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Ownership structure, control contestability, and corporate debt maturity☆

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ABSTRACT

The corporate governance literature has shown that self-interested controlling owners tend to divert corporate resources for private benefits at the expense of other shareholders. Such behavior leads the controlling owners to prefer long maturity debt to short maturity debt, to avoid frequent monitoring by lenders, which creates conflict between controlling and minority shareholders over the maturity structure of debt. In this paper, we examine whether the presence of multiple large shareholders (MLS), beyond the controlling owner, helps to mitigate this conflict. Using a large data set of French publicly traded firms during the period 1998–2013, we find strong evidence that firms with MLS exhibit shorter debt maturity. This result suggests that MLS curb the extraction of private benefits by the controlling owner and reduce her preference for less monitoring through the use of longer maturity debt. The findings are robust to a number of checks, including addressing endogeneity concerns and using alternative sample compositions and alternative regression frameworks.

1. Introduction

Over the last three decades, a substantial amount of research has been focused on the maturity structure of corporate debt. Building on the seminal works of Myers (1977), Flannery (1986), and Diamond (1991), among others, several studies provide evidence that firm characteristics (e.g., growth opportunities, asset maturity, and firm size) are important determinants of debt maturity.[1] More recently, the role of corporate governance in determining debt maturity has emerged as a central theme in this literature. In this vein, Datta et al. (2005) show that managerial ownership affects debt maturity choice. Jiraporn and Kitsabunnarat (2007) provide evidence that corporate debt maturity depends on the strength of shareholder rights. Harford et al. (2008) show that a strong board is

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[1] See, e.g., Barclay and Smith (1995), Guedes and Opler (1996), and Stohs and Mauer (1996).

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associated with shorter maturity debt. Brockman et al. (2010) find that CEO compensation incentives also affect the maturity structure of corporate debt.

While these papers document interesting results on how governance mechanisms affect debt maturity, their conclusions have been limited by their focus on the U.S. market, where the agency conflict is likely to be between managers and shareholders (type I agency problem) (Jensen and Meckling, 1976). However, the main agency problem outside the United States is that between controlling and minority shareholders, called the type II agency problem (see, e.g., Claessens et al., 2000; Dyck and Zingales, 2004; Faccio and Lang, 2002; La Porta et al., 1999). The larger the control–ownership wedge of a controlling owner, the more incentives she has to divert corporate resources for private benefits at the expense of minority shareholders. Previous studies, such as Claessens et al. (2002), show that the risk of expropriating minority shareholders by controlling owners is the dominant agency problem in most countries. However, the impact of this agency problem on corporate debt maturity remains largely underexplored.

Moreover, the literature (e.g., Claessens et al., 2000; Faccio and Lang, 2002; La Porta et al., 1999; Thomsen et al., 2006) documents the existence of a significant number of firms controlled through multiple large shareholders (MLS) structures outside the United States. For instance, Claessens et al. (2000) find that 32.2% of East Asian firms have at least two large shareholders (at the 10% threshold). Faccio and Lang (2002) document that MLS are present in almost 46% of concentrated ownership firms in Western Europe (at the 10% threshold). Similar findings are reported by Laeven and Levine (2008), who show that 34% of European firms have at least two large owners.

A growing body of empirical research suggests that MLS may play an important governance role in curbing the diversion of corporate resources. In this vein, MLS have been shown to play a valuable monitoring role over the controlling owner, which results in higher firm valuations (Attig et al., 2009; Laeven and Levine, 2008; Maury and Pajuste, 2005), lower costs of equity capital (Attig et al., 2008), higher dividend rates (Faccio et al., 2001), and so forth. However, a serious effort to link the governance role of MLS to debt maturity is absent from the literature. We fill this gap by examining the effects of MLS presence and control contestability of the largest owner on debt maturity.

We argue that debt maturity choice is affected not only by the private benefits the controlling owner can capture but also by the ability of MLS to curb the extraction of these benefits. An entrenched controlling owner tends to insulate herself from external monitoring to protect her private benefits of control. Therefore, she prefers longer maturity debt to avoid monitoring by the lenders for a longer period. However, previous studies argue that MLS may have strong incentives to monitor the controlling owner and to improve corporate governance (e.g., Bennedsen and Wolfenzon, 2000; Bloch and Hege, 2001). Hence, their presence and power impairs the ability of the controlling owner to divert corporate resources, which reduces her tendency to choose long-term debt.

In this paper, we examine the role of MLS in determining debt maturity by considering a large sample of French listed firms over the period 1998–2013. To obtain a complete picture of how large shareholders affect debt maturity, we begin by empirically examining whether, in our sample, controlling shareholders are indeed extracting private benefits of control. We also examine whether MLS and short-term debtholders curb the consumption of these benefits. For this purpose, we perform firm value regressions using a sample that includes widely held and concentrated ownership firms. We find that the presence of a controlling owner and the degree of separation of her control rights and cash flow rights are associated with lower firm valuations. This result implies that self-interested controlling owners have incentives to extract private benefits of control to the detriment of minority shareholders, which results in lower firm values. Moreover, we show that the effect of controlling owners on firm value is significantly less pronounced when MLS or short-term debtholders are present, which indicates that other large shareholders, beyond the controlling owner, and short-term debtholders play an effective monitoring role that limits the controlling owner's ability to extract private benefits of control. Furthermore, we provide evidence that short-term debtholders are able to reduce private benefits over and beyond what MLS could do themselves.

To investigate the impact of MLS on debt maturity, we limit our sample to concentrated ownership firms. After controlling for standard determinants of debt maturity, we report evidence suggesting that the presence of MLS and the extent of their contestability of the power of the largest controlling owner are associated with lower debt maturity. This finding supports the view that MLS limit the controlling owner's private benefits of control and reduce her need to evade scrutiny by lenders through the choice of long maturity debt over short maturity debt. We also find that debt maturity is positively associated with the control–ownership wedge of the controlling owner, indicating that entrenched controlling owners prefer longer maturity debt to avoid frequent monitoring by the debt market. These results are robust to a battery of sensitivity tests, including addressing endogeneity issues, using alternative proxies for MLS presence and voting power, and considering alternative sample compositions and regression frameworks.

This study advances the literature in several ways. First, it is, to the best of our knowledge, the first to examine how MLS presence and voting power determine corporate debt maturity structure. Thus, it adds a new dimension to the literature on capital structure choice in the presence of agency conflicts between controlling and minority shareholders. Second, it contributes to the corporate governance literature by shedding light on a channel through which the governance role of MLS could affect firms' financing decisions (i.e., the choice of debt maturity).

This study also offers new evidence on the determinants of debt maturity by focusing on a concentrated ownership context (i.e., France). Studies investigating the determinants of debt maturity in France are rare.[2] However, France provides a suitable laboratory for examining the role of MLS in mitigating the adverse effects of controlling owners on debt maturity. French listed firms typically have concentrated ownership structures and are controlled by large shareholders through different mechanisms, such as pyramid structures, non-voting shares, and double-voting shares. For instance, Faccio and Lang (2002) present evidence suggesting

[2] One exception is the study by Antoniou et al. (2006) on the determinants of debt maturity in France, Germany, and the United Kingdom; this study shows considerable differences in debt maturity patterns among these countries.

that only 14% of French listed firms in 1996 are widely held at the 20% threshold. Boubaker (2007) reports similar results using ownership structure data for the year 2000. These mechanisms allow controlling owners to hold more control rights than cash flow rights, which gives them incentives to extract private benefits of control at the expense of minority shareholders. In light of this, we expect that some aspects of financing decisions, such as the choice of debt maturity, are affected by the incentives of controlling owners to extract private benefits of control and to avoid monitoring by outsiders.

In addition, research has shown that a large proportion of French listed firms have MLS with substantial voting rights. In this vein, Faccio and Lang (2002) find that about 33% of French listed firms have more than one large shareholder. Boubaker (2007) also documents that MLS are present in 34% of French listed firms. Similarly, Laeven and Levine (2008) show that firms with MLS represent more than 36% of their sample of French firms. The existence of those MLS is also expected to have an impact on debt maturity decisions, since they have the power to monitor the controlling owner.

In terms of debt maturity, empirical research has shown that French listed firms have higher fractions of long-term debt in their capital structures compared to firms in other European countries. In this vein, Antoniou et al. (2006) find that the average ratio of long-term debt to total debt is higher in France (59%) than in Germany (53%) and the United Kingdom (46%). El Ghoul et al. (forthcoming) and Zheng et al. (2012) also report that, on average, French firms have longer debt maturities than many other European countries, such as Germany, Italy and the United Kingdom. Therefore, it is important to identify the factors that lead French firms to use more long-term debt. This paper focuses on the role of MLS in determining the choice of debt maturity.

The reminder of the paper is structured as follows. Section 2 discusses the different arguments that link MLS presence and contestability of the power of the controlling owner to debt maturity. The data and definitions of the variables used in the empirical analysis are presented in Section 3. The empirical design and the results are discussed in Section 4. Section 5 presents the robustness tests. The last section concludes the paper.

2. Literature review and hypothesis development

The largest controlling owners in concentrated ownership firms resort to different means to hold more control rights than cash flow rights, which provides them with strong incentives to extract private benefits of control (e.g., Bebchuk et al., 2000; Bennedsen and Nielsen, 2010; Claessens et al., 2002; Shleifer and Vishny, 1997).[3] Severe conflicts of interest may arise in such firms due to the inherent tendency of their controlling owners to avoid being monitored. This paper focuses on the role of MLS in the presence of conflicts between the largest owner and minority shareholders over the debt maturity structure choice.

The literature has suggested the maturity of corporate debt as an important mechanism to monitor corporate insiders. Shorter-term debt enables lenders to monitor borrowers through more frequent refinancing and renegotiations of contract terms (Demirgüç-Kunt and Maksimovic, 1999). Rajan and Winton (1995) argue that loans that have short fixed maturities give lenders greater flexibility to effectively monitor insiders by demanding frequent repayment. Stulz (2001) points out that short-term debt can be an extremely powerful tool for monitoring corporate insiders. Datta et al. (2005) argue that short maturity debt subjects managers to more frequent monitoring by outsiders (such as underwriters and rating agencies), which mitigates the agency costs between managers and shareholders. The authors show that more entrenched insiders prefer longer maturity debt, to insulate themselves from monitoring by the debt market. Jiraporn and Kitsabunnarat (2007) assert that insiders of firms with weak shareholder rights prefer long-term debt to short-term debt, to avoid frequent external monitoring. Additionally, Ortiz-Molina and Penas (2008) provide evidence that shorter loan maturities mitigate asymmetric information problems that may arise in small business lending.

To avoid frequent monitoring by lenders, self-interested controlling owners prefer longer maturity debt. Furthermore, more entrenched controlling owners have stronger incentives to extract private benefits of control to the detriment of minority shareholders and, therefore, have stronger affinity for autonomy. Thus, they are more inclined to choose longer maturity debt, to remain insulated from external monitoring for a longer period.[4] The findings of Lin et al. (2013) support this view. Using a sample of 9808 firms in 20 countries over the period 2001–10, the authors find evidence of a positive relation between the control–ownership wedge of the controlling owner and the proportion of long-term debt in the capital structure.

However, a growing number of studies are showing that the presence of MLS can limit the diversion of corporate resources for private benefits. For instance, MLS can form coalitions with large equity stakes that improve firm governance (Bennedsen and Wolfenzon, 2000). They can also limit the potential for expropriation of minority shareholders through competition for corporate control (Bloch and Hege, 2001). In a nutshell, MLS have the incentives and the power to monitor the largest controlling owner.

A number of studies have empirically documented the governance role of MLS. For instance, Maury and Pajuste (2005) and Laeven and Levine (2008) focus on the role of MLS in corporate governance and show that it can affect corporate valuations. In a similar vein, Attig et al. (2008) argue that MLS alleviate firm agency and information problems driven by the separation of ownership and control of the largest shareholder, thereby reducing the cost of equity financing. Accordingly, the presence of MLS is likely to mitigate the information asymmetry between corporate insiders and outsiders, which reduces the incentives of the controlling owner to insulate herself from frequent monitoring by debt markets.

[3] The largest controlling owners can enhance their control beyond their ownership stakes through different means, such as double-voting shares and pyramiding.

[4] It is important to note that firms with long-term debt maturity could still be exposed to external monitoring through refinancing, by, for instance, substituting new long-term debt for old debt or raising new equity. However, issuing new long-term debt or equity capital does not necessarily improve the monitoring of insiders in these firms, for at least two reasons. First, even given such refinancing schemes, insiders are, in general, exposed to less frequent monitoring by lenders compared to insiders of firms with short-term debt maturity (Jiraporn and Kitsabunnarat, 2007). Thus, even given these refinancing schemes, self-interested insiders still prefer long maturity debt to short maturity debt. Second, when firms decide to issue new long-term debt or equity capital, insiders of these firms can manage earnings to enhance their appearance to capital providers (e.g., Cohen and Zarowin, 2010; Kim and Park, 2005; Teoh et al., 1998).

MLS may also put pressure on the firm's controlling owner to use more short-term debt. For instance, MLS may have positions on the firm's board of directors (Mishra, 2011). In this case, they can vote against (in favor of) increasing the firm's use of long-term (short-term) debt. MLS, other than the controlling owner, may also collude to form a large coalition to gain control and shift the board's voting outcome towards the use of less (more) long-term (short-term) debt (Bennedsen and Wolfenzon, 2000). MLS can also indirectly force the controlling owner to use more short-term debt through disciplinary trading. MLS may, for instance, decide to sell their shares and push down the firm's stock price to penalize the use of long-term debt (see, e.g., Edmans and Manso, 2011). In light of all these arguments, we expect a negative relation between the presence of MLS and debt maturity, which is the central hypothesis of this paper.

3. Data and variables

This section describes the process of sample selection, presents the variables used in the analysis, and reports descriptive statistics.

3.1. Sample selection and data sources

We start with all French listed firms appearing in the Worldscope database over the period 1998–2013. Following prior studies on debt maturity, we remove financial firms (SIC codes between 6000 and 6999) due to the specific nature of their activity. We further exclude widely held firms—that is, firms with no shareholder owning more than 10% of the voting rights due to the absence of large controlling owners. Moreover, the relevant agency conflict in these firms is between managers and shareholders and not between controlling owners and minority shareholders (Jensen and Meckling, 1976).[5] We also discard firms that have missing or incomplete financial or governance data. Our final sample consists of 5711 firm-year observations covering 604 French listed firms for the period 1998–2013. Data on ownership structure are hand-collected from firms' annual reports. Financial data are obtained from Worldscope.

3.2. Regression variables

Appendix 1 presents the definitions and data sources for all the variables used in the analysis.

3.2.1. Debt maturity

Following previous research (e.g., Demirgüç-Kunt and Maksimovic, 1999; Zheng et al., 2012), we use the ratio of long-term debt to total debt to measure debt maturity (*DEBT_MATURITY*). The Robustness section checks the sensitivity of our results to the use of alternative proxies for debt maturity.

3.2.2. Corporate governance variables

Following previous studies on the governance role of MLS (Attig et al., 2008, 2009; Cai et al., forthcoming; Laeven and Levine, 2008; Maury and Pajuste, 2005; Mishra, 2011, among others), we consider different MLS-related variables to proxy for the presence of MLS and the extent of their contestability of the power of the largest controlling owner. The first is a dummy variable, *MLSD*, that is set to one if the firm has more than one large shareholder (that is, a shareholder who owns at least 10% of the voting rights) and zero otherwise. The second variable, *VRRATIO*, proxies for the voting power of MLS and equals the sum of the voting rights of the second-, third-, and fourth-largest blockholders, divided by the voting rights of the largest controlling owner. This variable captures the relative weight that a coalition between the second-, third-, and fourth-largest shareholders has vis-à-vis the controlling owner (Attig et al., 2008, 2009). We use *VRRATIO* to examine the effect of the monitoring role that such a coalition may play. Our third variable measures the dispersion of voting power among large shareholders, *DISPERSION*, which equals the sum of the squared differences between the voting rights of the four largest shareholders (Attig et al., 2008, 2009; Maury and Pajuste, 2005)—that is,

$$DISPERSION = (VR1\text{–}VR2)^2 + (VR2\text{–}VR3)^2 + (VR3\text{–}VR4)^2 \quad (1)$$

where *VR1*, *VR2*, *VR3*, and *VR4* equal the voting rights of the first-, second-, third-, and fourth-largest shareholders, respectively. We also use the Shapley value solution for the largest controlling owner, *SHAPLEY*, in a voting game where all large shareholders with at least 5% of the voting rights are considered as individual players and the remaining shareholders as the "ocean" (see, e.g., Maury and Pajuste, 2005).[6] This measure is Milnor and Shapley's (1978) continuous version for oceanic games. It has been employed in research to reflect the extent to which each large shareholder's vote is pivotal in deciding on firm policy. Zingales (1994) was among the first to use this measure to capture the control value of voting rights of a firm's shareholders. Other studies in corporate finance that use the Shapley value include Eckbo and Verma (1994), Nenova (2003), Maury and Pajuste (2005), Attig et al. (2008), Laeven and Levine (2008), and Chakraborty and Gantchev (2013). Higher values for the variables *DISPERSION* and *SHAPLEY* suggest lower contestability of the controlling owner's power by MLS. The variables *DISPERSION* and *SHAPLEY* capture the impact of the dispersion

[5] The results are robust to the inclusion of widely held firms in our sample. By definition, the variables WEDGE and MLS-related variables are equal to zero for these firms (e.g., Boubaker and Labégorre, 2008; Laeven and Levine, 2008; Lin et al., 2013).

[6] French law no. 89-531 (August 2, 1989) stipulates that any person, acting alone or in concert with other persons, who comes to own more than 5% of the capital of a French listed firm is compelled to inform the competent authorities and the firm within a period of 15 days.

of the voting rights among large blockholders on debt maturity. However, *SHAPLEY* puts more emphasis on the pivotal role of the controlling owner in affecting firms' decisions than *DISPERSION*.

The main test variable used in this study to proxy for the degree of separation of control rights and cash flow rights of the largest controlling owner is *WEDGE*. This variable is defined as the difference between the ultimate control and cash flow rights of the controlling owner, all divided by her ultimate control rights. To calculate this variable, we map out the complete ownership chains for each sample firm. Following Claessens et al. (2000) and Faccio and Lang (2002), we compute the ultimate cash flow rights of the controlling owner as the sum of the products of ownership stakes along the different control chains. Ultimate control rights are measured by the sum of the weakest links along each control chain.[7]

3.2.3. Control variables

Following prior studies (e.g., Barclay and Smith, 1995; Brockman et al., 2010; Datta et al., 2005; Zheng et al., 2012), we control for several firm characteristics that may affect the choice of the debt maturity structure.

(i) *LEVERAGE_RATIO* is the ratio of total debt to total assets. Firms with higher degrees of leverage would face a higher liquidity risk – that is, the risk of being forced into inefficient liquidation because they are not able to refund debt – which motivates them to lengthen the maturity of their debt (Diamond, 1991). However, firms with lower degrees of leverage are less exposed to liquidity risk, which reduces their incentive to shun short-term debt. Thus, *LEVERAGE_RATIO* is expected to be positively related to debt maturity.

(ii) *ASSET_MATURITY* is defined as the weighted average of the maturities of current and long-term assets. Following Zheng et al. (2012), the maturity of current assets is current assets divided by the cost of goods sold. We proxy for the maturity of long-term assets with the ratio of gross property, plant, and equipment to depreciation and amortization. According to the maturity matching principle, firms should match the maturity of their debt to that of their assets. By doing so, they avoid situations in which debt has a shorter or longer maturity than assets. If the debt has a shorter maturity than assets, the cash on hand may not be enough to repay the debt. Alternatively, in a situation where the debt has a longer maturity than assets, cash flows from assets cease while debt payments remain due (Stohs and Mauer, 1996). Also, Myers (1977) argues that firms can lower the agency costs of debt by matching the maturities of their assets and liabilities. We therefore expect the variable *ASSET_MATURITY* to be positively related to the use of long-term debt.

(iii) *MTB* is the market-to-book ratio. It is equal to the market value of equity divided by the book value of equity. It is our proxy for firm growth opportunities. Myers (1977) argues that firms with more growth options in their investment opportunity sets are more likely to experience conflicts between shareholders and debtholders over the exercise of these options. Myers notes that a firm can control this problem by shortening the effective maturity of its debt. Thus, firms with higher growth opportunities are more likely to use shorter-term debt. The variable *MTB* is, then, expected to be negatively related to debt maturity.

(iv) *STD_ROA* is a proxy for firm credit quality. This variable is measured as the standard deviation of a firm's return on assets over the previous five years. Firms with greater volatility of return on assets may be associated with greater credit risk. The long-term debt market screens out risky firms; thus, these firms can issue only short-term debt (Johnson, 2003). Accordingly, we expect *STD_ROA* to be negatively associated with debt maturity.

(v) *ABNE* measures the firm's abnormal earnings to proxy for firm quality (Barclay and Smith, 1995). It is the ratio of change in earnings before interest, taxes, depreciation, and amortization over the period $[t, t+1]$ to the market value of equity in year t. High-quality firms tend to signal their type to creditors by subjecting themselves to more frequent monitoring associated with short-term debt (Flannery, 1986). Low-quality firms, however, are reluctant to issue short-term debt to avoid external pressures from the debt markets. Therefore, the coefficient of the variable *ABNE* should be negative.

(vi) *SIZE* is the natural logarithm of total assets. Large firms can more easily obtain long-term debt because of their higher credit quality (Diamond, 1991). Smaller firms, however, are more likely to be screened out by the long-term debt market because of their higher degree of asymmetric information and higher risk of agency problems between shareholders and debtholders, which reduces their credit quality (Datta et al., 2005; Diamond, 1991). Accordingly, *SIZE* is expected to be positively related to debt maturity.

3.3. Summary statistics and correlations

Table 1 reports summary statistics for the variables used in the main analysis. To reduce the influence of outliers, we winsorize each of these variables at the first and 99th percentiles. Panel A of Table 1 provides descriptive statistics on the MLS-related variables and the control–ownership wedge. Approximately one third of our sample firms have at least two large blockholders, which is consistent with the findings of Boubaker (2007) and Laeven and Levine (2008), who report that MLS are present in 34% and 36.6%, respectively, of French publicly listed firms. Furthermore, the voting power of MLS relative to the largest controlling owner is 0.29, on

[7] To illustrate the computation of the variable *WEDGE*, we consider the following example of ownership structure. Suppose that a family owns 100% of firm A, which has 40% of the cash flow and voting rights of firm B and 10% of the cash flow and voting rights of another firm, C. Firm B in turn owns 30% of the cash flow and voting rights of firm C. The family is the largest controlling owner of firm C. Its ultimate cash flow rights and ultimate control rights in firm C are 22% (= 10% + 100% * 40% * 30%) and 40% (= 10% + min (100%, 40%, 30%)), respectively. The control–ownership wedge of the family is *WEDGE* = (40% − 22%) / 40% = 45%.

Table 1
Descriptive statistics.

	Obs.	Mean	STD	5th percentile	25th percentile	Median	75th percentile	95th percentile
Panel A: Ownership variables								
MLSD ($N_{(MLSD=1)} = 1945$)	5711	0.3406	0.4739	0.0000	0.0000	0.0000	1.0000	1.0000
VRRATIO	5711	0.2929	0.5139	0.0000	0.0000	0.0000	0.4333	1.4634
DISPERSION	5711	0.3173	0.2656	0.0139	0.0737	0.2572	0.5126	0.8110
SHAPLEY	5711	0.7294	0.3261	0.1827	0.3867	1.0000	1.0000	1.0000
WEDGE	5711	0.2252	0.2067	0.0000	0.0519	0.2001	0.3367	0.6500
Panel B: Firm characteristics								
DEBT_MATURITY	5711	0.5374	0.2867	0.0000	0.3411	0.5830	0.7577	0.9520
LEVERAGE_RATIO	5711	0.2165	0.1697	0.0027	0.0779	0.1938	0.3192	0.5247
ASSET_MATURITY	5711	5.5354	6.7283	0.0363	0.6023	2.6843	7.9591	24.1438
MTB	5711	2.2201	1.9095	0.2648	0.9099	1.6109	2.8018	7.7180
STD_ROA	5711	0.0475	0.0587	0.0000	0.0091	0.0266	0.0587	0.2235
ABNE	5711	0.0275	0.1442	−0.2688	−0.0236	0.0095	0.0663	0.4004
SIZE	5711	13.1046	3.1067	9.4082	10.6880	12.1295	15.0122	17.2055

This table reports descriptive statistics on the variables used in our regressions. The sample includes 5711 firm-year observations representing 604 French listed firms over the period 1998–2013. The sample includes only concentrated ownership firms (at the 10% threshold). Appendix 1 reports detailed definitions for all the variables used in this study.

average. Moreover, the mean (median) control–ownership wedge of the largest controlling owners is 22.52% (20.01%), which indicates that, on average, the risk of expropriating minority shareholders is high in our sample firms.

Panel B of Table 1 provides descriptive statistics on debt maturity structure and other firm characteristics. We document that, on average, 53.74% of the sample firms' total debt is long term. This percentage is similar to that reported by Zheng et al. (2012) in their sample of French firms (56.9%). Table 1 also shows that the mean leverage ratio is 21.65%, which is consistent with Antoniou et al. (2006), who report a mean leverage ratio of 23% for French firms. Our sample firms typically have valuable growth opportunities, since the market-to-book ratio equals 2.2201, on average. The descriptive statistics for the other firm characteristics are largely in line with those reported in the literature.

Table 2 presents the Pearson (below the diagonal) and Spearman (above the diagonal) correlation coefficients for all the variables used in the main analysis. Not surprisingly, the correlation coefficients between the MLS-related variables are relatively high. Table 2 generally reports low correlation coefficients among control variables, which mitigates the concern that multicollinearity could affect our regression results.

4. Empirical evidence

This section presents regression results that (i) link firm valuation to the ownership and control structure of the controlling shareholders, (ii) relate MLS variables to debt maturity, and (iii) address endogeneity concerns.

4.1. Evidence on agency costs of controlling shareholders

Before discussing the effect of MLS on debt maturity, it is worthwhile to provide empirical evidence on the agency costs of controlling shareholders (Section 4.1.1) and on the role of MLS and short-term debtholders in mitigating these costs (Sections 4.1.2 and 4.1.3). Such evidence is needed to better understand the complete mechanism that relates ownership structure to debt maturity in a concentrated ownership context.[8]

4.1.1. Controlling shareholders and firm value

Following a number of previous studies (e.g., Claessens et al., 2002; Cronqvist and Nilsson, 2003), we investigate the valuation of our sample firms relative to their ownership structures to provide evidence on agency costs of controlling shareholders. In particular, we focus on the effect of a controlling owner and the separation of her control rights and cash flow rights on firm value.[9] For this empirical analysis, we use a sample that includes widely held and concentrated ownership firms (at the 10% threshold). This sample includes 6192 firm-year observations over the study period (1998–2013). We use Tobin's q (Q) to proxy for firm value in our

[8] We are grateful to an anonymous referee for suggesting these points to us.

[9] Burkart et al. (2000) argue that direct evidence on private benefits is hard to find. For instance, Zingales (1994, pp. 145–146) points out that "[b]y their very nature private benefits of control are difficult to measure. If they were easily quantifiable, then these benefits would not be private (i.e., accruing only to the control group) any longer because outside shareholders would claim them in court." However, many corporate governance studies have examined the extent of minority shareholders' expropriation by studying the effect of the control–ownership wedge of the largest owner on firm valuation (Attig et al., 2009; Claessens et al., 2002; Cronqvist and Nilsson, 2003; Maury, 2006; Maury and Pajuste, 2005, and many others). In this paper, we adopt the same methodology to examine whether controlling shareholders are extracting private benefits of control in our sample.

Table 2
Correlation coefficients between variables.

Variable	*MLSD*	*VRRATIO*	*DISPERSION*	*SHAPLEY*	*WEDGE*	*LEVERAGE_RATIO*	*ASSET_MATURITY*	*MTB*	*STD_ROA*	*ABNE*	*SIZE*
MLSD	1.0000	0.9570[a]	−0.5498[a]	−0.3677[a]	0.0494[a]	−0.0353[a]	−0.1136[a]	0.0367[a]	−0.0048	−0.0031	−0.0784[a]
VRRATIO	0. 7863[a]	1.0000	−0.6059[a]	−0.4596[a]	0.0577[a]	−0.0280[b]	−0.1245[a]	0.0386[a]	−0.0106	−0.0100	−0.0560[a]
DISPERSION	−0.5415[a]	−0.5286[a]	1.0000	0.8102[a]	−0.1704[a]	0.0405[a]	0.2040[a]	−0.0653[a]	−0.0398[a]	0.0049	−0.0472[a]
SHAPLEY	−0.3677[a]	−0.5540[a]	0.7103[a]	1.0000	−0.1027[a]	0.1008[a]	0.2197[a]	−0.0382[a]	−0.0712[a]	0.0040	0.0107
WEDGE	0.0490[a]	0.0677[a]	−0.1958[a]	−0.1386[a]	1.0000	0.0627[a]	−0.0582[a]	0.0205	−0.0186	0.0152	0.0909[a]
LEVERAGE_RATIO	−0.0248[c]	−0.0113	0.0277[b]	0.0716[a]	0.0255[c]	1.0000	0.2687[a]	−0.1834[a]	0.0296[b]	0.0525[a]	0.1617[a]
ASSET_MATURITY	−0.0535[a]	−0.0674[a]	0.1009[a]	0.0929[a]	−0.0638[a]	0.1301[a]	1.0000	−0.1888[a]	0.0139	0.0028	0.2576[a]
MTB	0.0373[a]	0.0336[b]	−0.0739[a]	−0.0282[b]	−0.0186	−0.0912[a]	−0.0661[a]	1.0000	−0.2124[a]	−0.0262[b]	−0.0774[a]
STD_ROA	−0.0031	0.0106	−0.0214	−0.0579[a]	−0.0397[a]	0.0090	0.0188	−0.0533[a]	1.0000	0.0060	0.0030
ABNE	−0.0037	−0.0013	0.0022	−0.0108	−0.0111	0.0784[a]	0.0012	−0.0506[a]	0.0357[a]	1.0000	0.0731[a]
SIZE	−0.0692[a]	−0.0377[a]	−0.0516[a]	−0.0250[c]	0.1069[a]	0.0723[a]	0.0565[a]	−0.1054[a]	0.1561[a]	0.0478[a]	1.0000

This table reports Pearson (below the diagonal) and Spearman (above the diagonal) correlation coefficients for all variables used in our main regressions. The sample includes 5711 firm-year observations representing 604 French listed firms over the period 1998–2013. The sample includes only concentrated ownership firms (at the 10% threshold). The superscript a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Appendix 1 reports detailed definitions for all the variables used in this study.

Table 3
The impact of controlling owners on firm value.

Variable	Full sample		*MLSD* = 0	*MLSD* = 1	Long maturity	Short maturity	Long maturity and *MLSD* = 1	Short maturity and *MLSD* = 1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
WEDGE	−0.2783[a]		−0.3558[a]	−0.0620	−0.3697[a]	−0.0639	−0.3190[b]	0.1945
	(−4.1542)		(−4.4161)	(−0.4828)	(−5.0899)	(−0.4800)	(−1.9763)	(0.8872)
CONTROL_DUMMY		−0.2277[a]						
		(−4.1106)						
LEVERAGE_RATIO	−0.0752	−0.0746	0.0025	−0.2043	0.3935[a]	−0.7446[a]	0.1622	−0.6595[a]
	(−0.8475)	(−0.8409)	(0.0235)	(−1.2381)	(3.8954)	(−4.5225)	(0.7237)	(−2.6601)
SALES GROWTH	0.5888[a]	0.5904[a]	0.6043[a]	0.5640[a]	0.5811[a]	0.5500[a]	0.5395[a]	0.5201[a]
	(14.1489)	(14.1861)	(11.5842)	(7.9864)	(12.0563)	(7.4435)	(5.5640)	(5.0341)
TANGIBILITY	−0.7517[a]	−0.7214[a]	−0.7575[a]	−0.6651[a]	−0.8425[a]	−0.5583[b]	−0.9300[a]	−0.4741
	(−7.4499)	(−7.1548)	(−6.3524)	(−3.5254)	(−8.1199)	(−2.3480)	(−4.0238)	(−1.3241)
SIZE	−0.0539[a]	−0.0654[a]	−0.0429[a]	−0.1073[a]	−0.0356[a]	−0.1117[a]	−0.0809[a]	−0.1577[a]
	(−8.1468)	(−9.4026)	(−5.9282)	(−6.7272)	(−5.0910)	(−7.6015)	(−3.8919)	(−6.1136)
AGE	−0.0018[a]	−0.0019[a]	−0.0019[a]	−0.0015[b]	−0.0012[a]	−0.0034[a]	−0.0014	−0.0017
	(−4.9185)	(−5.0675)	(−4.2409)	(−2.0534)	(−2.9426)	(−4.3009)	(−1.5684)	(−1.2602)
Constant	2.9307[a]	3.2954[a]	2.7297[a]	3.2601[a]	2.3050[a]	4.0277[a]	3.4637[a]	4.2509[a]
	(21.7177)	(20.1352)	(18.2426)	(14.2756)	(20.2128)	(14.4073)	(8.5357)	(8.4058)
Year_FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	6192	6192	4247	1945	3776	2416	1074	871
Adjusted-R^2	0.1399	0.1399	0.1235	0.1753	0.1442	0.1592	0.1310	0.2495
F-value	32.4754[a]	32.4623[a]	20.3004[a]	13.9088[a]	20.8758[a]	15.7517[a]	6.0563[a]	10.3292[a]

Comparison of the WEDGE coefficients across the groups

	χ^2 (1)	*p*-value
MLSD = 0 vs. MLSD = 1	3.95[b]	0.046
Long maturity vs. Short maturity	5.11[b]	0.023
Long maturity and MLSD = 1 vs. Short maturity and MLSD = 1	4.09[b]	0.043

This table presents the results on the effect of controlling owners on firm value. In each specification, the dependent variable is Tobin's *q* (*Q*), which is the ratio of the market value of assets to the replacement costs of assets. The market value of assets is calculated as follows: market value of equity + (book value of assets − book value of equity). The replacement costs of assets are proxied by the book value of assets. The sample includes 6192 firm-year observations over the period 1998–2013. Heteroskedasticity-robust *t*-statistics are in parentheses beneath coefficient estimates. The superscript a, b, and c denote statistical significance at the 1%, 5%, and 10% levels. Appendix 1 reports detailed definitions for all the variables used in this study.

regressions. *Q* is the ratio of the market value of assets to the replacement cost of assets.[10] We estimate two specifications of the following model (subscripts suppressed for notational convenience):

$$Q = \alpha_0 + \alpha_1 X + \alpha_2 CONTROLS + FIXED\_EFFECTS + \varepsilon \quad (2)$$

where *X* is one of the variables *WEDGE* and *CONTROL_DUMMY*. *WEDGE* proxies for the degree of separation of the control rights and cash flow rights of the controlling owner. *CONTROL_DUMMY* is a dummy variable that equals one if the firm has a controlling owner (at the 10% threshold) and zero otherwise. *CONTROLS* is a set of firm-level control variables shown in the literature to affect firm value, namely *LEVERAGE_RATIO*, *SALES_GROWTH*, *TANGIBILIY*, *SIZE*, and *AGE* (Appendix 1 reports definitions for these variables.) *FIXED_EFFECTS* is a set of year and industry (based on the two-digit SIC codes) fixed effects.

The results of our OLS regressions are shown in the first two columns of Table 3. In specification (1) of Table 3, we include the variable *WEDGE*. We find that the coefficient of this variable is negative and statistically significant at the 1% level, indicating that the control–ownership wedge of the controlling owner is associated with decreased firm valuation. This result is consistent with the notion that controlling owners with higher degrees of separation of control rights and cash flow rights are entrenched and use their firms to generate private benefits of control at the expense of minority shareholders. The coefficient for *WEDGE* is also economically significant. Everything else being equal, a one standard deviation increase in the control–ownership wedge of the controlling owner induces a 0.0589 decrease in the Tobin's *q*, representing a 3.65% decrease over the sample average Tobin's *q*.[11]

In specification (2), we replace *WEDGE* with *CONTROL_DUMMY*. The coefficient on *CONTROL_DUMMY* is also negative and strongly significant, suggesting that the mere presence of a controlling owner translates into a 22.77% reduction in Tobin's *q*, *ceteris paribus*. These findings imply that entrenched controlling owners pursue private benefits of control to the detriment of other investors, which results in valuation discounts of their firms. These results are also in line with those of Claessens et al. (2002), Cronqvist and

[10] The market value of assets is calculated as follows (see, e.g., Cheng, 2008): market value of assets = market value of equity + (book value of assets − book value of equity). The replacement costs of assets are proxied by the book value of assets.

[11] To calculate the economic impact, we use the standard deviation of *WEDGE* (0.2117) and the average Tobin's *q* (1.6146) of the sample of all listed firms (6192 firm-year observations).

Nilsson (2003), and Boubaker (2007), among others. Moreover, the coefficients on the control variables are in line with prior research. In particular, the coefficients on *SALES_GROWTH* are positive and statistically significant at the 1% level and the coefficients on *TANGIBILITY*, *SIZE*, and *AGE* are significantly negative at the 1% threshold.

4.1.2. Evidence on the monitoring role of MLS

Previous studies have found that MLS have the incentives and power to monitor the controlling owner and to limit her ability to divert corporate resources. Such a monitoring role improves governance, leading to higher firm value (e.g., Attig et al., 2009; Laeven and Levine, 2008) and lower cost of capital (e.g., Attig et al., 2008). However, the corporate governance literature offers an alternative view by recognizing that large shareholders may also have incentives to collude in order to appropriate private benefits of control at the expense of minority shareholders. For instance, Zwiebel (1995) demonstrates that MLS may have incentives to be in collusion with each other to divert corporate resources for their personal consumption. Several empirical studies show that large shareholders may choose to collude to consume private benefits of control, which results in lower firm value (Maury and Pajuste, 2005) and lower dividend rates (Faccio et al., 2001).

In specifications (3) and (4) of Table 3, we examine whether controlling owners and MLS, beyond the controlling owner, are in a contentious relation or collude to extract private benefits of control. We rerun specification (1) of Table 3 separately for the subsample of firms with MLS (*MLSD* = 1) and those without MLS (*MLSD* = 0). Specifications (3) and (4) reveal that the coefficient for *WEDGE* is negative and statistically significant at the 1% level only for the subsample of firms without MLS, suggesting that the negative impact of controlling owners on firm value is less pronounced for the subsample of firms with MLS. The difference in coefficient on *WEDGE* between the two subsamples is statistically significant at the 5% level (χ^2 (1) = 3.95; *p*-value = 0.046). This finding supports the view that MLS and controlling owners are in a contentious relation, and that MLS play an effective monitoring role that helps to mitigate the adverse effects of the control–ownership wedge on firm value.

4.1.3. Evidence on the monitoring role of short-term debtholders

In specifications (5) and (6) of Table 3, we examine the role of short-term debtholders in curbing the consumption of private benefits by the controlling owners. We therefore split our sample into two groups: (i) firms with a high debt maturity ratio (i.e., firms with a long-term debt to total debt ratio higher than 50%); and (ii) firms with low debt maturity ratio (lower than 50%). We then rerun our firm value basic regression (specification (1) of Table 3) separately for the subsample of firms with long-term debt maturity and the subsample with short-term debt maturity. The results show that the coefficient for *WEDGE* is negative and statistically significant at the 1% level only for the subsample of firms with long-term debt maturity, suggesting that the adverse effects of the control–ownership wedge on firm value are more pronounced for firms with higher long-term debt. Moreover, we find that the difference in coefficient on *WEDGE* between the two subsamples is statistically significant at the 5% level (χ^2 (1) = 5.11; *p*-value = 0.023). These results indicate that short-term debtholders have an advantage over long-term debtholders in terms of monitoring efficiency, which makes them better able to curb the consumption of private benefits of control. These results remain qualitatively unchanged when we use *CONTROL_DUMMY* instead of *WEDGE* as a proxy for private benefits extraction.

Finally, we attempt to compare the monitoring abilities of MLS and short-term debtholders. Therefore, we limit our sample to firms with MLS (1945 firm-year observations). We then split this subsample into two groups based on the debt maturity ratio (using a breakpoint of 50%). We rerun our basic firm value regression (specification (1) of Table 3) separately for each group. The results, reported in specifications (7) and (8) of Table 3, show that the coefficient for *WEDGE* is negative and highly significant for firms with a high debt maturity ratio whereas it is positive and not statistically significant for firms with short maturity debt. This result suggests that short-term debtholders are more efficient than MLS in monitoring controlling shareholders (the difference in coefficient on *WEDGE* between the two subsamples is significant at the 5% level).[12] Specifically, this finding suggests that short-term debtholders are able to reduce private benefits over and beyond what MLS could do themselves.[13]

4.2. Model specification

We estimate several specifications of the following model (subscripts are suppressed for notational convenience):

$$\begin{aligned} DEBT\_MATURITY = {} & \beta_0 + \beta_1 MLSVAR + \beta_2 WEDGE + \beta_3 LEVERAGE\_RATIO \\ & + \beta_4 ASSET\_MATURITY + \beta_5 MTB + \beta_6 STD\_ROA + \beta_7 ABNE \\ & + \beta_8 SIZE + FIXED\_EFFECTS + \varepsilon \end{aligned} \tag{3}$$

where the dependent variable, *DEBT_MATURITY*, is the ratio of long-term debt to total debt. The corporate governance variables are *WEDGE* and *MLSVAR*, which is one of the MLS-related variables (that is, *MLSD*, *VRRATIO*, *SHAPLEY*, or *DISPERSION*). The control variables are *LEVERAGE_RATIO*, *ASSET_MATURITY*, *MTB*, *STD_ROA*, *ABNE*, and *SIZE*. The term *FIXED_EFFECTS* is a set of year and industry fixed effects based on the two-digit SIC codes that are included in the regressions to control for unobserved factors that may affect debt

[12] The significant impact of *WEDGE* on firm value in specification (7) does not imply that MLS are not effective monitors. Using the subsample of firms without MLS (*MLSD* = 0) and with a high debt maturity ratio, we find that the coefficient on *WEDGE* is significantly negative at the 1% level and significantly higher (in absolute value) than that of specification (7) in Table 3. In another test, we regress Tobin's *q* against the variable *MLSD* and the independent variables of Eq. (2). We find that *MLSD* enters the regression with a positive and strongly significant sign (at the 5% level), indicating that MLS play a valuable monitoring role. We omit the tabulation of these results to save space.

[13] In this section, the results are robust to splitting the sample at the median level of debt maturity ratio.

maturity. ε is an error term. Our principal concern in the analysis is the *MLSVAR* coefficient estimate, β_1. Negative (positive) coefficients of *MLSD* and *VRRATIO* (*DISPERSION* and *SHAPLEY*) would provide evidence that corporate debt maturity decreases with the presence of MLS and their contestability of the controlling owner's power.

4.3. Regression results

Table 4 presents our main evidence on the impact of MLS on debt maturity. We consider several specifications, all of which are OLS regressions with cluster effects at the firm level. *t*-statistics are calculated using White's (1980) heteroskedastic-consistent standard errors. Specification (1) reports the results from a baseline model comprising the key ownership variables *MLSD* and *WEDGE* along with *SIZE*. According to our main hypothesis, the presence of MLS is negatively related to the use of long-term debt. Specification (1) reveals that the coefficient of *MLSD* is negative and statistically significant at the 1% level. This result is also economically important in that, *ceteris paribus*, the presence of MLS leads to a lower fraction of long-term debt, with a difference of about 2.42%. This result supports the prediction that MLS provide valuable monitoring over the controlling owner, which reduces her preference for longer maturity debt and for less scrutiny and increases the firm's use of short-term debt.

The results also show that the coefficient of *WEDGE* is significantly positive at the 1% level, indicating that increases in the control rights over the ownership rights of the controlling owner are associated with longer-term debt. This result suggests that entrenched controlling owners (i.e., those with a higher control–ownership wedge) choose longer maturity debt to reduce the potential discipline of external monitoring by the debt market. This finding is in line with that of Lin et al. (2013), who show strong support for the prediction of a positive association between the control–ownership wedge of the controlling owner and debt maturity.

We also find evidence that larger firms have longer debt maturity structures, since the coefficient of the variable *SIZE* is positive and statistically significant at the 1% level. This result is consistent with the view that large firms have higher credit quality and therefore are more able to obtain long-term debt than small firms (Diamond, 1991). This finding is also in line with the results of Barclay and Smith (1995) and Johnson (2003), among others.

In specification (2), we regress *DEBT_MATURITY* on *MLSD*, *WEDGE*, and the remaining control variables of our model (Eq. (3)). We find that the coefficients and significance levels for *MLSD*, *WEDGE*, and *SIZE* are almost identical to those observed in specification (1). Moreover, consistent with prior research (e.g., Dang, 2011; Johnson, 2003; Lin et al., 2013; Stohs and Mauer, 1996; Zheng et al., 2012), we find that the coefficient estimate on *LEVERAGE_RATIO* is positive and statistically significant at the 1% level. This finding indicates

Table 4
The impact of MLS on debt maturity: main evidence.

Variable	(1)	(2)	(3)	(4)	(5)
MLSD	−0.0242[a]	−0.0221[a]			
	(−3.0027)	(−2.8054)			
VRRATIO			−0.0137[b]		
			(−1.9792)		
DISPERSION				0.0422[a]	
				(2.9872)	
SHAPLEY					0.0895[a]
					(7.7518)
WEDGE	0.0521[a]	0.0597[a]	0.0595[a]	0.0666[a]	0.0744[a]
	(2.7560)	(3.2283)	(3.2202)	(3.5704)	(3.9974)
LEVERAGE_RATIO		0.3493[a]	0.3502[a]	0.3503[a]	0.3413[a]
		(14.1594)	(14.1847)	(14.1989)	(14.0007)
ASSET_MATURITY		0.0013[a]	0.0013[a]	0.0013[a]	0.0012[a]
		(3.6289)	(3.6282)	(3.5479)	(3.3741)
MTB		0.0002	0.0002	0.0004	0.0003
		(0.1340)	(0.1196)	(0.2625)	(0.2372)
STD_ROA		−0.2952[a]	−0.2936[a]	−0.2870[a]	−0.2493[a]
		(−4.1617)	(−4.1440)	(−4.0465)	(−3.5221)
ABNE		−0.0394[a]	−0.0394[a]	−0.0395[a]	−0.0383[a]
		(−2.9792)	(−2.9760)	(−2.9942)	(−2.9068)
SIZE	0.0301[a]	0.0239[a]	0.0240[a]	0.0246[a]	0.0251[a]
	(15.1225)	(12.0087)	(12.0561)	(12.3241)	(12.6143)
Constant	0.0317	0.1148	0.1120	0.0875	0.0367
	(0.4572)	(1.6260)	(1.5815)	(1.2445)	(0.5238)
Year_FE	Yes	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes	Yes
Sample size	5711	5711	5711	5711	5711
Adjusted R^2	0.0601	0.1058	0.1051	0.1059	0.1141
F-value	18.6170[a]	21.9394[a]	21.7772[a]	21.9150[a]	23.4448[a]

This table presents our main evidence on the impact of MLS on debt maturity. In each specification, the dependent variable is *DEBT_MATURITY* that equals the ratio of long-term debt to total debt. The sample includes 5711 firm-year observations representing 604 French listed firms over the period 1998–2013. The sample includes only concentrated ownership firms (at the 10% threshold). Heteroskedasticity-robust *t*-statistics are in parentheses beneath coefficient estimates. The superscript a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Appendix 1 reports detailed definitions for all the variables used in this study.

that firms with higher leverage are more willing to choose longer maturity debt than their counterparts with lower leverage ratios, to avoid liquidity risk (Diamond, 1991).

The results of specification (2) of Table 4 also show that the coefficient of the variable *ASSET_MATURITY* is positive and statistically significant, suggesting that firms match the maturities of their assets and liabilities to avoid debt repayment problems and/or to lower the agency costs of debt. This finding supports the maturity matching principle. The coefficient of the variable *STD_ROA* is negative and statistically significant at the 1% level, suggesting that firms with higher credit risk are more likely to use short-term debt because they may be screened out of the long-term debt market (Johnson, 2003). Finally, we find that the variable *ABNE*, which proxies for a firm's abnormal earnings, exerts a negative and significant impact (at the 1% level) on debt maturity, suggesting that high-quality firms signal their type to creditors by issuing more short-term debt (Flannery, 1986). Overall, the signs of the variables in specification (2) remain qualitatively similar across all specifications in Table 4 and are consistent with the literature on debt maturity.

Furthermore, to assess the impact of the voting power of MLS and their control contestability of the largest owner on debt maturity, we introduce, in specifications (3), (4), and (5), three MLS related variables, namely *VRRATIO*, *DISPERSION*, and *SHAPLEY*, respectively. The variable *VRRATIO* enters the regression with a negative and strongly significant sign, suggesting that firms with higher relative MLS power vis-à-vis the controlling owner have shorter debt maturities. This finding reinforces our contention that MLS play an important governance role in reducing the tendency to lock in long-maturity debt financing.

We also find that the dispersion of the voting rights of the four largest shareholders has a significant impact on debt maturity, since the variable *DISPERSION* enters positively and significantly at the 5% level. Moreover, specification (5) reveals that the variable *SHAPLEY* has, as expected, a significantly positive effect on debt maturity. Again, these findings support our hypothesis that the control contestability of MLS with respect to the controlling owner limits her ability to extract private benefits, which reduces the firm's use of long-term debt as a fraction of its total debt. In sum, our findings provide strong evidence that large shareholders play an important role in determining corporate debt maturity. Their impact on debt maturity is both economically and statistically significant.

4.4. Endogeneity

A potential concern with our empirical analysis is the endogeneity issue. Specifically, our research is likely to suffer from reverse causality between ownership structure and debt maturity. Furthermore, our results may be biased due to the presence of omitted variables that affect both ownership structure and debt maturity. In this section, we address the endogeneity issue using different approaches.

4.4.1. Propensity score matching

Our first approach to addressing endogeneity is based on a propensity score matching (PSM) procedure. We use the PSM method to construct a sample that includes all firms with MLS (at the 10% threshold) and a matched set of firms without MLS. This technique allows us to identify a control sample of firms that have only one large shareholder but that have characteristics similar to those of firms with MLS (Dehejia and Wahba, 2002; Rosenbaum and Rubin, 1983). Thus, it allows us to control for observable differences in characteristics between these two groups of firms. The matched sample is identified based on the industry class, the year, and the nearest-neighbor technique, which consists of choosing the firm without MLS that is closest in terms of probability of being owned by MLS (that is, its propensity score).[14] This probability is calculated using a probit model where the dependent variable is *MLSD* and the independent variables are (i) *LEVERAGE_RATIO*, (ii) *SIZE*, (iii) *AGE*, (iv) *FCF*, and (v) *TANGIBILITY*, as well as industry and year dummy variables. These variables have been shown in prior studies to be determinants of the presence of large shareholders (e.g., Demsetz and Lehn, 1985; Faccio et al., 2011). We also include a proxy for growth opportunities (*CAPEX*), to address the possibility of self-selection of MLS based on firm strategy.[15] The PSM procedure results in a sample of 3890 firm-year observations equally distributed between firms with MLS and firms with only one large shareholder.

Table 5 presents the results from estimating the probit model (specification (1)) and from re-estimating Eq. (3) using the propensity score matched sample (specifications (2) to (5)). The probit results show that the coefficients of *SIZE* and *AGE* are negative and statistically significant at the 1% level, indicating that smaller and younger firms are more likely to be owned by MLS. These results are consistent with the view that acquiring large ownership fractions in larger or older firms (which generally tend to be larger and require more external funding) is very costly for investors (e.g., Demsetz and Lehn, 1985). The coefficient of *FCF* is significantly positive at the 5% threshold, which implies that MLS are more likely to be present and to play a valuable monitoring role in firms with high free cash flows, since controlling owners in these firms have higher incentives to consume private benefits of control (e.g., Bebchuk et al., 2000). More importantly, the results given in specifications (2) to (5) of Table 5 are similar to our earlier findings. The coefficients of *MLSD* and *VRRATIO* (*DISPERSION* and *SHAPLEY*) are negative (positive) and statistically significant at conventional levels. Moreover, the coefficients of *WEDGE* are significantly positive at the 1% level and the signs and statistical significance of the estimated coefficients on the remaining control variables are qualitatively unchanged. Thus, these results are consistent with the view that the presence and voting power of MLS increase the firm's use of short-term debt.

[14] Matching is conducted with replacement and within a maximum distance of 1% (Boubakri et al., 2012; Dehejia and Wahba, 2002; Morgan and Harding, 2006).

[15] If MLS know that a firm is on the right path, they may prefer to hold on to equity. High-growth firms, for instance, may prefer not to rely on long-term debt, leading to a negative relation between MLS and debt maturity. In unreported results, we use Tobin's *q* as an alternative proxy for growth opportunities, and we find similar results. We are grateful to an anonymous referee for bringing this possibility to our attention.

Table 5
Regressions using a propensity score matched sample.

Variable	Probit	Results using PSM sample			
	(1)	(2)	(3)	(4)	(5)
MLSD		−0.0227[b]			
		(−2.5294)			
VRRATIO			−0.0165[b]		
			(−2.2589)		
DISPERSION				0.0542[a]	
				(2.8424)	
SHAPLEY					0.1001[a]
					(7.3489)
WEDGE		0.1081[a]	0.1081[a]	0.1153[a]	0.1253[a]
		(4.6522)	(4.6491)	(4.9587)	(5.3701)
LEVERAGE_RATIO	0.0253	0.3052[a]	0.3064[a]	0.3050[a]	0.2995[a]
	(0.2269)	(9.9124)	(9.9453)	(9.8669)	(9.8438)
ASSET_MATURITY		0.0015[a]	0.0015[a]	0.0014[a]	0.0013[a]
		(4.0310)	(4.0057)	(3.9094)	(3.6168)
MTB		0.0003	0.0003	0.0006	0.0006
		(0.2057)	(0.2043)	(0.3467)	(0.3561)
STD_ROA		−0.3099[a]	−0.3055[a]	−0.2995[a]	−0.2608[a]
		(−3.8080)	(−3.7607)	(−3.6923)	(−3.2197)
ABNE		−0.0434[a]	−0.0437[a]	−0.0438[a]	−0.0417[a]
		(−2.7004)	(−2.7137)	(−2.7319)	(−2.6050)
SIZE	−0.0390[a]	0.0256[a]	0.0256[a]	0.0262[a]	0.0269[a]
	(−4.1702)	(9.8929)	(9.9065)	(10.1144)	(10.4509)
AGE	−0.0015[a]				
	(−2.9068)				
FCF	0.0039[b]				
	(2.0839)				
TANGIBILITY	−0.0018				
	(−1.2799)				
CAPEX	0.0039				
	(1.4278)				
Constant	0.3823[b]	0.3831[a]	0.3703[a]	0.3472[a]	0.2772[a]
	(2.0804)	(8.3720)	(8.3641)	(7.7242)	(5.9682)
Year_FE	Yes	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes	Yes
Sample size	5711	3890	3890	3890	3890
Wald χ^2	185.0112a				
Pseudo-R^2	0.0271				
Adjusted R^2		0.1042	0.1037	0.1046	0.1145
F-value		15.7162[a]	15.7594[a]	15.9006[a]	17.3135[a]

This table presents results of the probit regression used to calculate propensity scores (specification (1)) and the OLS regressions using a propensity score matched sample (specifications (2) to (5)). The dependent variable is the ratio of long-term debt to total debt in all specifications except specification (1), where the dependent variable is the dummy *MLSD* that equals one if the firm has at least two large shareholders (at the 10% threshold) and zero otherwise. The samples include only concentrated ownership firms (at the 10% threshold). The superscript a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Appendix 1 reports detailed definitions for all the variables used in this study.

4.4.2. Instrumental variable regressions

To further address the endogeneity issue, we consider a two-stage instrumental variable approach using the average values of the variables *MLSD*, *VRRATIO*, *DISPERSION*, and *SHAPLEY* of all other firms operating in the same industry group as instruments for *MLSD*, *VRRATIO*, *DISPERSION*, and *SHAPLEY*, respectively. These instrumental variables capture the "natural" tendency of MLS to be present in firms that are involved in similar types of activities.[16] An important feature of these instruments is that they are correlated with an individual firm's ownership structure, but it is unlikely that the change in debt maturity of one firm affects the average ownership structure of the entire industry. Laeven and Levine (2009), Mishra (2011), and Paligorova and Xu (2012) use similar instrumental variables to account for the endogeneity of ownership structures.

Table 6 reports results of the first-stage (Panel A) and second-stage (Panel B) regressions. In the first-stage regressions, we use each of the instruments along with all exogenous variables to explain the presence and voting power of MLS. For the sake of brevity, we only report the coefficients and the *t*-statistics for the instrumental variables, as well as the *F*-statistic and the partial R^2 of excluded instruments. We find that the instruments enter the first-stage regressions with strongly significant (at the 1% level) positive

[16] We follow Lin et al. (2013) and use the initial industry averages of our MLS variables as alternative instruments. These are reasonable instruments since it is unlikely that a firm's current debt maturity is affected by its historical industry average ownership structure. Yet it is likely that an individual firm's ownership structure is correlated with its industry average. We find similar results using these instruments (unreported). The results are also robust to using two-year lagged MLS variables as instruments.

Table 6
Instrumental variable regressions.

Variable	(1)	(2)	(3)	(4)
Panel A: First-stage regressions				
IV_MLSD	2.1319[a]			
	(35.5132)			
IV_VRRATIO		1.9220[a]		
		(30.1753)		
IV_DISPERSION			2.3267[a]	
			(39.0235)	
IV_SHAPLEY				1.5691[a]
				(31.9382)
Partial R^2 of excluded instruments	0.1818	0.1382	0.2115	0.1523
F-test of excluded instruments	1261.19[a]	910.548[a]	1522.84[a]	1020.05[a]
Panel B: Second-stage regressions				
MLSD (fitted)	−0.0784[a]			
	(−4.3401)			
VRRATIO (fitted)		−0.0947[a]		
		(−4.8906)		
DISPERSION (fitted)			0.1195[a]	
			(3.8204)	
SHAPLEY (fitted)				0.1020[a]
				(3.4808)
WEDGE	0.0657[a]	0.0725[a]	0.0836[a]	0.0767[a]
	(3.6154)	(3.9321)	(4.3333)	(4.0910)
LEVERAGE_RATIO	0.3490[a]	0.3538[a]	0.3521[a]	0.3407[a]
	(15.5502)	(15.6508)	(15.7214)	(15.2105)
ASSET_MATURITY	0.0013[a]	0.0012[a]	0.0012[a]	0.0012[a]
	(4.0282)	(3.7533)	(3.7603)	(3.8357)
MTB	0.0004	0.0005	0.0008	0.0004
	(0.3287)	(0.4305)	(0.6859)	(0.3013)
STD_ROA	−0.3003[a]	−0.2893[a]	−0.2765[a]	−0.2469[a]
	(−4.5739)	(−4.3734)	(−4.2034)	(−3.6996)
ABNE	−0.0396[a]	−0.0397[a]	−0.0400[a]	−0.0383[a]
	(−3.2276)	(−3.2163)	(−3.2698)	(−3.1547)
SIZE	0.0233[a]	0.0232[a]	0.0252[a]	0.0251[a]
	(11.7525)	(11.6388)	(12.6334)	(12.6799)
Constant	0.0554	0.0581	−0.0457	−0.0804[c]
	(1.3298)	(1.3896)	(−1.0480)	(−1.6487)
Year_FE	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes
Sample size	5711	5711	5711	5711
Adjusted R^2	0.0971	0.0846	0.1011	0.1137
Wald χ^2	715.8363[a]	711.4031[a]	714.7426[a]	722.1860[a]

This table presents results of the instrumental variable regressions. Panel A (B) reports first-stage (second-stage) regression results. The regressions are estimated using the mean values of the variables *MLSD*, *VRRATIO*, *DISPERSION*, and *SHAPLEY* of all other firms operating in the same industry group as instruments. The sample includes only concentrated ownership firms (at the 10% threshold). The superscript a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Appendix 1 reports detailed definitions for all the variables used in this study.

coefficients. Moreover, the *F*-statistics (partial R^2) range from 910.548 to 1522.84 (from 13.82% to 21.15%), which alleviates the concern that our coefficient estimators are biased because of weak instruments (Bound et al., 1995; Staiger and Stock, 1997).

In the second stage, we use the fitted value of each of our MLS-related variables from the first-stage regression as the test variable. The regression results from the second stage reported in Panel B of Table 6 reinforce our earlier findings. They show that the coefficients on the fitted values of *MLSD* and *VRRATIO* (*DISPERSION* and *SHAPLEY*) are negative (positive) and statistically significant at the 1% level, suggesting that the presence of MLS and the extent of their contestability of the power of the largest owner are associated with lower debt maturity.[17]

4.4.3. Additional control variables

To mitigate the omitted variable problem, we separately add to our model various control variables that have been shown in the literature to influence the maturity structure of corporate debt, one at a time.[18] The results of this sensitivity analysis are reported in

[17] Following Lin et al. (2013), we also extract the exogenous component of the control–ownership wedge of the controlling owners using an instrumental variable approach. We use as the instrument the initial industry average of *WEDGE*. The first-stage regressions and the *F*-test of excluded instruments strongly support the choice of this instrument. The second-stage regressions show that the coefficients on the fitted values of *WEDGE* are positive and statistically significant at the 1% level. We find similar results using, as instruments, the industry average of *WEDGE* and the two-year lagged *WEDGE*. These results are not tabulated, for the sake of space, but are available from the authors upon request.

[18] To further mitigate the omitted variable concern, our regressions include industry and year fixed effects to control for industry and time invariant factors that may be driving the results, in line with Laeven and Levine (2008) and Lin et al. (2013), among others.

Table 7
Additional control variables.

Variable	*UCF*	*ROA*	*ROE*	*LOSS*	*REGULATED*	*BIG-4*	*ETR*	*Z-SCORE*	*JONES*	*DD*	*MCNICHOLS*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
MLSD	−0.0264[a]	−0.0208[a]	−0.0211[a]	−0.0210[a]	−0.0222[a]	−0.0233[a]	−0.0220[a]	−0.0215[a]	−0.0221[a]	−0.0224[a]	−0.0227[a]
	(−3.1358)	(−2.6461)	(−2.6778)	(−2.6616)	(−2.8241)	(−2.9568)	(−2.7935)	(−2.7346)	(−2.8100)	(−2.8545)	(−2.8964)
WEDGE	0.0432[b]	0.0612[a]	0.0606[a]	0.0615[a]	0.0611[a]	0.0588[a]	0.0602[a]	0.0624[a]	0.0594[a]	0.0613[a]	0.0608[a]
	(1.9676)	(3.3284)	(3.2847)	(3.3392)	(3.3094)	(3.1775)	(3.2541)	(3.3846)	(3.2122)	(3.3280)	(3.2986)
ADDITIONAL_CONTROL	−0.0351[c]	0.0020[a]	0.0006[b]	−0.0352[a]	0.1095[a]	0.0192[b]	0.0096	0.0041[a]	0.0074	0.0906[a]	0.0965[a]
	(−1.6972)	(3.0762)	(2.3775)	(−3.6768)	(3.7573)	(2.4993)	(0.7166)	(4.0290)	(0.9035)	(5.1458)	(5.1616)
LEVERAGE_RATIO	0.3493[a]	0.3627[a]	0.3543[a]	0.3629[a]	0.3410[a]	0.3501[a]	0.3504[a]	0.3635[a]	0.3498[a]	0.3602[a]	0.3586[a]
	(14.1606)	(14.6497)	(14.2436)	(14.7054)	(13.7601)	(14.2053)	(14.1954)	(14.6529)	(14.1765)	(14.8296)	(14.7479)
ASSET_MATURITY	0.0014[a]	0.0014[a]	0.0014[a]	0.0013[a]	0.0012[a]	0.0013[a]	0.0013[a]	0.0013[a]	0.0013[a]	0.0013[a]	0.0013[a]
	(3.6916)	(3.7090)	(3.6969)	(3.6400)	(3.2440)	(3.5892)	(3.6468)	(3.4939)	(3.6357)	(3.6637)	(3.7249)
MTB	0.0000	−0.0001	0.0002	0.0001	0.0002	0.0000	0.0002	0.0003	0.0001	0.0000	0.0004
	(0.0322)	(−0.0470)	(0.1545)	(0.1101)	(0.1519)	(0.0190)	(0.1285)	(0.2569)	(0.0454)	(0.0095)	(0.2844)
STD_ROA	−0.3006[a]	−0.2741[a]	−0.2900[a]	−0.2740[a]	−0.2881[a]	−0.3007[a]	−0.2900[a]	−0.2778[a]	−0.2954[a]	−0.2816[a]	−0.2863[a]
	(−4.2313)	(−3.8326)	(−4.0739)	(−3.8471)	(−4.0683)	(−4.2412)	(−4.0675)	(−3.9086)	(−4.1631)	(−3.9827)	(−4.0508)
ABNE	−0.0394[a]	−0.0321[b]	−0.0393[a]	−0.0334[b]	−0.0393[a]	−0.0399[a]	−0.0389[a]	−0.0331[b]	−0.0387[a]	−0.0362[a]	−0.0372[a]
	(−2.9795)	(−2.3915)	(−2.9782)	(−2.5178)	(−2.9635)	(−3.0068)	(−2.9414)	(−2.5069)	(−2.9294)	(−2.7591)	(−2.8486)
SIZE	0.0234[a]	0.0226[a]	0.0231[a]	0.0221[a]	0.0234[a]	0.0230[a]	0.0237[a]	0.0246[a]	0.0242[a]	0.0241[a]	0.0241[a]
	(11.6151)	(11.1129)	(11.3322)	(10.8014)	(11.7180)	(11.3383)	(11.7483)	(12.3135)	(12.0403)	(12.2000)	(12.1602)
Constant	0.1394[c]	0.1374[c]	0.1281[c]	0.1609[b]	0.1279[c]	0.1258[c]	0.1173[c]	0.1027	0.1103	0.1098	0.1092
	(1.9304)	(1.9346)	(1.7973)	(2.2290)	(1.8125)	(1.7726)	(1.6605)	(1.4548)	(1.5690)	(1.5648)	(1.5537)
Year_FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	5711	5711	5711	5711	5711	5711	5711	5711	5711	5711	5711
Adjusted R^2	0.1064	0.1077	0.1068	0.1081	0.1078	0.1067	0.1058	0.1092	0.1059	0.1116	0.1116
F-value	21.6176[a]	21.7583[a]	21.5409[a]	22.0421[a]	21.9029[a]	21.5259[a]	21.2965[a]	22.2085[a]	21.3295[a]	22.7985[a]	22.8318[a]

This table presents regression results after adding various control variables, one at a time, to our model (Eq. (3)). In each specification, the dependent variable is *DEBT_MATURITY* that equals the ratio of long-term debt to total debt. The sample includes 5711 firm-year observations over the period 1998–2013. The sample includes only concentrated ownership firms (at the 10% threshold). Heteroskedasticity-robust *t*-statistics are in parentheses beneath coefficient estimates. The superscript a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Appendix 1 reports detailed definitions for all the variables used in this study.

Table 7. Specifically, we control for the ultimate cash flow rights of the controlling owner (*UCF*) in specification (1) of Table 7, return on assets (*ROA*) in specification (2), and return on equity (*ROE*) in specification (3). In specification (4), we include a dummy variable that equals one if the firm has negative earnings (*LOSS*) and zero otherwise. Specifications (5) and (6) include dummy variables that indicate whether a firm operates in a regulated industry (*REGULATED*) and appoints a Big Four auditor (*BIG-4*), respectively. Additionally, in specifications (7) and (8) we control for the firm's effective tax rate (*ETR*) and Altman's (1968) Z-score (*Z-SCORE*), respectively. Finally, we include the variables *JONES*, *DD*, and *MCNICHOLS*, which proxy for a firm's earnings quality in specifications (9), (10), and (11), respectively. Table 7 shows that, in all cases, our previous findings for the variables *MLSD* and *WEDGE*, and the control variables included in Eq. (3), remain qualitatively unchanged.[19]

More importantly, we find that the coefficient of the variable *UCF* is negative and statistically significant at the 10% level. Previous studies on corporate governance show that controlling owners with large ultimate cash flow stakes have strong incentives to have their firms run properly (e.g., Bebchuk et al., 2000; Claessens et al., 2002). Thus, their incentives to consume private benefits of control are weaker, because doing so would decrease their wealth. This result implies that controlling owners with greater ultimate cash flow rights are less inclined to divert corporate resources, which reduces their incentives to avoid scrutiny by creditors, leading to a preference for long maturity debt.

5. Robustness tests

In what follows, we check the robustness of our results to considering alternative proxies for corporate governance variables, adopting alternative regression frameworks and using different sample compositions.

5.1. Alternative proxies for corporate governance variables

We check the sensitivity of our findings to using alternative proxies for corporate governance variables. We begin by replacing the variable *WEDGE* with one of three alternative proxies for the control–ownership wedge of the largest owner. The first proxy is the simple difference between the ultimate control rights (*UCO*) and *UCF* of the largest owner (Claessens et al., 2002). We then use a dummy variable, *WEDGE_HIGH_1*, that equals one if the control–ownership wedge of the largest owner exceeds the median wedge (0.2001) and zero otherwise. Our third proxy is also a dummy variable, *WEDGE_HIGH_2*, which indicates whether the control–ownership wedge of the largest owner is higher than the median wedge in corporations where ultimate control rights are higher than ultimate cash flow rights (Claessens et al., 2002). The results of this sensitivity analysis are reported in specifications (1) to (3) of Table 8.[20] We find that the coefficients of these variables are significantly positive at the 5% level and the core evidence of the effect of *MLSD* and the remaining control variables remains qualitatively the same.

Moreover, in the last three specifications of Table 8, we examine the sensitivity of our results to using alternative MLS-related variables. We consider three variables, namely *MLSN*, *VR234*, and *CONTESTABILITY_INDEX*. The variable *MLSN* equals the number of large shareholders, other than the largest controlling owner, up to the fourth-largest; *VR234* is the sum of the voting rights of the second-, third-, and fourth-largest blockholders; and *CONTESTABILITY_INDEX* is the common factor extracted from the MLS-related variables *MLSD*, *MLSN*, *VR234*, *VRRATIO*, *SHAPLEY*, and *DISPERSION*, using a principal component analysis. This analysis generates one factor with an eigenvalue greater than one that explains almost 70% of total variance. As expected, the results show a negative and statistically significant relation between each of these variables (i.e., *MLSN*, *VR234*, and *CONTESTABILITY_INDEX*) and the fraction of long-term debt. In addition, the coefficients of *WEDGE* and the other control variables remain statistically significant and with the expected signs, suggesting that the use of alternative MLS-related variables does not change our main conclusions. This set of robustness checks provides additional evidence that the MLS's control contestability of the largest owner is associated with shorter maturity debt.

5.2. Alternative dependent variables and regression frameworks

In this section, we check whether our results hold if we consider alternative dependent variables and regression frameworks. The results are presented in Table 9.[21] First, in specifications (1) and (2), we replicate our model after replacing the dependent variable *DEBT_MATURITY* with the variables *DEBT_MATURITY_2* and *DEBT_MATURITY_3*, respectively. The variable *DEBT_MATURITY_2* is a dummy variable that equals one if more than 50% of the firm's total debt is long-term and zero otherwise.[22] The variable *DEBT_MATURITY_3* is calculated as the difference between a firm's total liabilities and current liabilities, divided by its total liabilities (El Ghoul et al., forthcoming). Table 9 shows that the coefficient on *MLSD* is negative and statistically significant at the 1% level in specifications (1) and (2).

[19] Using *VRRATIO*, *DISPERSION*, or *SHAPLEY* instead of *MLSD* does not qualitatively alter the results of this sensitivity analysis.

[20] For the sake of brevity, we report the results of specifications (1) to (3) using only one MLS-related variable, *MLSD*. The results remain qualitatively unchanged whether we use *VRRATIO*, *DISPERSION*, or *SHAPLEY*.

[21] For the sake of brevity, we report only the results of re-estimating specification (2) of Table 4. The results remain qualitatively unchanged when we re-estimate other specifications of that table.

[22] The use of a logit specification is motivated by the dichotomous nature of the variable *DEBT_MATURITY_2*.

Table 8
Alternative proxies for the control–ownership wedge and MLS.

Variable	Wedge			MLS		
	(1)	(2)	(3)	(4)	(5)	(6)
UCO–UCF	0.0965[b]					
	(2.4725)					
WEDGE_HIGH_1		0.0167[b]				
		(2.1856)				
WEDGE_HIGH_2			0.0157[b]			
			(2.0732)			
WEDGE				0.0603[a]	0.0587[a]	0.0627[a]
				(3.2613)	(3.1789)	(3.3819)
MLSD	−0.0193[b]	−0.0217[a]	−0.0216[a]			
	(−2.4352)	(−2.7528)	(−2.7432)			
MLSN				−0.0152[a]		
				(−2.6990)		
VR234					−0.0532[b]	
					(−2.0744)	
CONTESTABILITY_INDEX						−0.0059[a]
						(−3.4091)
LEVERAGE_RATIO	0.3475[a]	0.3480[a]	0.3480[a]	0.3512[a]	0.3499[a]	0.3497[a]
	(14.0833)	(14.0937)	(14.0957)	(14.2637)	(14.1697)	(14.1790)
ASSET_MATURITY	0.0013[a]	0.0013[a]	0.0013[a]	0.0013[a]	0.0013[a]	0.0013[a]
	(3.5752)	(3.6403)	(3.6285)	(3.6372)	(3.6395)	(3.5774)
MTB	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003
	(0.1711)	(0.1556)	(0.1597)	(0.1522)	(0.1384)	(0.1921)
STD_ROA	−0.2900[a]	−0.2921[a]	−0.2923[a]	−0.2970[a]	−0.2953[a]	−0.2909[a]
	(−4.0949)	(−4.1186)	(−4.1224)	(−4.1898)	(−4.1663)	(−4.1000)
ABNE	−0.0398[a]	−0.0395[a]	−0.0393[a]	−0.0395[a]	−0.0393[a]	−0.0393[a]
	(−3.0109)	(−2.9909)	(−2.9811)	(−2.9874)	(−2.9704)	(−2.9763)
SIZE	0.0248[a]	0.0249[a]	0.0250[a]	0.0238[a]	0.0240[a]	0.0240[a]
	(12.8650)	(12.8926)	(12.9014)	(11.9136)	(12.0127)	(12.0666)
Constant	0.1026	0.0999	0.0997	0.1176c	0.1138	0.1067
	(1.4623)	(1.4242)	(1.4219)	(1.6693)	(1.6092)	(1.5165)
Year_FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	5711	5711	5711	5711	5711	5711
Adjusted R^2	0.1050	0.1049	0.1048	0.1058	0.1052	0.1063
F-value	21.5863[a]	21.5228[a]	21.5000[a]	22.2089[a]	21.7312[a]	22.0752[a]

This table presents the results of a set of robustness tests using alternative proxies for the control–ownership wedge and MLS presence and voting power. In each specification, the dependent variable is *DEBT_MATURITY* that equals the ratio of long-term debt to total debt. The first three specifications provide results using alternative proxies for the control–ownership wedge of the ultimate owner. The last three specifications show results using alternative MLS-related variables. The sample includes 5711 firm-year observations over the period 1998–2013. The sample includes only concentrated ownership firms (at the 10% threshold). Heteroskedasticity-robust *t*-statistics are in parentheses beneath coefficient estimates. The superscript a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Appendix 1 reports detailed definitions for all the variables used in this study.

Second, previous studies argue that firms likely choose the level of their leverage and the maturity of their debt simultaneously, which implies that the use of OLS regressions could be problematic (e.g., Barclay et al., 2003; Johnson, 2003). To ensure that our findings are not driven by endogeneity, we use a generalized method of moments (GMM) model and a two-stage least squares (2SLS) regression analysis that account for the joint determination of maturity and leverage.

For the GMM model, we estimate the following system of equations:

$$LEVERAGE\_RATIO = f(ROA, PPE, MTB, STD\_ROA, SIZE) + FIXED\_EFFECTS \tag{4}$$

$$DEBT\_MATURITY = f(MLSVAR, WEDGE, LEVERAGE\_RATIO, ASSET\_MATURITY, MTB, STD\_ROA, ABNE, SIZE) + FIXED\_EFFECTS \tag{5}$$

In the first stage of the 2SLS regression, *LEVERAGE_RATIO* is regressed on the variables *MTB*, *STD_ROA*, *ABNE*, *SIZE*, *PPE*, *ROA*, and year and industry fixed effects. Specifications (3) and (4) of Table 9 show the results of the GMM and 2SLS regressions, respectively. Only the results of the debt maturity equations are reported. Table 9 shows that the results are qualitatively similar to our findings and economic implications based on OLS regressions, which indicate that our previous results are not plagued by endogeneity problems.

Third, given that the dependent variable, *DEBT_MATURITY*, is truncated at 0 and 1, the use of Tobit estimation is appropriate. The results of specification (5) of Table 9 suggest that our core evidence on the effect of MLS on debt maturity is virtually unaffected by the

Table 9
Alternative dependent variables and regression frameworks.

Variable	DEP. VAR.: *DEBT_MATURITY_2*	DEP. VAR.: *DEBT_MATURITY_3*	GMM	2SLS	Tobit	Fama–Macbeth	WLS	Random effects
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MLSD	−0.1450[a]	−0.0163[a]	−0.0198[b]	−0.0211[a]	−0.0158[b]	−0.0197[b]	−0.0205[a]	−0.0258[a]
	(−3.9343)	(−2.6810)	(−2.4397)	(−2.6271)	(−2.13)	(−2.4542)	(−2.5986)	(−2.7121)
WEDGE	0.3161[a]	0.0348[b]	0.0650[a]	0.0629[a]	0.0553[a]	0.0637[a]	0.0544[a]	0.0617[b]
	(3.5899)	(2.0747)	(3.4327)	(3.3523)	(3.01)	(4.0405)	(2.9482)	(2.5243)
LEVERAGE_RATIO	1.1263[a]	0.5700[a]	0.7713[a]	0.6955[a]	0.2870[a]	0.3544[a]	0.3527[a]	0.3633[a]
	(10.0870)	(26.4891)	(8.8360)	(7.8822)	(12.14)	(13.4626)	(14.3187)	(10.7784)
ASSET_MATURITY	0.0077[a]	0.0021[a]	0.0014[a]	0.0012[a]	0.0014[a]	0.0016[a]	0.0016[a]	0.0016[a]
	(4.8047)	(4.0417)	(3.1808)	(2.9434)	(4.58)	(4.8775)	(4.4563)	(3.6166)
MTB	0.0029	0.0005	0.0013	0.0012	0.0008	0.0008	0.0002	0.0004
	(0.5105)	(0.4960)	(0.9071)	(0.8655)	(0.84)	(0.4611)	(0.1163)	(0.2708)
STD_ROA	−1.2776[a]	−0.1436[b]	−0.3713[a]	−0.3597[a]	−0.1553[a]	−0.3571[a]	−0.3067[a]	−0.1391[b]
	(−4.1573)	(−2.4884)	(−5.0095)	(−4.8942)	(−2.90)	(−5.1825)	(−4.3158)	(−2.0061)
ABNE	−0.1376[b]	−0.0055	−0.0617[a]	−0.0589[a]	−0.0366[a]	−0.0483[a]	−0.0428[a]	−0.0349[a]
	(−2.3163)	(−0.5035)	(−4.3269)	(−4.1974)	(−3.17)	(−3.2606)	(−3.2272)	(−3.0219)
SIZE	0.0953[a]	0.0218[a]	0.0176[a]	0.0191[a]	0.0186[a]	0.0235[a]	0.0240[a]	0.0261[a]
	(9.6997)	(13.8335)	(7.5679)	(8.1854)	(6.65)	(7.6048)	(12.0867)	(7.1995)
Constant	−1.6174[a]	−0.2011[a]	0.1907[a]	0.1672[b]	0.1988[a]	0.1961[a]	0.1097	0.0290
	(−6.6360)	(−4.6501)	(2.6825)	(2.3496)	(2.62)	(4.4302)	(1.5802)	(0.2603)
Year_FE	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	5711	5711	5711	5711	5711	5711	5711	5711
Adj-R^2 (pseudo R^2) {avg-R^2} [overall R^2]	(0.0594)	0.2493	0.0516	0.0702		{0.1516}	0.1095	[0.1030]
F-value		73.1524[a]				139.7859[a]	22.9900[a]	
χ^2	446.5445[a]		638.9302[a]	633.9068[a]	312.4353[a]			321.5951[a]

In this table, we check the robustness of our results by considering alternative regression frameworks. In specification (1) (specification (2)), the dependent variable is *DEBT_MATURITY_2* (*DEBT_MATURITY_3*). *DEBT_MATURITY_2* is a dummy variable that equals one if more than 50% of the firm's total debt is long-term debt, and zero otherwise. *DEBT_MATURITY_3* equals the difference between a firm's total liabilities and current liabilities, divided by its total liabilities. In the remaining specifications, the dependent variable is *DEBT_MATURITY* that equals the ratio of long-term debt to total debt. The sample includes 5711 firm-year observations over the period 1998–2013. The sample includes only concentrated ownership firms (at the 10% threshold). Heteroskedasticity-robust *t*-statistics are in parentheses beneath coefficient estimates. The superscript a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Appendix 1 reports detailed definitions for all the variables used in this study.

use of this estimation technique. Finally, the empirical results remain virtually unchanged when we estimate our main model using the Fama–MacBeth approach, weighted least squares, or random effects estimations (the last three specifications in Table 9).

5.3. Alternative sample compositions

In this section, we check the robustness of our results to various sample compositions. First, we follow Barclay and Smith (1995), Datta et al. (2005), and Brockman et al. (2010), among others, by focusing only on industrial firms—that is, those with SIC codes between 2000 and 5999. The results are reported in specifications (1) to (4) of Table 10. Despite the reduction in sample size (3585 firm-year observations), our core evidence of the negative effect of MLS presence and control contestability of the largest owner on debt maturity is virtually unaffected.

Second, the corporate governance literature recognizes that group-affiliated firms may increase the opportunities for entrenchment of their controlling owners (e.g., Claessens et al., 2002). For instance, groups that are pyramidal in structure provide their controlling owners with strong incentives to channel resources from firms where they have low cash flow rights to those where they have high cash flow rights (Bertrand et al., 2002; Johnson et al., 2000; Paligorova and Xu, 2012). Importantly, the complex and opaque control web of such groups makes the monitoring activities by the shareholders of group-affiliated firms very costly and difficult (Boubaker and Labégorre, 2008; Claessens et al., 2002). To mitigate concerns that our results are driven by the existence of group-affiliated firms, we rerun our main regression after excluding such firms. The new sample contains 3798 firm-year observations. The results are reported in Table 10 (specifications (5) to (8)). Our core evidence of the negative (positive) effect of *MLSD* and *VRRATIO* (*DISPERSION* and *SHAPLEY*) on debt maturity is virtually unaffected.

Finally, our sample is dominated by family-controlled firms—that is, firms whose ultimate owners are families. This is consistent with previous studies of French firms, such as Faccio and Lang (2002) and Boubaker and Labégorre (2008). Thus, we re-estimate the regressions of Table 4 separately for family and non-family firms to test whether our core evidence is due to the over-representation of family firms. The results (specifications (9) to (16) of Table 10) show that the estimated coefficients on *WEDGE*, *MLSD*, and *VRRATIO* (*DISPERSION* and *SHAPLEY*) continue to be negative (positive) and statistically significant at conventional levels. Moreover, our previous findings on the other control variables remain qualitatively unchanged, suggesting that the disproportionate representation of family-controlled firms in our sample does not alter our main results.

Table 10
Alternative sample compositions.

Variable	Industrial firms only				Excluding group affiliated firms				Family firms only				Non-family firms only			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
MLSD	−0.0308[a]				−0.0343[a]				−0.0226[a]				−0.0373[c]			
	(−3.1978)				(−3.6923)				(−2.6995)				(−1.8736)			
VRRATIO		−0.0311[a]				−0.0258[a]				−0.0135[c]				−0.0337[c]		
		(−3.3842)				(−3.2615)				(−1.7247)				(−1.9002)		
DISPERSION			0.0890[a]				0.0621[a]				0.0419[a]				0.0705[c]	
			(5.1047)				(3.4622)				(2.6332)				(1.9268)	
SHAPLEY				0.1330[a]				0.0838[a]				0.0950[a]				0.1203[a]
				(9.1527)				(6.1049)				(7.4972)				(3.8734)
WEDGE	0.0514[b]	0.0519[b]	0.0711[a]	0.0747[a]	0.0665[b]	0.0696[b]	0.0781[b]	0.0830[b]	0.0411[b]	0.0412[b]	0.0506[b]	0.0621[a]	0.1173[a]	0.1186[a]	0.1187[a]	0.1288[a]
	(2.2955)	(2.3186)	(3.1294)	(3.3499)	(1.9975)	(2.0800)	(2.3080)	(2.4891)	(1.9704)	(1.9737)	(2.3821)	(2.9655)	(2.9922)	(3.0177)	(3.0207)	(3.3092)
LEVERAGE_RATIO	0.2982[a]	0.2992[a]	0.3049[a]	0.2974[a]	0.4151[a]	0.4166[a]	0.4167[a]	0.4116[a]	0.3298[a]	0.3304[a]	0.3318[a]	0.3231[a]	0.4807[a]	0.4858[a]	0.4798[a]	0.4851[a]
	(10.7525)	(10.7864)	(10.9997)	(10.8388)	(14.7943)	(14.8393)	(14.8459)	(14.7128)	(13.6151)	(13.6314)	(13.6928)	(13.4020)	(8.2686)	(8.3350)	(8.2573)	(8.3899)
ASSET_MATURITY	0.0015[a]	0.0015[a]	0.0014[a]	0.0015[a]	0.0009[b]	0.0009[b]	0.0009[b]	0.0008[b]	0.0009[b]	0.0009[b]	0.0009[b]	0.0008[b]	0.0022[a]	0.0022[a]	0.0021[a]	0.0018[a]
	(4.0186)	(3.9890)	(3.8279)	(3.9837)	(2.2808)	(2.2732)	(2.1867)	(1.9773)	(2.5410)	(2.5698)	(2.4610)	(2.3088)	(3.4199)	(3.3289)	(3.1718)	(2.7021)
MTB	−0.0005	−0.0004	0.0001	0.0001	0.0005	0.0005	0.0007	0.0006	0.0011	0.0011	0.0013	0.0014	−0.0030	−0.0031	−0.0032	−0.0038
	(−0.2943)	(−0.2537)	(0.0806)	(0.0507)	(0.3089)	(0.3217)	(0.4524)	(0.4273)	(0.8425)	(0.8355)	(1.0054)	(1.0346)	(−1.0448)	(−1.0949)	(−1.1248)	(−1.3382)
STD_ROA	−0.3815[a]	−0.3792[a]	−0.3537[a]	−0.3168[a]	−0.2972[a]	−0.2954[a]	−0.2754[a]	−0.2346[a]	−0.1997[a]	−0.1993[a]	−0.1943[a]	−0.1644[b]	−0.6790[a]	−0.6749[a]	−0.6619[a]	−0.6092[a]
	(−4.3604)	(−4.3346)	(−4.0434)	(−3.6454)	(−3.6345)	(−3.6110)	(−3.3583)	(−2.8561)	(−2.7237)	(−2.7167)	(−2.6480)	(−2.2490)	(−4.5470)	(−4.5222)	(−4.4363)	(−4.0845)
ABNE	−0.0321[b]	−0.0324[b]	−0.0333[b]	−0.0328[b]	−0.0383[b]	−0.0382[b]	−0.0385[b]	−0.0374[b]	−0.0270[b]	−0.0270[b]	−0.0274[b]	−0.0272[b]	−0.0818[b]	−0.0817[b]	−0.0797[b]	−0.0720[b]
	(−2.1345)	(−2.1577)	(−2.2218)	(−2.2032)	(−2.5582)	(−2.5484)	(−2.5690)	(−2.5073)	(−2.0611)	(−2.0655)	(−2.0927)	(−2.0865)	(−2.5553)	(−2.5530)	(−2.4871)	(−2.2545)
SIZE	0.0224[a]	0.0225[a]	0.0237[a]	0.0247[a]	0.0247[a]	0.0247[a]	0.0258[a]	0.0260[a]	0.0275[a]	0.0276[a]	0.0280[a]	0.0276[a]	0.0116[b]	0.0115[b]	0.0127[a]	0.0147[a]
	(9.7961)	(9.8461)	(10.3547)	(10.8540)	(9.4495)	(9.4361)	(9.8253)	(9.9447)	(12.1771)	(12.2413)	(12.4180)	(12.3412)	(2.5440)	(2.5126)	(2.7705)	(3.1982)
Constant	0.2801	0.2780	0.2444	0.2073	0.2183	0.2007	0.1563	0.1050	0.3712[a]	0.3561[a]	0.3356[b]	0.2787[b]	0.4351[a]	0.4281[a]	0.4270[a]	0.3610[a]
	(1.0607)	(1.0529)	(0.9273)	(0.7925)	(1.5387)	(1.4160)	(1.1022)	(0.7408)	(2.7687)	(2.6586)	(2.5079)	(2.0898)	(3.6951)	(3.6382)	(3.4934)	(2.9354)
Year_FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry_FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	3585	3585	3585	3585	3798	3798	3798	3798	4620	4620	4620	4620	1091	1091	1091	1091
Adjusted R^2	0.0986	0.0989	0.1026	0.1168	0.1143	0.1136	0.1139	0.1198	0.1051	0.1043	0.1051	0.1146	0.1445	0.1446	0.1447	0.1537
F-value	12.5302[a]	12.5705[a]	13.0502[a]	14.9459[a]	15.4077[a]	15.3076[a]	15.3527[a]	16.1968[a]	16.9615[a]	16.8189[a]	16.9498[a]	18.5787[a]	6.5790[a]	6.5827[a]	6.5864[a]	6.9975[a]

This table presents regression results on the effect of MLS on debt maturity using different sample compositions. Specifications (1) to (4) present results using a sample of industrial firms—that is, those with SIC codes between 2000 and 5999. Specifications (5) to (8) provide results after excluding group-affiliated firms from our sample of 5711 firm-year observations. Specifications (9) to (12) present results using a sample that includes only family firms. In the last four specifications, we replicate our results using a sample of only non-family firms. In each specification, the dependent variable is *DEBT_MATURITY* that equals to the ratio of long-term debt to total debt. Heteroskedasticity-robust *t*-statistics are in parentheses beneath coefficient estimates. The superscript a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Appendix 1 reports detailed definitions for all the variables used in this study.

6. Conclusion

This paper establishes empirically the role of multiple large shareholders (MLS) in determining the maturity structure of corporate debt. Specifically, we examine the impact on debt maturity of the presence of MLS and their contestability of the power of the controlling owner. We use a large sample of French listed firms over the period 1998–2013. Our results show that (i) entrenched controlling owners tend to extract private benefits of control, which results in lower firm values; (ii) controlling owners tend to avoid frequent monitoring by lenders, by choosing a debt structure with long maturity; and (iii) the presence of MLS and short-term debtholders limits the ability of controlling owners to extract private benefits. More importantly, we provide evidence that MLS are associated with shorter debt maturity. This finding indicates that MLS play an efficient monitoring role in curbing the diversion of corporate resources by the controlling owner, which reduces her incentives to insulate herself from frequent monitoring by debt markets through short-term debt.

Our findings are robust to modeling debt maturity and leverage as simultaneously determined. They are also robust to addressing endogeneity issues, to adopting a wide variety of estimation techniques and to the use of alternative sample compositions. Collectively, our results highlight the importance of MLS in determining the maturity structure of corporate debt. They also shed direct light on an important channel through which MLS could affect the financing decisions of firms.

Appendix 1. Definitions and sources of variables

Variable	Description	Source
Dependent variables		
DEBT_MATURITY	The ratio of long-term debt to total debt	Worldscope and authors' calculations
DEBT_MATURITY_2	Dummy variable that equals one if more than 50% of the firm's total debt is long-term debt and zero otherwise	As above
DEBT_MATURITY_3	The difference between a firm's total liabilities and current liabilities, divided by its total liabilities	As above
Q	The ratio of the market value of assets to the replacement cost of assets. The market value of assets is calculated as follows (see, e.g., Cheng, 2008): market value of assets = market value of equity + (book value of assets − book value of equity). The replacement costs of assets are proxied by the book value of assets.	As above
Corporate governance variables		
MLSD	Dummy variable that equals one if the firm has at least two large shareholders (at the 10% threshold) and zero otherwise	Annual reports and authors' calculations
VRRATIO	The sum of the voting rights of the second-, third-, and fourth-largest blockholders, divided by the voting rights of the largest controlling owner	As above
DISPERSION	The sum of squared differences between the voting rights of the four largest shareholders— that is, $(VR1 - VR2)^2 + (VR2 - VR3)^2 + (VR3 - VR4)^2$ where VR1, VR2, VR3, and VR4 equal the voting rights of the first-, second-, third-, and fourth-largest shareholders, respectively	As above
SHAPLEY	The Shapley value solution for the largest controlling owner in a voting game where all large shareholders (at the 5% threshold) are considered as individual players and the remaining shareholders the "ocean"	As above
MLSN	The number of large shareholders, other than the largest controlling owner, up to the fourth	As above
VR234	The sum of the voting rights of the second-, third-, and fourth-largest blockholders	As above
CONTESTABILITY_INDEX	The common factor extracted from the MLS variables (i.e., *MLSD*, *MLSN*, *VR234*, *VRRATIO*, and *DISPERSION*) using principal component analysis	As above
WEDGE	The control–ownership wedge of the ultimate owner (at the 10% threshold), defined as the difference between the ultimate owner's control rights and cash flow rights, all divided by her control rights	As above
CONTROL_DUMMY	A dummy variable that equals one if the firm has a controlling owner (at the 10% threshold) and zero otherwise	As above
WEDGE_HIGH_1	A dummy variable that equals one if the control–ownership wedge of the largest owner exceeds the median control–ownership wedge (0.2001) and zero otherwise	As above
WEDGE_HIGH_2	A dummy variable indicating whether the control–ownership wedge of the largest owner is higher than the median control–ownership wedge in corporations where the ultimate control and ownership differ	As above
Control variables		
LEVERAGE_RATIO	The ratio of total debt to total assets	Worldscope and authors' calculations
ASSET_MATURITY	The weighted average of the maturities of current and long-term assets. Following Zheng et al. (2012), the maturity of current assets is current assets divided by the cost of goods sold. The maturity of long-term assets is measured as the ratio of gross property, plant, and equipment to depreciation and amortization.	As above
MTB	Market-to-book ratio, which equals the market value of equity divided by the book value of equity	As above
STD_ROA	The standard deviation of firm's return on assets over the previous five years	As above
ABNE	The change in EBITDA from year t to year $t + 1$ divided by the market value of equity in year t	As above
SIZE	The natural logarithm of total assets	As above

(*continued on next page*)

(continued)

Variable	Description	Source
Additional control variables		
UCO	Ultimate control rights of the ultimate owner (at the 10%threshold), measured by the sum of weakest links along each control chain	Annual reports and authors' calculations
UCF	Cash flow rights of the ultimate owner (at the 10%threshold), which equals the sum of the products of ownership stakes along the different control chains	As above
ROA	Return on assets, measured by the ratio of earnings before interest, taxes, and depreciation and amortization (EBITDA) to total assets	Worldscope
ROE	Return on equity	As above
PPE	The ratio of net property, plant, and equipment to the book value of total assets	Worldscope and authors' calculations
LOSS	Dummy variable that equals one if the firm has negative earnings and zero otherwise	As above
REGULATED	Dummy variable that equals one for firms in regulated industries (SIC codes between 4900 and 4999) and zero otherwise	As above
BIG-4	Dummy variable that equals one if the firm appoints a Big Four auditor and zero otherwise	Annual reports and authors' calculations
ETR	Effective tax rate, proxied by the ratio of total income taxes to pre-tax income. If the pre-tax income is negative, the effective tax rate takes the value of 0.	Worldscope and authors' calculations
Z-SCORE	Altman's (1968) *Z*-score = 6.56 × (working capital/total assets) + 3.26 × (retained earnings/total assets) + 6.72 × (earnings before interest and taxes/total assets) + 1.05 × (book value of firm/book value of total liabilities)	As above
JONES	Measure of discretionary accruals based on Jones (1991) model	As above
DD	Proxy for accruals quality based on Dechow and Dichev's (2002) model	As above
MCNICHOLS	Proxy for accruals quality based on McNichols's (2002) model	As above
FCF	The ratio of free cash flows to total assets	As above
TANGIBILITY	Property, plant, and equipment, divided by total assets	As above
AGE	The number of years since the date of incorporation	Annual reports and authors' calculations
SALES_GROWTH	The firm's sales growth measured by the percentage change in sales over the past year	Worldscope
CAPEX	The ratio of capital expenditures to total assets	Worldscope

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