)	0.0017 (0.20)	-0.0009 (-0.12)
FINANC_STRENGTH	0.0312 (0.66)	0.0662 (1.41)	0.0616 (1.32)	0.0248 (0.54)	0.0627 (1.33)	0.0729 (1.52)	0.0459 (1.00)
TAX	-0.0340*** (-3.93)	-0.0312*** (-3.34)	-0.0295*** (-3.19)	-0.0282*** (-2.93)	-0.0315*** (-3.36)	-0.0310*** (-3.02)	-0.0303*** (-2.93)
SPREAD	-0.1453*** (-3.52)	-0.1302*** (-3.22)	-0.1351*** (-3.28)	-0.1468*** (-3.09)	-0.1322*** (-3.25)	-0.1555*** (-3.92)	-0.1609*** (-3.46)
Constant	0.0283 (0.28)	0.0408 (0.40)	0.0739 (0.71)	-0.0421 (-0.42)	0.0321 (0.32)	0.0886 (0.85)	-0.0148 (-0.14)
Observations	1.111	954	954	1.111	954	954	1.111
#Firms	228	222	222	228	222	222	228
m1	-5.26***	-4.88***	-4.89***	-5.02***	-4.93***	-5.15***	-5.00
m2	-1.40	-1.52	-1.52	-1.38	-1.52	-1.11	-1.39
Sargan test	151.05***	142.15***	140.76***	146.43***	142.24***	127.29***	145.38***
Hansen Test	61.49	59.49	58.49	61.43	57.54	52.96	54.34

T-statistics are in parentheses *** p<0.01. ** p<0.05. * p<0.10

APPENDIX

Table 1A. Industry distribution of sample firms

ICB Code	ICB Description	#firm-year obs.	#firms	Debt Maturity		Leverage		LnAssets		Big4		Ownership (%)	
				Mean	Media	Mean	Median	Mean	Median	Mean	Median	Mean	Median
530	Oil & Gas Producers	45	15	0.5263	0.6643	0.1935	0.0823	10.8097	10.9806	0.2667	0	0.2025	0.1517
570	Oil Equipment. Services & Distribution	17	3	0.6885	0.9147	0.1246	0.1409	10.3609	10.4963	0.0000	0	0.3828	0.3356
580	Alternative Energy	22	5	0.4805	0.3651	1.6148	0.4290	8.7800	8.4112	0.0455	0	0.2475	0.1849
1350	Chemicals	33	6	0.6264	0.7237	0.1613	0.0593	9.4869	9.4670	0.2424	0	0.1847	0.1671
1730	Forestry & Paper	9	1	0.7004	0.7265	0.1794	0.1834	10.7987	10.7911	1.0000	1	0.1289	0.1420
1770	Mining	54	14	0.4464	0.4898	0.1552	0.0454	10.9429	11.3673	0.2963	0	0.1852	0.1473
2350	Construction & Materials	42	8	0.6358	0.7078	0.1575	0.1042	10.8264	10.2951	0.0714	0	0.1955	0.1752
2710	Aerospace & Defense	2	1	0.6134	0.6134	0.0030	0.0030	10.0740	10.0740	0.0000	0	0.1458	0.1458
2720	General Industrials	12	2	0.1906	0.2244	0.2371	0.1501	9.1690	9.3290	0.0000	0	0.2000	0.0985
2730	Electronic & Electrical Equipment	78	15	0.4178	0.3967	0.1832	0.1715	9.5523	9.4867	0.2564	0	0.1963	0.1714
2750	Industrial Engineering	52	8	0.3809	0.4134	0.1745	0.1990	10.6333	10.5503	0.1731	0	0.2367	0.1518
2770	Industrial Transportation	7	1	0.4298	0.2467	0.2544	0.2591	11.1258	11.1082	0.8571	1	0.2090	0.2860
2790	Support Services	216	33	0.5103	0.6122	0.2044	0.1613	10.3844	10.4039	0.4120	0	0.2277	0.1645
3350	Automobiles & Parts	6	1	0.5189	0.5884	0.1328	0.0899	7.3399	7.3314	1.0000	1	0.2222	0.2387
3530	Beverages	8	2	0.3442	0.3266	0.2184	0.1871	8.8183	8.2435	0.0000	0	0.1702	0.1595
3570	Food Producers	49	8	0.3277	0.3687	0.1540	0.1178	10.9558	11.5386	0.2653	0	0.1732	0.1339
3720	Household Goods & Home Construction	47	8	0.5253	0.7019	0.1675	0.1365	10.5357	10.7524	0.6383	1	0.2608	0.2460
3740	Leisure Goods	13	2	0.1056	0.0000	0.2189	0.2197	10.2098	10.4153	0.0000	0	0.1889	0.2220
3760	Personal Goods	11	3	0.4301	0.4790	0.1261	0.0895	10.0363	10.3889	0.1818	0	0.2863	0.2800
4530	Health Care Equipment & Services	49	9	0.5122	0.5189	0.1932	0.1086	9.6227	9.1110	0.4490	0	0.1448	0.1216
4570	Pharmaceuticals & Biotechnology	53	11	0.5327	0.6595	0.3100	0.1226	9.6318	9.5032	0.1887	0	0.2156	0.1695
5330	Food & Drug Retailers	4	2	0.9000	1.0000	0.0259	0.0201	10.5683	10.4847	0.5000	0.5	0.2346	0.2338
5370	General Retailers	26	5	0.5590	0.6390	0.1331	0.0253	11.1004	11.3259	0.6538	1	0.1145	0.1010
5550	Media	97	19	0.4818	0.5000	0.1469	0.1027	9.8469	10.3112	0.1753	0	0.1549	0.1317
5750	Travel & Leisure	48	10	0.7051	0.9065	0.1970	0.1705	10.8908	10.8275	0.4167	0	0.1472	0.1323
9530	Software & Computer Services	147	32	0.5415	0.6208	0.1975	0.0935	9.4322	9.5987	0.2585	0	0.1801	0.1505
9570	Technology Hardware & Equipment	8	3	0.4741	0.6300	0.1512	0.1605	9.9982	10.4497	0.6250	1	0.1890	0.1582
	Total	1,155	227	0.5031	0.5714	0.2130	0.1310	10.1366	10.2801	0.3074	0	0.1983	0.1550

Note: ownership denotes the percentage held by the largest shareholder

Table 2A. Debt maturity, audit quality and ownership structure (controlling for the financial crisis period)

The Table shows the determinants of long-term debt using ordinary least squares (OLS), controlling for the financial crisis variable (a dummy, which takes the value 1 from years 2008 to 2012). Dependent variable: DEBT_MATURITY defined as long-term debt over total debt. For the sake of brevity, variable definitions are provided in Table 1. We also include interaction terms between Big4 auditor and ownership variables from model (5) to model (7). All variables are winsorized at 99% and 1% levels.

Indep. Var.	(1) OLS Debt Maturity	(2) OLS Debt Maturity	(3) OLS Debt Maturity	(4) OLS Debt Maturity	(5) OLS Debt Maturity	(6) OLS Debt Maturity	(7) OLS Debt Maturity
BIG4	0.0586** (2.19)	0.0590** (2.21)	0.0588** (2.20)	0.0560** (2.10)	0.0080 (0.20)	0.0233 (0.39)	0.0476 (0.98)
OWNERSHIP_MAIN_SH		0.1588** (2.27)	-0.0202 (-0.11)		0.0866 (1.06)	-0.0298 (-0.14)	
OWNERSHIP_MAIN_SH_SQ			0.2454 (1.04)			0.1640 (0.59)	
HIGH_CONCENTRATION_d				0.0787*** (3.25)			0.0757*** (2.69)
BIG4*OWNERSHIP_MAIN_SH					0.2554* (1.72)	0.1268 (0.30)	
BIG4*OWNERSHIP_MAIN_SH_SQ						0.1520 (0.30)	
BIG4*HIGH_CONCENTRATION_d							0.0110 (0.21)
LEV	0.1461*** (3.71)	0.1311*** (3.29)	0.1227*** (3.02)	0.1431*** (3.65)	0.1289*** (3.23)	0.1218*** (2.99)	0.1432*** (3.65)
ROA	0.0248 (1.17)	0.0232 (1.10)	0.0234 (1.11)	0.0218 (1.03)	0.0234 (1.11)	0.0236 (1.11)	0.0219 (1.03)
EARN_VOLATILITY	-0.0048 (-1.16)	-0.0047 (-1.14)	-0.0047 (-1.15)	-0.0052 (-1.27)	-0.0047 (-1.14)	-0.0047 (-1.13)	-0.0052 (-1.27)
TANG	0.0398 (0.77)	0.0354 (0.69)	0.0370 (0.72)	0.0347 (0.68)	0.0434 (0.84)	0.0451 (0.87)	0.0351 (0.68)
SIZE	0.0446*** (4.27)	0.0437*** (4.19)	0.0434*** (4.16)	0.0441*** (4.24)	0.0436*** (4.19)	0.0435*** (4.17)	0.0440*** (4.24)
AGE	0.0056 (0.41)	0.0021 (0.16)	0.0012 (0.09)	0.0030 (0.22)	0.0016 (0.12)	0.0004 (0.03)	0.0030 (0.22)
MARKET_TO_BOOK	0.0178* (1.85)	0.0149 (1.53)	0.0139 (1.43)	0.0171* (1.78)	0.0152 (1.56)	0.0144 (1.48)	0.0171* (1.78)
FINANC_STRENGTH	-0.1687*** (-3.95)	-0.1752*** (-4.10)	-0.1784*** (-4.17)	-0.1638*** (-3.85)	-0.1806*** (-4.22)	-0.1836*** (-4.28)	-0.1639*** (-3.85)
TAX	0.0630 (0.95)	0.0601 (0.91)	0.0601 (0.91)	0.0587 (0.89)	0.0620 (0.94)	0.0624 (0.94)	0.0584 (0.88)
SPREAD	-0.0022 (-0.27)	-0.0033 (-0.40)	-0.0035 (-0.42)	-0.0025 (-0.31)	-0.0033 (-0.40)	-0.0034 (-0.41)	-0.0026 (-0.32)
CRISIS	0.0232 (1.08)	0.0229 (1.07)	0.0225 (1.05)	0.0241 (1.13)	0.0218 (1.02)	0.0218 (1.01)	0.0240 (1.12)
Constant	-0.0010 (-0.01)	-0.0032 (-0.02)	0.0286 (0.20)	-0.0461 (-0.33)	0.0088 (0.06)	0.0299 (0.21)	-0.0435 (-0.31)
Observations	1.155	1.155	1.155	1.155	1.155	1.155	1.155
R-squared	0.16	0.16	0.17	0.17	0.17	0.17	0.17
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes

T-statistics are in parentheses *** p<0.01. ** p<0.05. * p<0.10

**Table 3A. Debt maturity, audit quality and ownership structure (Interaction terms).
Sub-samples of firm size.**

The Table shows the determinants of long-term debt using ordinary least squares (OLS). The Table reports the interaction effects of Big4 with different ownership structure variables. We distinguish firms according to total asset quartiles. Dependent variable: DEBT_MATURITY defined as long-term debt over total debt. For the sake of brevity, variable definitions are provided in Table 1. All variables are winsorized at 99% and 1% levels.

Panel A

Indep. Var.	(1) OLS Debt Maturity (1 st Quartile Total Asset)	(2) OLS Debt Maturity (2 nd Quartile Total Asset)	(3) OLS Debt Maturity (3 rd Quartile Total Asset)	(4) OLS Debt Maturity (4 th Quartile Total Asset)
BIG4*OWNERSHIP_MAIN_SH	1.6978 (1.45)	3.5782* (1.85)	-1.0618 (-1.20)	0.3674 (0.45)
BIG4*OWNERSHIP_MAIN_SH_SQ	-1.2995 (-0.99)	-5.3128 (-1.29)	0.9432 (0.94)	0.1883 (0.17)
BIG4	-0.1711 (-1.04)	-0.2717 (-1.38)	0.2808** (2.18)	-0.2109* (-1.86)
OWNERSHIP_MAIN_SH	0.0426 (0.10)	-0.3122 (-0.79)	0.8020* (1.68)	-0.6550 (-1.06)
OWNERSHIP_MAIN_SH_SQ	0.0783 (0.12)	0.6142 (1.23)	-0.5827 (-1.03)	0.4475 (0.56)
LEV	0.0919 (1.52)	0.1359 (1.25)	0.5104*** (3.31)	0.5557*** (2.74)
ROA	0.0029 (0.10)	0.0793 (1.50)	0.1164 (0.69)	-0.2886 (-1.56)
EARN_VOLATILITY	-0.0083 (-0.99)	0.0241 (0.40)	0.0577 (0.62)	-0.0075 (-1.50)
TANG	0.1972* (1.77)	-0.0541 (-0.44)	-0.1275 (-1.13)	-0.0622 (-0.45)
SIZE	0.0815** (2.27)	0.0731 (0.92)	0.0190 (0.22)	0.0264 (0.51)
AGE	-0.0266 (-0.83)	-0.0554* (-1.70)	0.0268 (0.85)	0.0273 (0.74)
MARKET_TO_BOOK	0.0416** (2.41)	-0.0458** (-2.08)	-0.0170 (-0.69)	-0.0138 (-0.51)
FINANC_STRENGTH	-0.3273*** (-2.95)	-0.0013 (-0.02)	-0.1455 (-1.61)	-0.0742 (-0.76)
TAX	0.0142 (0.09)	-0.0672 (-0.52)	0.1647 (1.22)	0.1805 (1.27)
SPREAD	0.0150 (0.44)	-0.0794** (-2.25)	-0.0236 (-0.67)	-0.0312 (-0.80)
Constant	-0.1945 (-0.51)	0.2090 (0.26)	0.2633 (0.28)	0.0754 (0.12)
Observations	289	289	289	288
R-squared	0.32	0.27	0.41	0.41
Sector dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes

T-statistics in parentheses *** p<0.01. ** p<0.05. * p<0.10

Panel B

Indep. Var.	(1) OLS	(2) OLS	(3) OLS	(4) OLS
	Debt Maturity (1 st Quartile Total Asset)	Debt Maturity (2 nd Quartile Total Asset)	Debt Maturity (3 rd Quartile Total Asset)	Debt Maturity (4 th Quartile Total Asset)
BIG4*HIGH_CONCENTRATION_d	0.0756 (0.53)	0.1520 (1.25)	-0.1089 (-0.91)	-0.0315 (-0.33)
BIG4	0.0168 (0.14)	0.0263 (0.24)	0.2099* (1.81)	-0.1004 (-1.12)
HIGH_CONCENTRATION_d	0.0497 (0.92)	0.0796 (1.52)	0.1360** (2.06)	0.0479 (0.66)
LEV	0.1076** (2.09)	0.0939 (0.88)	0.5367*** (3.59)	0.5581*** (2.77)
ROA	0.0014 (0.05)	0.0767 (1.46)	0.1766 (1.06)	-0.2979 (-1.61)
EARN_VOLATILITY	-0.0088 (-1.06)	0.0165 (0.28)	0.0847 (0.91)	-0.0081 (-1.59)
TANG	0.1775 (1.59)	-0.0938 (-0.77)	-0.1099 (-0.98)	-0.0594 (-0.43)
SIZE	0.0790** (2.21)	0.0842 (1.06)	0.0165 (0.20)	0.0186 (0.36)
AGE	-0.0276 (-0.86)	-0.0561* (-1.74)	0.0281 (0.91)	0.0236 (0.63)
MARKET_TO_BOOK	0.0412** (2.45)	-0.0407* (-1.85)	-0.0068 (-0.29)	-0.0080 (-0.30)
FINANC_STRENGTH	-0.3168*** (-2.84)	-0.0063 (-0.08)	-0.1203 (-1.47)	-0.0486 (-0.50)
TAX	0.0312 (0.19)	-0.0573 (-0.45)	0.1590 (1.19)	0.1730 (1.22)
SPREAD	0.0130 (0.38)	-0.0739** (-2.10)	-0.0282 (-0.81)	-0.0319 (-0.82)
Constant	-0.1847 (-0.49)	0.0461 (0.06)	0.2646 (0.28)	0.0302 (0.05)
Observations	289	289	289	288
R-squared	0.31	0.27	0.41	0.41
Sector dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes

T-statistics in parentheses *** p<0.01. ** p<0.05. * p<0.10

**Table 4A. Debt maturity, audit quality and ownership structure (Interaction terms).
Sub-samples of leverage.**

The Table shows the determinants of long-term debt using ordinary least squares (OLS). The Table reports the interaction effects of Big4 with different ownership structure variables. We distinguish between firms with HIGH_LEVERAGE (2nd, 3rd, 4th quartiles) and firms with LOW_LEVERAGE (1st quartile). Dependent variable: DEBT_MATURITY defined as long-term debt over total debt. For the sake of brevity, variable definitions are provided in Table 1. All variables are winsorized at 99% and 1% levels.

Indep. Var.	(1) OLS Debt Maturity (High_Leverage)	(2) OLS Debt Maturity (Low_Leverage)	(3) OLS Debt Maturity (High_Leverage)	(4) OLS Debt Maturity (Low_Leverage)
BIG4*OWNERSHIP_MAIN_SH	0.2104 (0.46)	-1.9623 (-1.05)		
BIG4*OWNERSHIP_MAIN_SH_SQ	-0.0514 (-0.09)	6.5140* (1.67)		
BIG4*HIGH_CONCENTRATION_d			0.0927 (1.58)	-0.2381* (-1.79)
BIG4	0.0367 (0.55)	0.1033 (0.53)	0.0046 (0.09)	0.1924 (1.60)
OWNERSHIP_MAIN_SH	-0.2644 (-1.09)	0.4340 (0.80)		
OWNERSHIP_MAIN_SH_SQ	0.4922 (1.59)	-0.6772 (-0.93)		
HIGH_CONCENTRATION_d			0.0335 (1.03)	0.1765*** (2.72)
ROA	0.0982** (2.23)	5.7124** (2.12)	0.1293*** (3.05)	5.3987** (2.03)
EARN_VOLATILITY	0.0305 (1.34)	-0.0321 (-0.49)	0.0294 (1.29)	-0.0267 (-0.41)
TANG	-0.0049 (-0.84)	-0.0060 (-0.93)	-0.0048 (-0.82)	-0.0070 (-1.10)
SIZE	0.0469 (0.78)	0.0939 (0.74)	0.0351 (0.59)	0.0960 (0.76)
AGE	0.0459*** (3.95)	0.0300 (1.09)	0.0478*** (4.13)	0.0242 (0.89)
MARKET_TO_BOOK	0.0072 (0.49)	-0.0608 (-1.52)	0.0108 (0.74)	-0.0730* (-1.86)
FINANC_STRENGTH	0.0097 (0.86)	0.0235 (0.95)	0.0151 (1.37)	0.0182 (0.74)
TAX	-0.2586*** (-4.91)	0.0250 (0.26)	-0.2206*** (-4.25)	-0.0046 (-0.05)
SPREAD	0.0377 (0.51)	0.0199 (0.12)	0.0368 (0.49)	0.0446 (0.27)
Constant	-0.0272 (-1.40)	0.0393 (0.76)	-0.0288 (-1.49)	0.0481 (0.93)
Observations	866	289	866	289
R-squared	0.22	0.26	0.22	0.26
Sector dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes

T-statistics in parentheses *** p<0.01. ** p<0.05. * p<0.10

Table 5A. Debt maturity, audit quality and ownership structure (Tobit model).

The Table shows the determinants of long-term debt using a tobit model. The Table reports the interaction terms between Big4 and the ownership structure variables. Dependent variable: DEBT_MATURITY defined as long-term debt over total debt. For the sake of brevity, variable definitions are provided in Table 1. All variables are winsorized at 99% and 1% levels.

Indep. Var.	(1) Tobit Debt Maturity	(2) Tobit Debt Maturity	(3) Tobit Debt Maturity	(4)Tobit Debt Maturity	(5) Tobit Debt Maturity	(6) Tobit Debt Maturity	(7) Tobit Debt Maturity
BIG4	0.0659** (2.08)	0.0665** (2.10)	0.0667** (2.10)	0.0626** (1.98)	-0.0155 (-0.33)	-0.0046 (-0.06)	0.0416 (0.72)
OWNERSHIP_MAIN_SH		0.2215*** (2.65)	-0.0642 (-0.29)		0.1076 (1.11)	-0.1209 (-0.47)	
OWNERSHIP_MAIN_SH_SQ			0.3890 (1.38)			0.3172 (0.96)	
HIGH_CONCENTRATION_d				0.0955*** (3.28)			0.0880*** (2.59)
BIG4*OWNERSHIP_MAIN_SH					0.4091** (2.31)	0.3256 (0.65)	
BIG4*OWNERSHIP_MAIN_SH_SQ						0.0890 (0.15)	
BIG4*HIGH_CONCENTRATION_d							0.0272 (0.43)
LEV	0.1722*** (3.61)	0.1504*** (3.12)	0.1365*** (2.77)	0.1690*** (3.57)	0.1477*** (3.07)	0.1355*** (2.75)	0.1693*** (3.57)
ROA	0.0567* (1.84)	0.0540* (1.75)	0.0544* (1.76)	0.0529* (1.72)	0.0546* (1.77)	0.0550* (1.78)	0.0531* (1.73)
EARN_VOLATILITY	-0.0069 (-1.33)	-0.0069 (-1.34)	-0.0069 (-1.34)	-0.0076 (-1.46)	-0.0069 (-1.33)	-0.0069 (-1.33)	-0.0076 (-1.46)
TANG	0.0536 (0.86)	0.0450 (0.72)	0.0480 (0.77)	0.0434 (0.70)	0.0566 (0.91)	0.0591 (0.94)	0.0442 (0.71)
SIZE	0.0579*** (4.57)	0.0567*** (4.49)	0.0560*** (4.44)	0.0575*** (4.57)	0.0566*** (4.49)	0.0561*** (4.45)	0.0574*** (4.56)
AGE	0.0084 (0.52)	0.0039 (0.24)	0.0022 (0.14)	0.0058 (0.36)	0.0029 (0.18)	0.0013 (0.08)	0.0058 (0.36)
MARKET_TO_BOOK	0.0218* (1.84)	0.0182 (1.53)	0.0167 (1.40)	0.0212* (1.80)	0.0191 (1.60)	0.0177 (1.48)	0.0213* (1.80)
FINANC_STRENGTH	-0.2615*** (-4.92)	-0.2721*** (-5.11)	-0.2780*** (-5.20)	-0.2550*** (-4.82)	-0.2825*** (-5.28)	-0.2877*** (-5.36)	-0.2551*** (-4.82)
TAX	0.0640 (0.80)	0.0602 (0.75)	0.0605 (0.76)	0.0579 (0.73)	0.0638 (0.80)	0.0642 (0.80)	0.0572 (0.72)
SPREAD	-0.0522* (-1.77)	-0.0589** (-1.99)	-0.0572* (-1.93)	-0.0600** (-2.03)	-0.0598** (-2.02)	-0.0582** (-1.97)	-0.0604** (-2.04)
Constant	-0.0689 (-0.39)	-0.0678 (-0.39)	-0.0158 (-0.09)	-0.1165 (-0.67)	-0.0472 (-0.27)	-0.0054 (-0.03)	-0.1101 (-0.63)
Observations	1,155	1,155	1,155	1,155	1,155	1,155	1,155
LR Chi2	219.30	226.32	228.22	229.99	231.66	233.16	230.17
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes

T-statistics are in parentheses *** p<0.01. ** p<0.05. * p<0.10

Table 6A. Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1.DEBT MATURITY	1.000															
2.BIG4	0.114***	1.000														
3.OWNER_MAIN_SH	0.042	-0.014	1.000													
4.HIGH_CONC.ION_d	0.062**	0.058**	0.498***	1.000												
5.LEV	0.089***	-0.014	0.126***	0.007	1.000											
6..ROA	0.066**	0.076***	-0.003	0.040	-0.328***	1.000										
7.EARN_VOLATILITY	-0.064**	-0.073***	-0.026	-0.002	0.096***	-0.191***	1.000									
8.TANG	0.011	0.051*	0.073***	-0.004	-0.043*	0.004	-0.136***	1.000								
9.SIZE	0.145***	0.297***	0.041	0.030	-0.025	0.119***	-0.021	0.121***	1.000							
10.AGE	0.089***	0.170***	0.064**	-0.008	-0.018	0.139***	-0.074***	0.245***	0.091***	1.000						
11.MARKET_TO_BOOK	-0.015	-0.008	0.057**	0.004	-0.127***	-0.039	-0.037	0.135***	-0.103***	-0.092***	1.000					
12.FINAC_STRENGTH	-0.122***	-0.032	0.078***	-0.036	-0.108***	0.095***	-0.044*	0.221***	-0.011	0.192***	0.038	1.000				
13..BOARD_SIZE	-0.004	-0.016	-0.117***	0.013	-0.017	0.020	0.061**	0.084***	-0.052*	0.076***	-0.116***	-0.029	1.000			
14.AUDIT_TENURE	0.104***	0.280***	-0.028	-0.016	-0.018	0.055**	-0.088***	0.157***	0.179***	0.146***	0.069***	0.072***	-0.004	1.000		
15. TAX PAID	0.058*	0.124***	-0.000	-0.046	-0.112***	0.255***	-0.120***	0.040	0.155***	0.161***	-0.104***	0.152***	0.032	0.033	1.000	
16. SPREAD	-0.017	0.005	0.028	-0.007	0.034	-0.037	0.035	-0.124***	0.074***	-0.003	-0.312***	-0.013	-0.021	0.040	-0.019	1.000

*** p<0.01, ** p<0.05, * p<0.1