# ON THE RELEVANCE OF OWNERSHIP STRUCTURE IN DETERMINING THE MATURITY OF DEBT

**Maria-Teresa Marchica**[*,1]
*Manchester Business School (UK)*

**ABSTRACT**

This paper analyzes the relation between maturity structure of debt and ownership and governance characteristics. My tests control for the endogeneity of the independent variables which can lead to spurious inference if not properly accounted for. Analysis of the UK market proves very insightful given the propensity I document of British firms to use short term finance more than their US counterparts. I find a significant negative link between short-term debt and large non-managerial blockholding. Results support the prediction that the identity of shareholders matters in determining debt maturity choices. My tests also indicate that managerial ownership is non-monotonically related to short-term debt. Finally, I report evidence of a strong negative impact of the separation between CEO and Chairman on debt maturity suggesting a substitute relation between a control mechanism such as short maturity and the monitoring device derived from the split between these two main offices.

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[*] Address for correspondence: Maria-Teresa Marchica, Manchester Accounting and Finance Group, Manchester Business School, Crawford House, Oxford Road, Manchester, M13 9PL, UK; phone: +44 (0) 161 2750121; fax: +44 (0) 161 2754023; e-mail: maria.marchica@mbs.ac.uk

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## 1. Introduction

The relation between short-term debt and both ownership and board characteristics has received little attention so far in the debt maturity literature. Theoretical studies maintain that non-postponable, short-term debt forces managers to disgorge funds that they might otherwise use to undertake unprofitable empire-building projects (Hart and Moore, 1995); while others argue that short-term debt gives lenders the flexibility to effectively monitor managers with minimum effort (Rajan and Winton, 1995; and Stulz, 2000). A very limited number of studies have empirically examined the role of short-term debt as a control mechanism (Kim and Sorensen, 1986, and Datta et al., 2005; Guney and Ozkan, 2005). However, by focusing on insider ownership only and assuming its exogeneity, they ignore the possibility of an endogenous relation between short-term debt and ownership characteristics and they overlook the role of outside blockholders and board composition.

This paper fills these gaps. Endogeneity between short-term debt and ownership structure arises, for instance, because either managers or shareholders may decide to invest in certain companies on the basis of the maturity structure of their debt. As a larger proportion of short-term debt increases liquidity risk, potential investors may be reluctant in holding shares in a company with heavy liquidity problems. Alternatively, if short maturity debt reduces managers-shareholders conflicts, investors may prefer firms with high monitoring efforts and thus they may be willing to invest in firms with more short-term debt. This would invert the direction of causality between short-term debt and ownership. I show that when the endogeneity is taken into account by adopting the Generalized Method of Moments (GMM) approach, the sign, for example, of the estimated coefficient for managerial ownership changes.

I test for a wider range of ownership characteristics. I examine empirically the separate effects of ownership by company insiders (managers) and external blockholders both institutional and non-institutional. Further, I investigate whether the separation of CEO and Chairman and the proportional representation of non-executive (outside) directors on the board are important in determining debt maturity choices. I find that the presence of blockholding is an alternative instrument to short-term debt to monitor managerial behavior, while insider ownership shows a U-shaped relation with debt maturity choices.

The proposed analysis uses an original, hand collected database of UK non-financial listed firms between 1991 and 2001 which provides out-of-sample evidence that complements US-based studies. As Table 1 shows, UK companies rely on short-term debt significantly more than their US counterparts, regardless their size. For instance, the median total debt due within one year for small UK firms is 72%; the corresponding figure for the US is only about

3%. In addition, our calculations reveal that a staggering 30% of US listed firms do not have any debt maturing within one year. Conversely, this only counts for 1% of the entire UK sample. From a theoretical perspective, it can be argued that debt due within one year has greater implications than longer maturities in terms of both more stringent monitoring and higher liquidity risk. Given the specificities of the two countries, the analysis of the UK market may significantly enhance our understanding of debt maturity decisions by firms, adding to US studies that usually investigate longer maturities.[2]

[INSERT TABLE 1 HERE]

Further, both UK and US governance systems are market-based (Franks and Mayer, 1997; Faccio and Lasfer, 2000) and both are characterized by a strong dominance of institutional investors (see ONS, 2005, for the UK and Binay, 2002 for the US). However, during the 90s the UK experienced the consequences of the dramatic collapse of a number of large companies due to the fraudulent behavior of their directors. This sparked a vivid debate on and criticisms of the monitoring role of institutional investors. The absentee landlord paradigm became the classic way to describe the behavior of financial institutions "exerting power without responsibility" (Hutton, 1995). Since then, policy-makers and practitioners implemented a number of measures to improve the corporate governance of UK firms (e.g., Cadbury Report, 1992; Hampel, 1998) and included a code of best practice on a "comply or explain" basis within the LSE listing rules.

Therefore, the analysis of the UK system, where firms are subject to similar agency conflicts as their US counterparts, but regulators give a distinct response to these conflicts, will markedly improve our understanding of the interactions between the stringent control mechanism of short maturity and the corporate ownership and governance structure.

I begin by examining whether a relation exists between blockholding and debt maturity structure, as no study on debt maturity and ownership has investigated this aspect before. The agency costs literature highlights the important monitoring role played by non-managerial owners: large investors have greater incentives than small ones to monitor, given their significant economic stake in the firm (e.g., Stiglitz, 1985; Shleifer and Vishny, 1997; Holderness, 2003). To the extent that blockholding acts as an alternative control mechanism to short term debt to reduce managerial discretion, a negative relation between short-term debt

[2] One possible explanation of this substantial use of short-term debt among UK companies might be that they tend to rely significantly on bank debt (see Table 8). To inspect whether my results are driven by a 'bank-debt effect' rather than a maturity effect, I perform robustness tests where I control for the source of debt. As I show in the last part of the paper, results are not sensitive to the inclusion of bank debt as a control variable.

and blockholding could be expected. Alternatively, as argued by Agrawal and Knoeber (1996), a positive relation might also exist if control mechanisms complement each other. Furthermore, a number of researchers emphasize that the incentives to monitor may vary with the owner's identity (Pound, 1988; Brickley et al., 1994). For instance, institutional investors are expected to have well diversified portfolios and to be less prone to spending resources in monitoring managerial behaviour (Denis, 2001). Therefore, in line with the hypothesis of alternative control mechanisms, I would expect institutional shareholders be positively related to short-term debt.

Nonetheless, ownership concentration has its own drawbacks as well. Several theoretical papers argue that there is a trade-off between a high degree of monitoring, which is promoted by concentrated ownership, and risk-sharing gains, which requires more diffuse ownership (e.g., Admati et al., 1994). As to debt maturity choices, we may expect large non-managerial shareholders to lengthen the maturity of debt in an attempt to reduce the costs associated with higher liquidity risk implied in shorter maturities instead of to monitor managerial behaviour.

To sort out these various potential influences, I proceed as follows. In the first stage, I test the relation between short-term debt and blockholding. Then, I distinguish among institutional and non-institutional shareholders. Finally, I divide the sample into high and low liquidity risk firms. This is to verify whether a negative relation between short-term debt and non-managerial owners exists for those companies more exposed to liquidity problems (Diamond, 1991) and thus the influence of undiversified shareholders is driven by their risk aversion rather than their incentives to monitor.

The second important issue I tackle is to investigate the role played by insider shareholding. Previous empirical work on debt maturity investigates the importance of agency costs of equity associated with managerial ownership and finds contrasting results. For a large sample of US firms, Kim and Sorensen (1986) show that long-term debt is positively related to insider ownership with managers owning more than 25% of shares, interpreting this result as evidence that manager-controlled firms suffer lower of agency costs of debt. In contrast, Datta et al. (2005) find a monotonically decreasing (increasing) relation between long-term (short-term) debt and insider shareholding, in line with the prediction that the more managers' and shareholders' interests are aligned, the shorter the maturity. A similar result is instead interpreted as a sign of higher managerial discretion by Guney and Ozkan (2005) for a sample of UK companies.

My analysis has two distinct features from the previous literature. First, as discussed above, I control for the endogeneity of regressors which can lead to biased and inconsistent

estimates if not properly accounted for. Indeed, my tests indicate a change in the sign of the estimated coefficients once endogeneity is allowed. A further important aspect I explore is the possibility that the relation between maturity and insider ownership is non-linear. A vast literature on the links between ownership and performance shows the alternating alignment and entrenchment effects associated with increased share ownership This non-linear association between insider ownership and firm value is well documented by numerous previous studies (e.g., McConnell and Servaes, 1990 and 1995, for the US; Lasfer, 2004, for the UK). Therefore, I investigate whether the diversity of incentives associated with insider ownership differently influences also the maturity choice. To the extent that alternative control mechanisms are interdependent, in the presence of aligned managers, the use of short-term debt as a monitoring device may be reduced. *Vice versa*, entrenched managers may use short-term debt to signal to the market their commitment to refrain from expropriation of firm resources. To disentangle the different incentives provided by insiders ownership, I include a quadratic term for managerial shareholding in my model, where lower level of ownership should aligned insiders to shareholders incentives, while higher level should entrench them.

In addition, contrary to previous work in this area, I distinguish the impact on debt maturity structure of different kinds of directors, as board members have different incentives and roles inside the firm. In particular, non-executive (outside) directors are "delegated monitors", charged by the shareholders with observing the actions of executive managers (Hart, 1995). Following the corporate scandals in the main Anglo-Saxon countries over the last fifteen years, corporate governance practices have evolved considerably. One of the crucial aspects in the UK system is the separation between the offices of the chairman and the chief executive officer in order to avoid concentration of power in one director's hands (Cadbury, 1992). The presence of non-executives in the board has been considered another relevant element to ensure an effective monitoring action of executives' decisions. It is important, therefore, to examine whether board composition plays a role in determining the maturity structure of firms. As this is the first test on this matter, I explore whether both the CEO/Chairman split and the proportion of non-executives on the board are significantly related to debt maturity decisions. In particular, I expect that these are negatively related to short-term debt, to the extent that different control mechanisms substitute each other to reduce the manager-shareholder kind of conflicts.

I find evidence of a significant relation between short-term debt and blockholding. A higher concentration of large, non-managerial shareholdings seems to be inversely related to short-term debt. There is also evidence that the identity of large shareholders matters in

determining maturity structure decisions. The results indicate a negative link between short-term debt and non-institutional investors, suggesting that individuals and non-financial corporations may actively monitor managerial behavior. In addition, similar evidence is reported when I single out the largest institutional owner. Further investigation shows that these results are not driven by the high liquidity risk of companies. The other novel result provided in this paper is a significant U-shaped relation between short-term debt and managerial ownership. In addition, board composition is relevant in determining debt maturity choices when I consider the division of responsibilities at the head of the company (negative impact), while the number of non-executives does not seem to play a significant role. Finally, further robustness checks confirm that my results are not driven by creditors' identity.

The remainder of the paper is organized as follows. Section 2 develops the hypotheses tested in this analysis. In Sections 3 and 4, the data and the methodology respectively are described. The empirical results are presented in Section 5, while Section 6 reports the robustness checks. Finally, Section 7 discusses the conclusions to be drawn from the study.

## 2. Hypotheses

### *2.1 Blockholders*

The seminal paper by Myers (1977) indicates that non-managerial shareholders are better off with a higher level of short-term debt, because of the reduced underinvestment problem associated with it. One of the underlying assumptions in his model is that of perfect alignment between managers and shareholders. Therefore, monitoring actions by the firm's owners are not required.

Conversely, if there are conflicts between managers and shareholders, the presence of blockholders plays a crucial role in successful corporate governance systems (Shleifer and Vishny, 1997). Large shareholders may have greater incentives to be involved in the control process than smaller ones, because they can more easily bear the high fixed costs of collecting information on management behavior (Stiglitz, 1985). Holderness (2003) comments about the shared benefits of control arising from the superior monitoring that can derive from the concentration of decision rights in a large block ownership. In addition, Zeckhauser and Pound (1990) maintain that the mere presence of a large shareholder often acts as a signal to the market that managers are less able to expropriate firm resources, thus avoiding the need for managers to increase debt level as a signal.

Consistent with these arguments, previous US-based studies show positive excess returns around the announcement date when outsiders acquire large equity positions (e.g.,

Holderness and Sheehan, 1988; Barclay and Holderness, 1991). Similar results are also provided for the UK market (Sudarsanam, 1996). By the same token, Kim and Sorensen (1986) argue that lenders may have a clearer view of firm risk when there is close control of equity ownership. This implies that a smaller amount of debt may be required to monitor managerial behavior. Similar conclusions are reached by a number of studies exploring the interaction among different control mechanisms to maximize firm value (e.g., Agrawal and Knoeber, 1996).

Along the same lines, then, I would expect ownership by large non-managerial shareholders to be negatively related to short-term debt. As a control mechanism, short-term debt may be less necessary in the presence of blockholders.

Two alternative measures of blockholding are adopted: first, the proportion of shares held by all non-managerial shareholders with more than 5% of shares (*Blockholding*); and, second, the proportion of shares held by the largest non-managerial shareholder with more than 5% of shares (*Largest Non-Managerial Ownership*). Unlike the US system, in the UK the disclosure threshold was lowered to 3% in 1990 (Companies Act 1985). The decision to define *Blockholding* and *Largest Non-Managerial Ownership* at 5% instead of 3% is based on the fact that the Companies Act 1985 empowers shareholders with at least 5% of shares to add any resolution to the AGM agenda which may properly be moved there.[3]

*2.2 Identity of blockholders*

As discussed earlier, I distinguish blockholders by their identity, since different categories of shareholders may have different incentives to monitor. I discriminate between direct ownership by all institutional investors (*Institutional Ownership*) which include banks, insurance companies, pension funds, fund managers and similar, and direct ownership by non-financial institutions (*Non-Institutional Ownership*), comprising private individuals and non-financial companies.

As a robustness check, I also divide the ownership of the largest blockholder (*Largest Non-Managerial Ownership*) into institutional (*Largest Institutional Ownership*) and non-institutional ownership (*Largest Non-Institutional Ownership*). This classification does seem important, given the peculiarities of the UK institutional setting.

Since 1963, investment trusts, insurance companies and pension funds have progressively increased their holdings in listed UK equities at the expense of direct holdings

[3] All tests were replicated with a 3% cutoff, and the results are virtually unchanged.

by individuals (Stapledon, 1996). The Office for National Statistics (2005) reports that the equity position owned by UK institutional investors has increased from 29% in 1963 to 50% in 2001. This trend is similar to the evidence provided by Binay (2002) for the US market where the average shareholding by domestic institutional owners has grown from 35% in 1981 to 58% in 2002. Unlike their US counterparts, UK institutions are not subject to legal restrictions on stock ownership, and they are under no obligation to disclose the fact that they have formed informal coalitions to monitor managers.[4]

Despite all this legal freedom, UK financial institutions have been much less involved in the business activities of corporations than one might expect. There has been extensive criticism of the apparently low activism of institutional investors in the 1990s, and their limited participation in voting processes (e.g., Cadbury Report, 1992; Hampel, 1998; Faccio and Lasfer, 2000). In the literature, various reasons are advanced for this behavior. First, investment and pension funds seem to follow an "index tracker" strategy and, consequently, do not dispose of the resources to monitor actively the large number of companies in their portfolios (Black and Coffee, 1994). Second, insider-trading regulations may have caused low institutional involvement in the firm's business (Goergen and Renneboog, 2001). Plender (1997) reports that UK institutional investors seldom exercise their voting power. Moreover, coordination issues between numerous institutional shareholders in the same company may create free-riding problems. As a result, the incentives to be an active investor rapidly decline.

However, in trying to understand institutional governance in the UK, it is necessary to take into account the well-developed network of informal communication and coalitions between institutional investors in the "London Square Mile" (Black and Coffee, 1994; Short and Keasey, 1997). This may help to reduce free-riding problems for institutions. Some recent surveys report an increase in the average level of voting (Mallin, 2001), while Short and Keasey (1999) provide evidence of a positive impact of institutions on the return on shareholders' equity. Similarly, Goergen and Renneboog (2001) show that institutional shareholding reduces the possibility of inefficient investments.

A preliminary investigation of the present data provides some insight into these matters. Table 2 reveals that, although the average shareholding of institutional investors as a group (*Institutional Ownership*) is around 16% in all years, this stake is held by an average of less than two institutions (*Institutional Investors*). On the other hand, non-financial corporations and individuals (*Non-Institutional Ownership*) hold fewer shares in the UK market

[4] In the US, for example, schedule 13D filing obliges a shareholder group with more than 5% shares to disclose the group's plans in regard to the company.

than institutional investors, on average 7% across years. However, in the average firm a non-institutional investor owns a greater stake than a financial shareholder, because there is less than one non-financial owner (*Non-Institutional Investors*) for almost two institutional investors (see Table 2 Panel B). This may reduce the coordination problems for non-institutional shareholders. Higher shareholding by individuals (or non-financial companies) in a firm holding may increase the incentives to monitor managerial behavior more actively. Furthermore, a single individual (or a non-financial company) is more likely to have a less diversified investment portfolio than an investment company. Some authors find that, for UK firms, non-financial shareholders seem to be more active and influential than financial ones in instigating changes (and board turnover) at the top level of management (Lai and Sudarsanam, 1997), in firms where performance is declining (Franks et al., 2001). Non-financial shareholders also seem able to stimulate investment spending when there is a high level of free cash flow in the company (Goergen and Renneboog, 2001).

[INSERT TABLE 2 HERE]

Based on these arguments, I expect that the presence of large non-institutional investors may provide effective monitoring of managerial behavior, thus reducing the pressure to increase short-term debt as a control mechanism. In contrast, short-term debt may be issued when financial investors are the main shareholders in the firm, to signal to the market that an effort is being made to keep the manager-shareholder conflict under control.

*2.3 Managerial ownership*

Due to the separation between ownership and control, manager-shareholder conflicts are expected to be more severe as managers tend to maximize their own utility function at the expense of the owners. In their seminal work, Jensen and Meckling (1976) propose insider shareholding as a mechanism to align managers' and shareholders' interests (alignment effect). A vast literature on ownership and performance has provided significant evidence supporting this idea (, Morck et al., 1988; McConnell and Servaes, 1990, among others).

In the context of debt maturity choices, Datta et al. (2005) argue that as their direct equity position in the company increases, managers become more aligned to shareholders; as a consequence, they may be expected to prefer short-term debt as it reduces the risk of underinvestment.

However, short-term debt is in itself a device to reduce the conflicts between managers and shareholders (e.g., Hart and Moore, 1995). Shorter maturities, in fact, help lenders and other external investors to monitor managerial behavior more frequently, especially when the conflicts

are more acute (Rajan and Winton, 1995; Stulz, 2000). Further, increasing levels of short-term debt may discourage managers from investing in the company, given that shorter maturity debt induces higher liquidity risk.

Therefore, it is reasonable to infer that short-term debt and managerial ownership are simultaneously determined. Consequently, the direction of their association may be inverted. In fact, if these two monitoring devices are substitute for each other, as I hypothesize and test here, then their relation could be different from that predicted by previous studies. With increasing equity ownership by managers, the use of short-term debt as a control mechanism may be avoidable. Also, to the extent that more aligned managers constitute a favorable signal to the market, lenders may reduce the pressure for shorter maturity debt. As a result, a negative relation between short-term debt and insider shareholding may be expected. To disentangle this empirical issue, I adopt the GMM technique in order to clearly identify the direction of causality by controlling for the endogeneity of all variables in the model.

Furthermore, since Demsetz (1983), a growing body of studies has acknowledged that the impact of ownership on managerial incentives may be non-monotonic. Shleifer and Vishny (1989) contend that, as the percentage of shares held by managers increases, their discretion over the firm's resources also increases (entrenchment effect). A vast literature has documented that this is detrimental for firm value (among others see, Morck et al., 1988; McConnell, 1990, for the US; Short and Keasey, 1999; Lasfer, 2004 and Mura, 2007 for the UK) and hampers the ability to raise capital (among others, Crutchley et al., 1999).

It is therefore important to explore whether there is a non-linear relation between managerial ownership and maturity decisions. The direction of this link is, as before, difficult to predict ex-ante and is therefore an empirical issue. On the one hand, the higher the degree of managerial entrenchment, the stronger the incentives for managers to avoid any kind of external monitoring. Therefore, a negative relation may be expected. On the other hand, when direct equity holding by managers is substantial, managers pay a large fraction of the cost of, for instance, reduced firm value. Consequently, they may be more willing to issue more short-term debt, in an attempt to signal to the market their commitment toward value-maximizing actions; moreover, when faced with entrenched managers, external investors may increase the pressure for more short-term debt to reduce the potential threat of resource expropriation. Under both these perspectives, a positive relation between short maturities and higher insider shareholding may be predicted.

To explore the possibility of a non-linear link, I include a quadratic term (*Executive Ownership*$^2$) besides managerial ownership (*Executive Ownership*) in my models. Managerial

ownership is measured as the proportion of shares held by the executive directors to the total shares outstanding at the end of the fiscal year (this is in line with Datta et al., 2005, Faccio and Lasfer, 2000, and Lasfer, 2004). Executives are those who are directly involved in the daily business of the firm and, thus, take the financial decisions as well. Considering non-executive shareholding also as a part of managerial ownership (as in Guney and Ozkan, 2005) can be misleading, as non-executives have a specific role as monitors of executive decisions. Therefore, it is important to distinguish the two groups of directors and explore how their different roles and incentives impact the debt maturity structure of firms. This leads to the analysis of the role played by board composition in the maturity of debt choice in the following sub-section.

*2.4 Board structure of companies*

One increasingly important issue relating to equity agency conflicts concerns the role of board composition in influencing managerial incentives. It is generally accepted in the literature that the degree of alignment between the interests of managers and shareholders may vary with the composition of the board. More specifically, previous literature maintains that CEOs often control the composition of the board and reduce its effectiveness as a monitoring instrument, by, for instance, being also chairmen (Jensen, 1993; Hermalin and Weisbach, 1991). In the UK, since the 1990s, increasing attention has been placed on this issue. Cadbury (1992), Hampel (1998) and recently Higgs (2003) have all recommended a division between the offices of chairman and chief executive officer. Lasfer (2004) shows, for instance, that adopting this division is a value-enhancing mechanism in particular for those companies more likely to suffer from managerial discretion problems.

Furthermore, it is argued that non-executive (outside) directors are appointed to act in the shareholders' interests, and that they have incentives to signal that they do indeed act in this way (Fama and Jensen, 1983; Hart, 1995). In the UK, all the codes of best practice have clearly emphasized the importance of non-executive directors, by recommending an increasing presence of non-executives on boards of directors, as a rule of good governance. Dahya and McConnell (2005) conclude that boards with a larger proportion of non-executives appear to take different, and possibly better, decisions than boards dominated by executives. In addition, Dahya and McConnell (2006) show that UK companies that increased the proportion of non-executives, to comply with the Cadbury recommendations, experienced significant improvements in operating performance.

This is the first analysis that investigates whether different characteristics of board composition have a significant impact also on debt maturity decisions. More specifically, to the

extent that firms with separated roles for CEO and Chairman or outside-dominated boards are likely to experience a reduction in agency conflicts, I would expect these firms to hold lower amounts of short-term debt. Therefore, I include in my analysis two variables representing board composition: a dummy equal to one if the company has two distinct officers for the CEO and Chairman (*Split*); and the proportion of non-executives to the total number of directors (*Ratio*).

*2.5 Control variables*

I include several control variables identified in the literature as being likely to influence corporate debt maturity. Following the contracting-cost theory (Myers, 1977; Barnea et al., 1980), in the case of a firm with outstanding debt, the benefits from a profitable investment project are split between debt-holders and shareholders. In some states of nature, the benefits accruing to debt-holders do not allow normal returns to shareholders. In this way, there arises an incentive to reject positive net present value projects (resulting in an underinvestment problem). If higher growth opportunities are available, the conflict between debtholders and shareholders becomes greater. One solution is to shorten the maturity of debt (Myers, 1977). Therefore, I expect a positive relation between short-term debt and growth opportunities.

However, firms with high growth opportunities are expected to suffer more from liquidity risk, and this may give them an incentive to borrow long term (Guedes and Opler, 1996). Consequently, a negative relation between short-term debt and growth opportunities may be expected. I define growth opportunities (*Market-to-Book*) as the ratio of market value of total assets (book value of total assets minus book value of total equity plus market value of total equity) to book value of total assets.

Another implication of contracting-cost theory relates to firm size. It is argued that larger firms are less exposed to the agency costs of debt. Moreover, they have easier access to capital markets than smaller firms (Titman and Wessel 1988), and can guarantee long-term debt with substantial collateral. As a result, the relation between short-term debt and firm size, is expected to be negative. Size (*Size*) is defined as the natural logarithm of total assets in 1991 prices.[5]

Finally, Myers (1977) argues that, to deal effectively with agency problems between shareholders and bondholders, debt repayments should be scheduled to match the decline in value of assets in place. Thus, firms with more long-term assets should show more long-term debt. Consequently, I expect a negative relation between short-term debt and asset maturity

[5] For robustness purposes, I also used alternative definitions for *Size*, that is, the logarithm of market value of equity (e.g., Barclay and Smith, 1995) and the logarithm of net sales in 1991 prices (Johnson, 2003). Results are virtually similar to what reported here.

(*Asset Maturity*), which is proxied by the ratio of total fixed assets (net total of land and buildings, plant and machinery, construction in progress and other fixed assets) to annual depreciation expense, in line with Guedes and Opler (1996).

According to the liquidity risk theory (Diamond, 1991), firms may lengthen debt maturity to reduce the liquidity risk embedded in short-term debt. Therefore, highly-levered firms are expected to use, *ceteris paribus,* less short-term debt, to reduce the risk of suboptimal liquidation (Diamond, 1991; Johnson, 2003). I define leverage (*Leverage*) as the total amount of debt to total assets.

I also include a measure of volatility as an additional proxy for credit risk in line with Johnson (2003). Firms with more volatile cash flow may be more likely to encounter periods of financial duress and may find repaying debt more difficult. This suggests a negative relation with short term debt. I define volatility (*Volatility*) as the standard deviation of the first differences of earnings before taxes and depreciation over the four years preceding the sample year, divided by average assets for that period.[6]

Signaling theory maintains that, because of the costs of rolling over short-term debt, only high-quality firms will issue debt with shorter maturities, to signal their quality to the market (Flannery, 1986; Diamond, 1991). This is because firms with private positive information about future prospects prefer short-term debt that can be refinanced after the information is revealed. This implies a positive relation between short-term debt and firm quality (*Quality*), which I approximate by the difference between the pre-tax profits in $t$+1 and the pre-tax profits in $t$ divided by the pre-tax profits in $t$.

Finally, some studies (e.g., Brick and Ravid, 1985; Kane et al., 1985) demonstrate the impact of the tax system on debt maturity choice. In particular, Kane et al. (1985) develop a model in which optimal debt maturity is determined by a trade-off between the tax advantage of debt and bankruptcy per period and debt issue flotation costs. In order to spread refinancing costs over a longer period, the firm lengthens debt maturity as flotation costs increase. Firms lengthen the maturity as the tax advantage of debt decreases, to ensure that the remaining tax advantage of debt is not less than amortized flotation costs. A positive relation between short-term debt and effective tax rate is then expected, where tax rate is defined as total tax charge divided by pre-tax profits (*Tax*).

Furthermore, Brick and Ravid (1985) maintain that, if the yield curve is upward sloping, then long-term debt is optimal, because tax gains are accelerated. Therefore, a negative relation

[6] As a robustness check, I calculated also the standard deviation of the first differences of earnings over the six years preceding the sample year, but results do not change significantly.

between short maturity and term structure is expected. A term structure measure is defined as the difference between the yields on 10-year government bonds and the three-month Treasury bills (*Term Structure*).

**3. Data**

In the initial stage, a sample of approximately 1,000 UK listed non-financial firms was randomly selected from *Datastream* constituent lists. As ownership and corporate governance data were not available in machine-readable form, they were hand-collected from the *PriceWaterhouse Corporate Register* (December issue) for the period 1991-2001 (Marchica and Mura, 2005; Mura, 2007). Economic and market data were downloaded from *Datastream*.

To be able to follow companies over time from two different datasets, a huge effort was devoted into tracking all the name changes (and defunct companies) in the sample period. This information was mainly collected from the London Stock Exchange Yearbook, which reports systematic information on name changes, entries removed from the companies section, companies in liquidation, and companies in receivership and in administration. Moreover, as a further check, the Companies House website was also used. This is an online facility that provides various types of information on companies (including name changes).

To run the empirical analysis, a number of steps were undertaken. First, the dataset was cleaned of outliers. The ownership part of the dataset was thoroughly inspected in several directions. For example, the total shares collected for each company should not sum to more than 100%. In cases where it did, I tried to double check the information with other issues of the Hemscott volumes (using either the September edition of the same year or the March edition of the following year) and/or with the London Stock Exchange Yearbook, which also contains some ownership information. In cases where it proved impossible to find coherent information from the different sources of data, the observation was dropped from the sample.

I then checked for outliers in the economic variables. There is no fixed rule for dealing with outliers, so, as a general rule of thumb, data were trimmed to the 99% percentile. The trimmed data were then always benchmarked with descriptive statistics reported in other papers, to ensure that the sample was representative of the population of non-financial firms in the market. After the issue of outliers had been addressed, I excluded firms in the public utilities because of the peculiarities in their operational and regulatory conditions. I also excluded all firm-years missing observations for any variable.

Finally, I retained all firms with at least five consecutive years of observations, in order to compute asymptotically efficient second order serial correlation tests for GMM estimations

(Arellano and Bond, 1991). After this screening, there remained an unbalanced panel of 656 firms with 5983 observations.

## 4. Methodology

Under imperfect capital markets, the influence of financing decisions on firm value may imply that firms have a long-run target financial structure that is determined by corporate and personal taxes, liquidity and bankruptcy costs, and agency-related costs. Taking this argument as a starting point, Jalilvand and Harris (1984) examine the issuance of short-term and long-term debt, by assuming the existence of a target debt maturity. In addition, Brick and Ravid (1991) demonstrate theoretically the existence of an optimal debt maturity structure in the presence of interest rate uncertainty. However, market imperfections, such as transaction costs (e.g., a delay in the (re)negotiation process with external lenders), will lead firms not to conform completely to their target, but instead to follow a pattern of partial adjustment. Previous studies on debt maturity show significant dynamic effects in the determination of firms' debt maturity structure (Antoniou et al., 2006). Therefore, I estimate the following dynamic model:[7]

$$MAT_{it} = \alpha MAT_{it-1} + \sum_{k=1}^{k} \beta_k X_{it} + \eta_i + \eta_t + \nu_{it} \qquad i = 1,2...N; t = 1,2...T \qquad (1)$$

Firm-specific effects, $\eta_i$, allow for heterogeneity in the means of dependent variables across individuals, and reflect qualitative characteristics that make each firm different , such as market reputation and quality of management, and also the features of the industry in which the firm operates. Time-specific effects, $\eta_t$, on the other hand, refer to macroeconomic events that may influence all firms.

Arellano and Bond (1991) demonstrate that, in estimating a partial adjustment model such as equation (1), both OLS and Within Group (WG) methodologies produce biased and inconsistent results, because of the presence of individual heterogeneity and endogeneity of the lagged dependent variable. The bias can be even stronger if, besides the lagged dependent variable, other regressors are potentially endogenous. Endogeneity arises because shocks that affect debt maturity decisions are also likely to affect regressors such as leverage, growth opportunities and asset maturity. In addition, this problem may derive from cross-causality. It could be argued that, for instance, the level of equity holding by non-managerial shareholders or managers may influence maturity decisions. However, either outsiders or insiders may also decide to invest in a certain company on the basis of the liquidity risk of its capital structure,

[7] See Maddala (2001) for a more technical treatment.

or the level of agency conflicts. A further source of endogeneity arises if there are unobservable firm-specific characteristics that are correlated with the regressors.

The use of a simultaneous equations model (SEM) is efficient in dealing with the contemporaneous correlation between some variables in the model and the presence of firm-specific effects, but it ignores partial adjustment behavior and tends to treat the majority of regressors in the model as exogenously determined. Following this reasoning , Datta et al. (2005), as Johnson (2003) and Barclay et al. (2003), have recognized the correlation between maturity and leverage decisions, and have accordingly specified a system of two equations for maturity and leverage. However, they treat all the other ownership and economic variables as exogenous.

Endogeneity of both the lagged dependent variable and the other regressors requires the use of an Instrumental Variables estimation method that also makes it possible to control for fixed effects. Arellano and Bond (1991) derived a Generalized Method of Moments (GMM-DIFF) estimator that has been shown to be more efficient than other procedures in dealing with these issues, by taking the first difference of the model and using lagged levels of endogenous variables as instruments.

In this type of analysis, the choice of an appropriate set of instruments is crucial. The validity of the instruments can be tested by the Sargan test of overidentifying restrictions. This is asymptotically distributed as $\chi^2$ under the null hypothesis of zero correlation between the instruments and the error term. Rejection by the Sargan test casts doubt on the validity of the instruments. By adopting the Difference Sargan test, as suggested by Arellano and Bond (1991) and Bond (2002), I can discriminate the strongly endogenous from the weakly endogenous and exogenous regressors, to choose the appropriate set of instruments[8]. The results of these diagnostic checks suggest that leverage and size are to be treated as strongly endogenous, while all the remaining regressors are to be considered weakly endogenous. No test supports the hypothesis of exogeneity of any of the regressors.

Using too many moment conditions reduces dramatically the power of the Sargan statistic to detect invalid instruments (Bowsher, 2002). As a consequence, I adopt a parsimonious specification with the earliest instrument lagged at *t*-2.

[8] The Difference Sargan test approach works as follows: first only instruments dated t-2 (strong endogeneity) for all variables are used and the corresponding Sargan test is calculated. Then, an instrument dated t-1 (weak endogeneity) is added for each variable at once in a number of subsequent regressions and the corresponding Sargan tests are computed. The set of instruments specified under the strong endogeneity assumption is a subset of those specified under the weak endogeneity assumption. If S denotes the Sargan statistics under the strong endogeneity assumption in the initial regression and S` the Sargan statistics under the weak endogeneity assumption in each subsequent regression, the difference DS = S-S` tests the validity of the additional instrument in each regression and, thus, assesses the nature of the endogeneity for that particular regressor (Bond, 2002).

## 5. Results

*5.1 Summary Statistics*

Table 2 reports information on the ownership characteristics of my sample across the entire estimation period. In addition to my discussion in the hypotheses section, the figures in Panel A suggest that the distribution of ownership by executive directors clearly decreases by approximately 6% in ten years, with almost half of this reduction taking place between 1991 and 1993, immediately after the Cadbury Report was issued (1992). The trend is also similar when I consider the average shareholding per executive director, by dividing managerial ownership (*Executive Ownership*) by the total number of executives on the board (*Executive Directors*).

On the other hand, non-managerial shareholding shows some volatility but no clear trend. Average blockholding with more than 5% shares (*Blockholding*) remains around 24%, while all financial (*Institutional Ownership*) and non-financial shareholders (*Non-Institutional Ownership*) hold about 16% and 7%, respectively, of total outstanding shares. Similar results are obtained when I calculate the average holding by each financial and non-financial owner. However, average shareholding by the largest non-managerial owner appears to be increasing over time.

Further, Panel B shows that, while average board size is relatively stable over time (*Executive Directors* plus *Non-Executive Directors*), the composition of the board changes significantly. In 1991, there was an average of 4.71 executives and 2.33 non-executives, but by 2001 non-executives constituted almost half of the average board. These figures corroborate the findings of Faccio and Lasfer (2000) and Peasnell et al. (2003). Results on *Split*, on the other hand, show that most of the UK companies have separated the roles of CEO and Chairman during the entire estimation period. This is in line with findings reported by Peasnell et al. (2003) and Lasfer (2004).

Table 3 provides descriptive statistics for the economic variables. For the average firm, 54% of total debt is due within one year (MAT). This figure is in line with Antoniou et al. (2006) for the UK. In addition, UK firms show a higher level of short-term debt than their US counterparts, as documented above in Table 1 and also in Datta et al. (2005) where debt due within 1 year is equal to 21.46% of total debt for the average company.[9]

In line with Antoniou et al. (2006), I report an average market-to-book ratio of 1.57. This figure is in line with US evidence as well (e.g., 1.61 in Johnson, 2003; 1.80 in Datta et al., 2005). The average asset maturity of 9.94 years is 30% lower than that reported by Antoniou et

[9] I refer to Table I Panel A in Datta et al. (2005). The average percentage of debt maturing after one year is equal to 78.54 (or 21.46% for debt due within one year).

al. (2006). This result may suggest that firms shortened their debt maturities in the last decade of the century, to match the decrease in asset maturity during the same period. Datta et al. (2005) document the opposite trend in the US system during the 1990s. The other economic variables are consistent with other UK-based studies.

[INSERT TABLE 3 HERE]

*5.2 Regression results*

Table 4 presents results for equation (1) estimated with alternative methods to assess the extent of the bias due to the endogeneity of regressors. Models 1 and 2 show estimations in OLS and WG respectively. In models 3 and 4 results are obtained using two alternative GMM methods that control for the endogeneity issue. More specifically , in model 3 I adopt the Anderson-Hsiao technique (AH), where all variables except lagged maturity are treated as exogenous; while in model 4 all the independent variables are endogenous in line with the Difference Sargan diagnostic tests discussed above. In models 3 and 4 , I report Sargan tests of overidentifying restrictions.

Anderson and Hsiao (1982) argue that OLS and WG estimates of the lagged dependent variable $\alpha$ are biased in opposite directions: upward for the OLS, due to the presence of firm-specific effects, and downward for the WG regression, due to the correlation between the transformed lagged dependent variable and the transformed error term. As Bond (2002) maintains, a candidate consistent estimator is expected to lie between the OLS and WG estimates, or at least not to be significantly higher than the former, or significantly lower than the latter. Results for OLS and WG are 0.704 and 0.331 respectively, while when $\alpha$ is treated as endogenous, results are 0.473 and 0.471 in AH and GMM respectively, in line with the econometrics theory.

In addition, there is evidence of misspecification under the AH specification. The Sargan test rejects the validity of the instruments at the 5% level of significance. This can be taken as evidence that it is inappropriate to assume that the regressors are strictly exogenous in estimating the maturity model. Furthermore, not controlling for endogeneity may also influence the sign of the estimated coefficients, leading to misinterpretation of the results. Managerial ownership, for instance, has a positive and significant impact on short-term debt in models 1 to 3, in line with the results in Datta et al. (2005) and Guney and Ozkan (2005); in model 4, when endogeneity is controlled for, its estimated impact becomes negative.

Estimating the same models of Table 4 in a static framework leaves the results unchanged. However, the findings show that the coefficient of the lagged maturity is positive

and significantly different from zero. Therefore, the adjustment factor $\lambda$, given by $1-\alpha$, which represents the ability of firms to adjust to their target maturity levels, is greater than 0.5, possibly providing evidence that the dynamic nature of equation (1) is not rejected. This is consistent with Ozkan (2000) and Antoniou et al. (2006). Firms seem to adjust their short-term debt relatively quickly, in an attempt to reach their target debt maturity.

[INSERT TABLE 4 HERE]

*5.2.1 Blockholders and their identity*

Tables 4 and 5 show the results for the main ownership and board composition variables, besides those for the control variables.

In particular, the evidence in Tables 4 and 5 seems to support my predictions for large external shareholders. Both proxies for blockholding, *Blockholding* and *Largest Non-Managerial Ownership*, are negative and significant (Models 4, 5 and 6). This corroborates the hypothesis that the presence of blockholders *per se* plays a significant role in monitoring managerial behavior, in line with Zeckhauser and Pound's (1990) argument. This is also consistent with the idea that the disciplinary pressure imposed on managers through the corporate governance process acts as a substitute for the disciplinary role of debt maturity. It may also suggest that increased institutional monitoring may reduce the efficacy of debt as a market-signaling device. This results may extend previous findings of an interdependence between different control mechanisms in an agency perspective (Agrawal and Knoeber, 1996).

Models 7 and 8 in Table 5 provide further insights into the relation between debt maturity decisions and non-managerial shareholders. I find corroborating evidence for the hypothesis that different shareholders have different incentives to monitor and, therefore, a different impact on maturity decisions. The results show that the presence of individuals and/or non-financial corporations, both as a group (*Non-Institutional Ownership*) and as largest non-managerial owners (*Largest Non-Institutional Ownership*), is inversely related to short-term debt. This may suggest that debt maturity and non-institutional shareholders are substitute monitoring instruments. Non-financial shareholders may have incentives to monitor managerial behavior, and this may be a signal to the market of mitigated agency conflicts within the firm.

On the other hand, I fail to detect a significant relation between institutional investors and debt maturity decisions when I consider institutional investors as a group (*Institutional Ownership*, Model 7). This may be interpreted as a evidence of free-riding problems among multiple investors. However, when I single out the investor with the largest stake among

institutional shareholders (*Largest Institutional Ownership*, Model 8), the results show that its impact on maturity decisions is negative and significant, suggesting that even a financial institution may provide lenders with a positive signal of some monitoring actions. This supports the efficient monitoring hypothesis of Pound (1988) who maintains that institutional investors can be more efficient monitors than other shareholders because of their greater expertise, especially in financial matters. Alternative arguments are provided by Bathala et al. (1994). They explain that although larger investors have the option of simply selling their holdings, the magnitude of the average holdings is so large that the shares cannot be sold without further affecting the stock price. Therefore, investors have more incentives to monitor Consistent with this evidence in the US system, Gillan and Starks (2000) argue that the low annual turnover of shares of CalPERS (California Public Employee Retirement System) and the New York Retirement funds implies that larger investors may have incentives to hold the shares and actively encourage managers to improve performance and increase shareholder value. Finally, Bathala et al. (1994) and Crutchley et al. (1999) show that the monitoring role of institutional ownership is an alternative device to the disciplinary role of debt.

[INSERT TABLE 5 HERE]

*5.2.2 Managerial ownership*

Model 4 in Table 4 shows that managerial ownership plays a significant role in determining the maturity structure of firms in line with previous studies in this literature. However, Datta et al. (2005) and Guney and Ozkan (2005) find a negative relation between long-term debt and managerial ownership, while my results show a negative relation between short-term debt and insider shareholding. As explained above, my evidence may differ because I take into account potential endogeneity issues that may bias the estimated association. In addition, my panel data of ownership lets me exploit the intertemporal variation of ownership structures (shown in the descriptive statistics) to obtain more robust estimates, an aspect that is explicitly neglected in Guney and Ozkan (2005). This finding seems to support the hypothesis that alternative control mechanisms are substitutes. Increasing ownership makes managers more aligned and reduces the pressure by lenders for frequent monitoring actions through the roll-over of short-term debt.

To further explore the relation between maturity and managerial ownership, in Table 5 I include a quadratic term. Generally, in all the estimated models, there is a significant U-shaped relation between managerial ownership and short-term debt, suggesting that managers tend to lengthen the maturity of debt as their ownership share in the firm increase. However,

high levels of insider ownership may reinforce entrenched managers, and induce them to expropriate external investors. In order to reduce negative repercussions, such as lower market evaluation of the firm's stocks, managers would tend to issue more short-term debt to signal to the market that they are not resorting to expropriation. Alternatively, external investors in the market may increase the pressure for higher levels of short-term debt if there is a potential threat of non value-maximizing actions by entrenched managers. The estimated turning points of the quadratic relation are about 37% across all models in Table 5.[10] Further data inspection reveals that a non-negligible 12% of companies feature executive ownership greater than 37%. Although the context is different from this paper, the inflection point is comparable with that reported by Lasfer (2004) to distinguish the alignment and entrenchment area of insider ownership with respect to firm performance (about 42%). Among US-based studies that use leverage defined as long-term debt (which is the complement of my dependent variable), Friend and Lang (1988) report similar effects for low and high levels of insider shareholding and Wansley et al. (1996) show comparable turning points (approximately 40%) to those in my tests.[11]

*5.2.3 Board composition*

Estimates for the two variables included in the analysis to approximate board composition show a negative sign in line with my prediction. Nonetheless, in all models only the separation between CEO and Chairman appears to be relevant in determining maturity decisions. The result may be interpreted as evidence that those firms that adopt a division of the roles at the head of the company give a signal of limited managerial discretion. Lasfer (2004) finds that the compliance to this provision is a value-enhancing device in particular for those firms more exposed to managerial entrenchment. In our context, this positive signal reduces the disciplinary role of shorter debt maturities.

On the other hand, my analysis shows that a larger presence of non-executive directors on the board does not appear to provide the market with the signal of better monitoring and performance in the firm. One possible explanation for this result is that non-executives do not have sufficient financial incentives to efficiently monitor executives decisions (Jensen, 1993). To

[10] For example, the inflexion point for the quadratic relation in Model 5 is calculated as the solution to the following equation: MAT = -0.008MAN + 0.0001MAN$^2$, where MAN stands for *Executive Ownership* for brevity reasons. I differentiate MAT with respect to MAN, $\partial MAT/\partial MAN = -0.008 + 0.0001MAN$; I let $\partial MAT/\partial MAN = 0$ and I solve for MAN.

[11] In line with previous studies on ownership and performance (e.g., Morck et al., 1988; Mura, 2007, a cubic term for managerial ownership is also included in the regressions. Unreported results, however, show that the cubic form does not appear to enhance the explanatory power of the model.

explore this aspect in more detail, I run two different tests. First, I include in the model the non-executives' shareholding in both linear and quadratic forms. Second, I substitute *Ratio* with the proportion of non-executives with shares to the total number of directors. Unreported results show insignificant findings in both analyses. In a different area, this is consistent with Faccio and Lasfer (2000) and Lasfer (2004) who find insignificant improvements in market performance from increasing the number of non-executives in the board.

*5.2.4 Control variables*

As far as the firm-specific determinants are concerned, in Table 5 I generally find that firms with higher growth opportunities (*Market-to-Book*) tend to have less short-term debt. This finding is in line with Stohs and Mauer (1996), Johnson (2003) and Datta et al. (2005) for the US market; and with Schiantarelli and Sembenelli (1997) and Antoniou et al. (2006) for the UK sub-sample. This result tends to support the liquidity risk hypothesis: firms tend to issue more long-term debt in an attempt to avoid inefficient liquidation of their riskier growth opportunities.[12] Among the other contracting-costs predictions, larger firms seem to adopt more long-term debt, as in the results of all previous empirical studies. The asset maturity coefficient is not significant, as in Datta et al. (2005) and Antoniou et al. (2006).

The liquidity risk hypothesis is supported by the significant and negative results of *Leverage*, in line with Stohs and Mauer (1996), Johnson (2003) and Datta et al. (2005). Furthermore, the volatility of earnings (*Volatility*) is always significant and negative in line with Johnson (2003).

My study fails to find support for the signaling hypothesis that high quality firms use more short-term debt to signal their quality. This is in line with the results reported in Ozkan (2002).

Finally, I find evidence of a significant relation between debt maturity and taxation, but not with the predicted sign. However, this result is in line with previous UK-based evidence (Ozkan, 2000; Antoniou et al., 2006). The proxy for the term structure (*Term Structure*), on the other hand, shows an insignificant impact on debt maturity. One possible reason is that this variable is market-based, that is, a shock in it would indistinguishably affect all the companies in the system. Therefore, by including firm-invariant time effect dummies in the regressions, I have already discounted the potential impact of term structure on debt maturity decisions. This result is in line with Johnson (2003) when time dummies are included in the estimations.

[12] As suggested by Stohs and Mauer (1996), I also ran the same regressions for all the specifications without controlling for leverage, but I obtained the same results reported here.

## 6. Robustness checks

*6.1 Largest shareholders and liquidity risk*

One of the implications of Myers (1977) is that short-term debt maximizes firm value by reducing the underinvestment problem when managers act in the shareholders' interests. In this context, liquidity risk is not taken into account. Shareholders, in fact, are assumed to hold a well-diversified financial portfolio: thus, their holdings in one particular firm represent a relatively small portion of their overall wealth. Consequently, the potential liquidity risk entailed in shorter maturities may have a relatively small negative effect on their wealth. Admati et al. (1994) also argue that there is a trade-off between a high degree of monitoring, which is promoted by concentrated ownership, and risk-sharing gains, which requires more diffuse ownership. This implies that large shareholders with less diversified portfolios benefit less from risk-sharing gains and are expected to prefer longer maturities in order to reduce the liquidity risk. From this perspective, one could argue that the negative coefficient of external blockholding documented in previous estimations may be driven by the shareholder's risk aversion rather than its monitoring action.

If this is so, I should find a significant and negative impact of proxies for blockholding in high liquidity risk companies, rather than in others. Otherwise, if my initial hypothesis on monitoring role prevails, I should not detect any significant difference. To investigate this issue in more detail, I define alternative proxies for high-liquidity risk firms. In line with Diamond (1991), highly leveraged companies are more exposed to liquidity risk. In addition, firms with more growth opportunities are likely to be more harmed by premature liquidation. Furthermore, Johnson (2003) suggests that companies with more volatile cash flows may be more likely to experience difficulties in repaying debt; while smaller firms are likely less diversified which implies higher expected liquidity risk and bankruptcy costs. Therefore, for robustness purposes, I build three separate dummies that are equal to one when a company is in the highest quartile of the distributions of leverage, market-to-book value and volatility and a further dummy equal to one when a company is in the lowest quartile of the distributions of size. Then, I interact these dummies with *Largest Non-Managerial Ownership*, which represents the most undiversified external blockholder, in four separate models. In line with the above risk aversion argument, I expect the interaction dummy to have a negative and significant influence on short-term debt.

The results are reported in Table 6. In all models the direct impact of blockholding is negative and significant as in previous regressions. However, in high liquidity risk firms its

effect is not significantly different from that in the other companies. In Models 9, 10 and 12, the interaction terms show a positive impact on debt maturity, which is inconsistent with the hypothesis of risk averse large shareholders. On the other hand, when I investigate large shareholders' influence in firms with high volatility (Model 11), the interaction term is negative, but insignificant. This seems to suggest that, generally, there is no systematic difference in the influence of *Largest Non-Managerial Ownership* on high and low risk firms.

[INSERT TABLE 6 HERE]

As a further robustness check, I replicate the same analysis by controlling for the identity of the largest shareholder. In line with the risk aversion argument, I would expect less diversified shareholders, such as non-financial companies and individuals (*Largest Non-Institutional Ownership*), to have a negative and significant impact on short-term debt decisions in those companies with high liquidity risk. Otherwise, as above, if the monitoring hypothesis holds, I should not expect any significant difference between the sub-samples. The results in Table 7 are very similar to those in Table 6. There is no systematic difference between high and low risk firms. All the interactions terms are insignificant. In only one case do I document a marginal significant influence of large institutional shareholders in highly leveraged firms (Model 13).[13]

To sum up, all these results corroborate my argument that the monitoring pressure imposed on managers through the presence of large non-managerial owners acts as a substitute for the disciplinary role of debt maturity.

[INSERT TABLE 7 HERE]

*6.2 Debt maturity and creditors' identity*

Finally, I further investigate the composition of debt maturity in terms of creditors' identity. As Table 8 shows, banks are the main lenders in the UK system. 58% of the total debt in the mean company is provided by banks (*Bank Debt*). In terms of maturity, on average 64% of short-term debt consists of bank debt (STBK), while in the median firm this figure increases to 84%. On the other hand, statistics for the identity of long-term debt lenders reveal that, in the average firm, bank debt accounts for 38% of long-term debt (LTBK), but for only 5% in the median firm. This suggests that most long-term debt consists of non-bank debt.

[13] As a further robustness check, I excluded from the above estimations *Leverage*, *Market-to-Book*, *Volatility* and *Size* and substituted them with the corresponding dummies for high liquidity risk firms. Results on the interaction terms are similar to those reported here, while the dummies are not significant possibly due to the first differencing process involved in the GMM method. Furthermore, I divided the sample into high and low liquidity risk companies according to the average value of the distribution for *Leverage*, *Market-to-Book*, *Volatility* and *Size* respectively, finding that LARGEST has no significantly different impact between high and low risk companies. Results are available upon request.

[INSERT TABLE 8 HERE]

On the basis of these statistics, it could be argued that the results on short-term debt in this work may be driven by creditors' identity and, thus, may capture a bank effect rather than a maturity effect. As a robustness check, therefore, in Table 9 I estimate the base model (Model 6) using long-term debt (the ratio of debt due after one year to total debt, LGDEBT) as a dependent variable instead of short-term maturity. If my previous findings really capture a maturity effect, then I should not detect any difference in the results, except for the opposite signs. Indeed, Table 9 Model 17 reports the same relations detected in earlier estimations, corroborating the argument that my estimations were not driven by creditors' identity.

Nonetheless, a simple algebraic reason may lead to the results in Model 17. Long-term debt is, in fact, the complement of short-term debt. Therefore, further investigations are necessary. In Model 18, I estimate again the base Model 6 with short-term debt as dependent variable by including bank debt in the regressors (*Bank Debt*), to verify if the previous results still hold. The findings show that the negative relation with blockholding, the U-shaped relation with managerial ownership and the negative influence of splitting the officers' roles remain unaffected by the presence of bank debt. Overall, this supports the argument that my findings are not driven by creditors' identity.

[INSERT TABLE 9 HERE]

**7. Conclusions**

This study investigates whether a link exists between corporate debt maturity and both ownership structure and board composition. Three specific issues are analyzed in the study. First, what are the separate effects on debt maturity of the proportional ownership by blockholders, both institutions and non institutions and insiders, and what is the shape of this relation? Second, what is the effect of composition of the board of directors on debt maturity choices? Third, is there a substitution effect among different agency controlling mechanisms?

Two main factors contribute to making my tests interesting. First, the GMM methodology that I use is able to control simultaneously for endogeneity of the regressors and for endogeneity due to fixed effects, both of which may confound inferences about causality. Second, I use an original, large panel dataset of UK firms for the 1991-2001 period. UK data is particularly appropriate for the tests because UK institutions have a reputation for being passive investors. Indeed, all UK codes of best practice have explicitly expressed concern about the failure of institutional owners to deal with underperformance in companies in which they invest. Further, the enactment of these codes has significantly altered the typical board structure of UK companies.

My results are consistent with the hypothesis of interdependence among different monitoring devices (e.g., Jensen et al., 1992; Agrawal and Knoeber, 1996; Crutchley et al., 1999). First, I report a significant negative relation between short-term debt and different proxies for blockholding. This may suggest that short-term debt and blockholding are indeed alternative control mechanisms for mitigating managerial discretion. Several robustness checks are performed to test the possibility that the negative relation is driven by the decision of non-diversified shareholders to lengthen the maturity of debt in the attempt to reduce liquidity risk. My tests do not lend support to this alternative interpretation.

Second, by controlling also for the identity of non-managerial shareholders, I provide further evidence which corroborates the argument that there is a substitution effect between alternative control mechanisms that reduce the agency costs within a company. The findings indicate that non-financial shareholders, who have the ability and the incentives to monitor managerial behavior, have a significantly negative impact on debt maturity decisions. Furthermore, when I single out the largest institutional investor in the firm I find that institutional owners have similar incentives to monitor the financial decisions of the company.

Third, my results support the hypothesis I formulate in this work that the link between insider ownership and debt maturity is non-linear. We find strong evidence of a U-shaped association. At low levels of ownership, the negative relation I detect may indicate that the presence of a control mechanism already in place may induce external investors to temper the pressure for shorter maturities. Conversely, at higher levels of managerial ownership, the increasing costs of expropriation seem to induce managers to raise the proportion of short-term debt, in the attempt to give a positive signal of self-imposed monitoring to the market. Finally, evidence appears to indicate that the choice by companies to separate the CEO from the Chairman office significantly determines debt maturity choices, while the proportion of non-executive directors in the board does not seem to play any significant role.

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**Table 1. Median (mean) percentage of total debt that matures at different times for small and large firms in the UK and US.**

This table shows the median (mean) percentage of total debt that matures at different times, categorized by firm size for the UK and US companies over the sample period, 1991-2001. *Size*, defined as the natural logarithm of total assets in 1991 prices, is used to separate small from large companies. Small companies are defined those below the median size for the total sample; *vice versa*, large companies are those above the median. Data for US companies were collected from *Compustat* and definitions for different maturities follow Datta et al. (2005).

| | **UK** | | **US** | |
|---|---|---|---|---|
| **Maturities** | ***Small firms*** | ***Large firms*** | ***Small firms*** | ***Large firms*** |
| **due within 1 year** | 0.72 | 0.34 | 0.03 | 0.03 |
| | (0.66) | (0.42) | (0.12) | (0.10) |
| **due between 2 and 5 years** | 0.03 | 0.35 | 0.25 | 0.33 |
| | (0.20) | (0.37) | (0.32) | (0.37) |
| **due in more than 5 years** | 0.00 | 0.01 | 0.38 | 0.45 |
| | (0.05) | (0.15) | (0.42) | (0.47) |

## Table 2. Descriptive statistics for ownership variables.

This table shows the sample ownership characteristics for 625 firms over the period 1991-2001. Panel A reports the percentage of shares held by executive directors and non-managerial shareholders. Panel B shows the average number of owners divided by category of owner. *Executive Ownership* represents the percentage of shares by executive directors; *Blockholding* is the total percentage of shares held by all large non-managerial shareholders with more than 5% of the shares in each company; *Largest Non-Managerial Ownership* is equal to the percentage of shares by the first non-managerial shareholder; *Ratio* is the proportion of non-executives to total number of directors; *Institutional Ownership* is the total percentage of shares held by the disclosed investment companies, insurance companies and banks in each firm; *Non-Institutional Ownership* represents the total percentage of shares held by the disclosed non-financial corporations and individuals in each firm; *Largest Institutional Ownership* is the percentage of shares by the first non-managerial shareholder when it is an institutional investor, insurance company or bank; *Largest Non-Institutional Ownership* is equal to the percentage of shares by the first non-managerial shareholder when it is a non-financial company or an individual; *Float* is the sum of the undisclosed shareholding, below the official threshold; *Executive Directors* is the total number of executive directors; *Non-Executive Directors* is the total number of non-executive directors; *Ratio* is the proportion of non-executive directors on total board; *Non-Managerial Shareholders* is the total number of external shareholders with more than 5% shares; *Institutional Investors* is the total number of financial institutions; *Non-Institutional Investors* is the total number of non-financial institutions, private individuals, other non-financial companies; *Split* is a dummy equal to 1 if there is separation between CEO and Chairman (figures below represent the percentage of firms with *Split* =1).

*Panel A. Average percentage of ordinary shares held by managers and non-managerial shareholders*

| | 1991* | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(%)** | | | | | | | | | | | |
| ***Executive Ownership*** | 14.51 | 12.75 | 12.02 | 11.10 | 10.53 | 9.53 | 9.62 | 9.13 | 8.98 | 8.38 | 8.26 |
| ***Blockholding*** | 21.72 | 23.16 | 23.54 | 21.70 | 22.04 | 22.85 | 24.31 | 24.99 | 25.82 | 25.78 | 24.40 |
| ***Largest Non-Managerial Ownership*** | 9.51 | 9.51 | 9.90 | 10.12 | 10.35 | 10.73 | 11.00 | 11.37 | 11.00 | 12.20 | 11.68 |
| ***Institutional Ownership*** | 13.41 | 15.44 | 15.71 | 14.92 | 15.15 | 16.49 | 17.23 | 18.08 | 18.09 | 17.88 | 16.30 |
| ***Non-Institutional Ownership*** | 8.45 | 7.82 | 7.91 | 6.96 | 7.10 | 6.50 | 7.15 | 7.00 | 7.80 | 7.97 | 8.15 |
| ***Largest Institutional Ownership*** | 5.15 | 5.78 | 5.66 | 6.33 | 6.57 | 7.31 | 7.39 | 7.78 | 7.29 | 7.57 | 7.35 |
| ***Largest Non-Institutional Ownership*** | 4.31 | 3.71 | 4.15 | 3.78 | 3.76 | 3.42 | 3.61 | 3.59 | 3.71 | 4.63 | 4.33 |
| ***Float*** | 60.96 | 52.49 | 51.93 | 56.59 | 56.47 | 56.81 | 55.53 | 56.00 | 54.92 | 56.25 | 57.07 |

*Panel B. Ownership composition: Average number of owners*

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Number of owners*** | | | | | | | | | | | |
| ***Executive Directors*** | 4.71 | 4.59 | 4.47 | 4.33 | 4.26 | 4.17 | 4.09 | 4.09 | 4.01 | 4.00 | 3.90 |
| ***Non-Executive Directors*** | 2.33 | 2.47 | 2.69 | 2.78 | 3.04 | 3.12 | 3.22 | 3.26 | 3.36 | 3.41 | 3.50 |
| ***Ratio*** | 0.32 | 0.33 | 0.36 | 0.38 | 0.41 | 0.42 | 0.43 | 0.44 | 0.45 | 0.45 | 0.47 |
| ***Non-Managerial Shareholders*** | 2.20 | 2.44 | 2.48 | 2.15 | 2.13 | 2.22 | 2.37 | 2.42 | 2.53 | 2.44 | 2.34 |
| ***Institutional Investors*** | 1.51 | 1.77 | 1.84 | 1.59 | 1.57 | 1.69 | 1.77 | 1.83 | 1.87 | 1.83 | 1.67 |
| ***Non-Institutional Investors*** | 0.69 | 0.68 | 0.64 | 0.56 | 0.56 | 0.53 | 0.60 | 0.59 | 0.65 | 0.61 | 0.67 |
| ***Split (%)*** | 83.90 | 85.12 | 86.99 | 88.46 | 90.42 | 91.05 | 90.60 | 92.61 | 92.56 | 91.55 | 93.03 |
| ***Total sample firms*** | 503 | 531 | 561 | 598 | 637 | 637 | 638 | 582 | 497 | 426 | 373 |

* In 1991 my source of data still reported figures with a 5% threshold, so average shareholding by outsiders is not directly comparable to the following years.

## Table 3. Descriptive statistics for economic variables.

This table shows the sample economic characteristics for 625 firms over the period 1991-2001. *MAT* is the ratio of loans repayable within one year to total debt; *Leverage* is the ratio of total debt to total assets; *Market-to-Book* is equal to the ratio of market value of total assets to book value of total assets, where market value of total assets is defined as the book value of firm's assets plus the difference between the market value and the book value of equities; *Size* is defined as the natural logarithm of total assets in 1991 prices; *Asset Maturity* is the ratio of total fixed assets to annual depreciation, where total fixed assets represent the net total of land and buildings, plant and machinery, construction in progress and other fixed assets; *Quality* is the growth rate of earnings, defined as the difference between the pre-tax profits in t+1 and the pre-tax profits in t divided by the pre-tax profits in t; *Volatility* is equal to earnings before taxes and depreciation over the four years preceding the sample year, divided by average assets for that period; *Tax* is the total tax ratio, defined as total tax charge divided by pre-tax profits; *Term Structure* is defined as the difference between the yields on 10-years government bonds and the three-months Treasury bills.

| Variable | Mean | Std. Dev. | 25th Percentile | Median | 75th Percentile | Total observations |
|---|---|---|---|---|---|---|
| ***MAT*** | 0.54 | 0.34 | 0.24 | 0.50 | 0.91 | 5983 |
| ***Market-to-Book*** | 1.57 | 0.94 | 1.01 | 1.32 | 1.82 | 5983 |
| ***Leverage*** | 0.17 | 0.13 | 0.06 | 0.16 | 0.25 | 5983 |
| ***Asset Maturity*** | 9.94 | 8.31 | 5.56 | 7.92 | 10.82 | 5983 |
| ***Size*** | 11.26 | 1.83 | 9.95 | 11.04 | 12.41 | 5983 |
| ***Quality*** | -0.10 | 1.79 | -0.37 | 0.07 | 0.33 | 5983 |
| ***Volatility*** | 0.07 | 0.06 | 0.03 | 0.05 | 0.08 | 5983 |
| ***Tax*** | 26.16 | 19.12 | 22.06 | 30.22 | 33.81 | 5983 |
| ***Term Structure*** | 0.54 | 0.34 | 0.24 | 0.50 | 0.91 | |

## Table 4. OLS, WG, AH and GMM results.

This table includes OLS, WG, AH and GMM estimations for a sample of 656 firms between 1991 and 2001. The dependent variable is the ratio of debt repayable within one year to total debt (*MAT*); *Blockholding* is the sum of all large external shareholders with more than 5% of shares; *Executive Ownership* is the total share of ownership held by executive directors; *Split* is a dummy equal to 1 if there is separation between CEO and Chairman; *Ratio* is equal to the proportion of non-executives to total number of directors; *Market-to-Book* is equal to the ratio of market value of total assets to book value of total assets, where market value of total assets is defined as the book value of firm's assets plus the difference between the market value and the book value of equities; *Size* is defined as the natural logarithm of total assets in 1991 prices; *Asset Maturity* is the ratio of total fixed assets to annual depreciation, where total fixed assets represent the net total of land and buildings, plant and machinery, construction in progress and other fixed assets; *Leverage* is the ratio of total debt to total assets; *Volatility* is equal to the standard deviation of the first differences of earnings before taxes and depreciation over the four years preceding the sample year, divided by average assets for that period; *Quality* is the growth rate of earnings, defined as the difference between the pre-tax profits in t+1 and the pre-tax profits in t divided by the pre-tax profits in t; *Tax* is the total tax ratio, defined as total tax charge divided by pre-tax profits; *Term Structure* is defined as the difference between the yields on 10-years government bonds and the three-months Treasury bills. In AH model only the lagged dependent variable is endogenous and the corresponding instrument is in levels dated (t-2). GMM model is in first differences with levels dated (t-2) of the dependent variable, *Leverage*, and *Size* and (t-1, t-2) of all other regressors as instruments. In all models time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in the estimations. *P*-values are reported in parentheses.

| | | **OLS** | **WG** | **AH** | **GMM** |
|---|---|---|---|---|---|
| | | **(1)** | **(2)** | **(3)** | **(4)** |
| Independent variables | Predicted signs | Coeff. | Coeff. | Coeff. | Coeff. |
| ***$MAT_{t-1}$*** | + | 0.695*** | 0.331*** | 0.479*** | 0.477*** |
| | | (0.000) | (0.000) | (0.000) | (0.000) |
| ***Blockholding*** | - | 0.001*** | -0.001* | 0.004 | -0.002* |
| | | (0.000) | (0.096) | (0.182) | (0.051) |
| ***Executive Ownership*** | - | 0.002*** | 0 | 0.004 | -0.002** |
| | | (0.000) | (0.412) | (0.427) | (0.042) |
| ***Split*** | - | 0.055*** | 0.016 | -0.071 | -0.081* |
| | | (0.000) | (0.305) | (0.330) | (0.052) |
| ***Ratio*** | - | 0.03 | 0.049 | 0.141 | -0.013 |
| | | (0.170) | (0.152) | (0.530) | (0.857) |
| ***Market-to-Book*** | +/- | 0.008** | -0.001 | -0.076 | -0.044** |
| | | (0.032) | (0.800) | (0.385) | (0.015) |
| ***Size*** | - | 0.008*** | -0.057*** | 0.432 | -0.182*** |
| | | (0.000) | (0.000) | (0.449) | (0.000) |
| ***Asset Maturity*** | - | -0.002*** | -0.001 | -0.022 | -0.001 |
| | | (0.000) | (0.568) | (0.344) | (0.527) |
| ***Leverage*** | - | -0.258*** | -0.297*** | 1.556 | -0.357** |
| | | (0.000) | (0.000) | (0.342) | (0.026) |
| ***Volatility*** | - | 0.169*** | 0.022 | 0.707 | -0.147 |
| | | (0.004) | (0.724) | (0.193) | (0.146) |
| ***Quality*** | + | -0.008*** | -0.005*** | -0.007 | -0.004* |
| | | (0.000) | (0.004) | (0.612) | (0.084) |
| ***Tax*** | + | 0 | -0.000* | -0.001 | -0.001*** |
| | | (0.474) | (0.056) | (0.370) | (0.004) |
| ***Term Structure*** | - | 0.002 | 0.003 | -0.014 | 0.001 |
| | | (0.329) | (0.221) | (0.373) | (0.948) |
| **No. of firms** | | 656 | 656 | 656 | 656 |
| **No. of obs** | | 5983 | 5983 | 5983 | 5983 |
| **Sargan test** | | | | 3.22** | 149.75 |
| | | | | (0.050) | (0.708) |
| **m1** | | | | -7.50*** | -11.57*** |
| | | | | (0.000) | (0.000) |
| **m2** | | | | -0.48 | 1.31 |
| | | | | (0.629) | (0.190) |

*** Indicate statistical significance at the 1% level.
** Indicate statistical significance at the 5% level.
* Indicate statistical significance at the 10% level.

## Table 5. Regressions in two-step robust GMM.

This table includes GMM estimations for a sample of 656 firms between 1991 and 2001. The dependent variable is the ratio of debt repayable within one year to total debt (*MAT*); *Blockholding* is the sum of all large external shareholders with more than 5% of shares; *Largest Non-Managerial Ownership* is the shares held by the largest non-managerial shareholder with at least 5% shares; *Institutional Ownership* is the sum of the shares held by institutional investors, insurance companies and banks with more than 5% shares; *Non-Institutional Ownership* is the sum of the shares held by corporations and individuals with more than 5% shares; *Largest Institutional Ownership* is the shares held by the first non-managerial shareholder when it is either an institutional investor or an insurance company or a bank with more than 5% shares; *Largest Non-Institutional Ownership* is the shares held by the first non-managerial shareholder when it is either a corporation or an individual with more than 5% shares; *Executive Ownership* is the total share of ownership held by executive directors; *Executive Ownership*$^2$ is the square of *Executive Ownership*; *Split* is a dummy equal to 1 if there is separation between CEO and Chairman; *Ratio* is equal to the proportion of non-executives to total number of directors; *Market-to-Book* is equal to the ratio of market value of total assets to book value of total assets, where market value of total assets is defined as the book value of firm's assets plus the difference between the market value and the book value of equities; *Size* is defined as the natural logarithm of total assets in 1991 prices; *Asset Maturity* is the ratio of total fixed assets to annual depreciation, where total fixed assets represent the net total of land and buildings, plant and machinery, construction in progress and other fixed assets; *Leverage* is the ratio of total debt to total assets; *Volatility* is equal to the standard deviation of the first differences of earnings before taxes and depreciation over the four years preceding the sample year, divided by average assets for that period; *Quality* is the growth rate of earnings, defined as the difference between the pre-tax profits in t+1 and the pre-tax profits in t divided by the pre-tax profits in t; *Tax* is the total tax ratio, defined as total tax charge divided by pre-tax profits; *Term Structure* is defined as the difference between the yields on 10-years government bonds and the three-months Treasury bills. GMM models are in first differences with levels dated (t-2) of the dependent variable, *Leverage*, and *Size* and (t-1, t-2) of all other regressors as instruments. In all models time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in the estimations. *P*-values are reported in parentheses. Tp is inflexion points for the U-shaped relation of *Executive Ownership*.

| | | **(5)** | **(6)** | **(7)** | **(8)** |
|---|---|---|---|---|---|
| Independent variables | Predicted signs | Coeff. | Coeff. | Coeff. | Coeff. |
| ***MAT$_{t-1}$*** | + | 0.449*** | 0.425*** | 0.455*** | 0.427*** |
| | | (0.000) | (0.000) | (0.000) | (0.000) |
| ***Blockholding*** | - | -0.002** | | | |
| | | (0.028) | | | |
| ***Largest Non-Managerial Ownership*** | - | | -0.003* | | |
| | | | (0.064) | | |
| ***Institutional Ownership*** | +/- | | | -0.001 | |
| | | | | (0.318) | |
| ***Non-Institutional Ownership*** | - | | | -0.002* | |
| | | | | (0.091) | |
| ***Largest Institutional Ownership*** | +/- | | | | -0.002* |
| | | | | | (0.082) |
| ***Largest Non-Institutional Ownership*** | - | | | | -0.002* |
| | | | | | (0.095) |
| ***Executive Ownership*** | - | -0.008*** | -0.009*** | -0.007** | -0.009*** |
| | | (0.008) | (0.004) | (0.012) | (0.003) |
| ***Executive Ownership$^2$*** | + | 0.0001** | 0.0001*** | 0.0001** | 0.0001*** |
| | | (0.011) | (0.006) | (0.013) | (0.004) |
| ***Split*** | - | -0.083** | -0.089** | -0.078* | -0.093** |
| | | (0.049) | (0.036) | (0.064) | (0.031) |
| ***Ratio*** | - | -0.041 | -0.045 | -0.015 | -0.03 |
| | | (0.576) | (0.540) | (0.840) | (0.680) |
| ***Market-to-Book*** | +/- | -0.036** | -0.041** | -0.032* | -0.037** |
| | | (0.044) | (0.034) | (0.050) | (0.039) |
| ***Size*** | - | -0.166*** | -0.166*** | -0.154*** | -0.160*** |
| | | (0.001) | (0.001) | (0.001) | (0.001) |
| ***Asset Maturity*** | - | 0 | 0 | 0 | 0 |
| | | (0.839) | (0.950) | (0.992) | (0.944) |
| ***Leverage*** | - | -0.319** | -0.349** | -0.274* | -0.339** |
| | | (0.037) | (0.026) | (0.064) | (0.022) |
| ***Volatility*** | - | -0.168* | -0.198** | -0.169* | -0.188** |
| | | (0.093) | (0.040) | (0.074) | (0.041) |
| ***Quality*** | + | -0.002 | -0.003 | -0.002 | -0.003 |
| | | (0.353) | (0.311) | (0.361) | (0.245) |
| ***Tax*** | + | -0.001*** | -0.001*** | -0.001** | -0.001*** |
| | | (0.005) | (0.002) | (0.012) | (0.003) |

| | | | | | |
|---|---|---|---|---|---|
| ***Term Structure*** | - | 0.003 | 0.003 | 0.002 | 0.002 |
| | | (0.755) | (0.706) | (0.841) | (0.804) |
| **No. of firms** | | 656 | 656 | 656 | 656 |
| **No. of obs** | | 5983 | 5983 | 5983 | 5983 |
| **Sargan test** | | 180.77 | 182.43 | 210.10 | 197.61 |
| | | (0.407) | (0.374) | (0.204) | (0.414) |
| **m1** | | -11.18 | -11.12 | -11.01*** | -11.05*** |
| | | (0.000) | (0.000) | (0.000) | (0.000) |
| **m2** | | 1.13 | 0.98 | 1.10 | 0.99 |
| | | (0.258) | (0.327) | (0.272) | (0.323) |
| **Tp** | | 36.93 | 38.08 | 35.90 | 36.68 |

*** Indicate statistical significance at the 1% level.
** Indicate statistical significance at the 5% level.
* Indicate statistical significance at the 10% level.

## Table 6. High and low liquidity risk firms and Largest Non-Managerial Ownership.

This table includes GMM estimations for the model (6) augmented by the interaction terms with *Largest Non-Managerial Ownership*. The sample consists of 656 firms between 1991 and 2001. The dependent variable is the ratio of debt repayable within one year to total debt (*MAT*); *Largest Non-Managerial Ownership* is the shares held by the largest non-managerial shareholder with at least 5% shares; HLEV is a dummy equal to 1 if the firm is in the top quartile of the *Leverage* distribution; HLEV* *Largest Non-Managerial Ownership* is the interaction term between HLEV and *Largest Non-Managerial Ownership*; HMB is a dummy equal to 1 if the firm is in the top quartile of the market-to-book distribution; HMB* *Largest Non-Managerial Ownership* is the interaction term between HMB and *Largest Non-Managerial Ownership*; HVOL is a dummy equal to 1 if the firm is in the top quartile of *Volatility* distribution; HVOL* *Largest Non-Managerial Ownership* is the interaction term between HVOL and *Largest Non-Managerial Ownership*; LSIZE is a dummy equal to 1 if the firm is in the bottom quartile of SIZE distribution; LSIZE* *Largest Non-Managerial Ownership* is the interaction term between LSIZE and *Largest Non-Managerial Ownership*; *Executive Ownership* is the total share of ownership held by executive directors; *Executive Ownership*$^2$ is the square of *Executive Ownership*; *Split* is a dummy equal to 1 if there is separation between CEO and Chairman; *Ratio* is equal to the proportion of non-executives to total number of directors; *Market-to-Book* is equal to the ratio of market value of total assets to book value of total assets, where market value of total assets is defined as the book value of firm's assets plus the difference between the market value and the book value of equities; *Size* is defined as the natural logarithm of total assets in 1991 prices; *Asset Maturity* is the ratio of total fixed assets to annual depreciation, where total fixed assets represent the net total of land and buildings, plant and machinery, construction in progress and other fixed assets; *Leverage* is the ratio of total debt to total assets; *Volatility* is equal to the standard deviation of the first differences of earnings before taxes and depreciation over the four years preceding the sample year, divided by average assets for that period; *Quality* is the growth rate of earnings, defined as the difference between the pre-tax profits in t+1 and the pre-tax profits in t divided by the pre-tax profits in t; *Tax* is the total tax ratio, defined as total tax charge divided by pre-tax profits; *Term Structure* is defined as the difference between the yields on 10-years government bonds and the three-months Treasury bills. GMM models are in first differences with levels dated (t-2) of the dependent variable, *Leverage*, and *Size* and (t-1, t-2) of all other regressors as instruments. In all models time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in the estimations. *P*-values are reported in parentheses. Tp is inflexion points for *Executive Ownership*.

| | | **High leverage** | **High MTBV** | **High Volatility** | **Low Size** |
|---|---|---|---|---|---|
| | | **(9)** | **(10)** | **(11)** | **(12)** |
| Independent variables | Predicted signs | Coeff. | Coeff. | Coeff. | Coeff. |
| ***MAT$_{t-1}$*** | + | 0.413*** | 0.430*** | 0.413*** | 0.428*** |
| | | (0.000) | (0.000) | (0.000) | (0.000) |
| ***Largest Non-Managerial Ownership*** | - | -0.003* | -0.002* | -0.002 | -0.002 |
| | | (0.055) | (0.090) | (0.139) | (0.124) |
| ***HLEV* Largest Non-Managerial Ownership*** | | 0.002 | | | |
| | | (0.172) | | | |
| ***HMTBV* Largest Non-Managerial Ownership*** | | | 0 | | |
| | | | (0.842) | | |
| ***HVOL* Largest Non-Managerial Ownership*** | | | | -0.001 | |
| | | | | (0.115) | |
| ***LSIZE* Largest Non-Managerial Ownership*** | | | | | 0.001 |
| | | | | | (0.806) |
| ***Executive Ownership*** | - | -0.009*** | -0.008*** | -0.009*** | -0.008*** |
| | | (0.002) | (0.006) | (0.001) | (0.007) |
| ***Executive Ownership$^2$*** | + | 0.0001*** | 0.0001*** | 0.0001*** | 0.0001** |
| | | (0.004) | (0.008) | (0.002) | (0.011) |
| ***Split*** | - | -0.101** | -0.074* | -0.079* | -0.086** |
| | | (0.019) | (0.077) | (0.068) | (0.041) |
| ***Ratio*** | - | -0.013 | -0.041 | -0.027 | -0.065 |
| | | (0.862) | (0.588) | (0.711) | (0.401) |
| ***Market-to-Book*** | +/- | -0.042** | -0.039** | -0.035* | -0.043** |
| | | (0.029) | (0.039) | (0.061) | (0.025) |
| ***Size*** | - | -0.169*** | -0.157*** | -0.146*** | -0.185*** |
| | | (0.000) | (0.002) | (0.004) | (0.000) |
| ***Asset Maturity*** | - | 0 | 0 | -0.001 | 0 |
| | | (0.916) | (0.979) | (0.758) | (0.923) |
| ***Leverage*** | - | -0.432** | -0.345** | -0.404*** | -0.293* |
| | | (0.011) | (0.023) | (0.010) | (0.064) |
| ***Volatility*** | - | -0.202** | -0.204** | -0.098 | -0.212** |
| | | (0.032) | (0.028) | (0.319) | (0.032) |
| ***Quality*** | + | -0.003 | -0.003 | -0.003 | -0.002 |
| | | (0.279) | (0.358) | (0.262) | (0.388) |

| | | | | | |
|---|---|---|---|---|---|
| ***Tax*** | + | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | | (0.001) | (0.002) | (0.007) | (0.002) |
| ***Term Structure*** | - | 0.002 | 0.001 | 0.003 | 0.002 |
| | | (0.845) | (0.902) | (0.741) | (0.837) |
| **No. of firms** | | 656 | 656 | 656 | 656 |
| **No. of obs** | | 5983 | 5983 | 5983 | 5983 |
| **Sargan test** | | 206.36 | 209.28 | 197.48 | 208.82 |
| | | (0.258) | (0.215) | (0.417) | (0.221) |
| **m1** | | -10.96 | -10.88*** | -10.96*** | -10.88*** |
| | | (0.000) | (0.000) | (0.000) | (0.000) |
| **m2** | | 0.98 | 0.97 | 0.91 | 1.02 |
| | | (0.325) | (0.330) | (0.364) | (0.310) |
| **Tp** | | 37.80 | 37.06 | 37.90 | 38.45 |

*** Indicate statistical significance at the 1% level.
** Indicate statistical significance at the 5% level.
* Indicate statistical significance at the 10% level.

## Table 7. High and low liquidity risk firms and shareholders identity.

This table includes GMM estimations for the model (6) augmented by the interaction terms with the identities of the largest blockholding. The sample consists of 656 firms between 1991 and 2001. The dependent variable is the ratio of debt repayable within one year to total debt (*MAT*); *Largest Institutional Ownership* is the shares held by the first non-managerial shareholder when it is either an institutional investor or an insurance company or a bank with more than 5% shares; *Largest Non-Institutional Ownership* is the shares held by the first non-managerial shareholder when it is either a corporation or an individual with more than 5% shares; HLEV is a dummy equal to 1 if the firm is in the top quartile of the *Leverage* distribution; HLEV* *Largest Institutional Ownership* is the interaction term between HLEV and *Largest Institutional Ownership*; HLEV* *Largest Non-Institutional Ownership* is the interaction term between HLEV and *Largest Non-Institutional Ownership*; HMB is a dummy equal to 1 if the firm is in the top quartile of the market-to-book distribution; HMB* *Largest Institutional Ownership* is the interaction term between HMB and *Largest Institutional Ownership*; HMB* *Largest Non-Institutional Ownership* is the interaction term between HMB and *Largest Non-Institutional Ownership*; HVOL is a dummy equal to 1 if the firm is in the top quartile of the *Volatility* distribution; HVOL* *Largest Institutional Ownership* is the interaction term between HVOL and *Largest Institutional Ownership*; HVOL* *Largest Non-Institutional Ownership* is the interaction term between HVOL and *Largest Non-Institutional Ownership*; LSIZE is a dummy equal to 1 if the firm is in the bottom quartile of the *Size* distribution; LSIZE * *Largest Institutional Ownership* is the interaction term between LSIZE and *Largest Institutional Ownership*; LSIZE * *Largest Non-Institutional Ownership* is the interaction term between LSIZE and *Largest Non-Institutional Ownership*; *Executive Ownership* is the total share of ownership held by executive directors; *Executive Ownership*$^2$ is the square of *Executive Ownership*; *Split* is a dummy equal to 1 if there is separation between CEO and Chairman; *Ratio* is equal to the proportion of non-executives to total number of directors; *Market-to-Book* is equal to the ratio of market value of total assets to book value of total assets, where market value of total assets is defined as the book value of firm's assets plus the difference between the market value and the book value of equities; *Size* is defined as the natural logarithm of total assets in 1991 prices; *Asset Maturity* is the ratio of total fixed assets to annual depreciation, where total fixed assets represent the net total of land and buildings, plant and machinery, construction in progress and other fixed assets; *Leverage* is the ratio of total debt to total assets; *Volatility* is equal to the standard deviation of the first differences of earnings before taxes and depreciation over the four years preceding the sample year, divided by average assets for that period; *Quality* is the growth rate of earnings, defined as the difference between the pre-tax profits in t+1 and the pre-tax profits in t divided by the pre-tax profits in t; *Tax* is the total tax ratio, defined as total tax charge divided by pre-tax profits; *Term Structure* is defined as the difference between the yields on 10-years government bonds and the three-months Treasury bills. GMM models are in first differences with levels dated (t-2) of the dependent variable, *Leverage*, and *Size* and (t-1, t-2) of all other regressors as instruments. In all models time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in the estimations. Tp is inflexion points for the U-shaped relation of *Executive Ownership*.

| | | **High Leverage** | **High Market-to-Book** | **High Volatility** | **Low Size** |
|---|---|---|---|---|---|
| | | **(13)** | **(14)** | **(15)** | **(16)** |
| Independent variables | Predicted signs | Coeff. | Coeff. | Coeff. | |
| ***MAT$_{t-1}$*** | + | 0.405*** | 0.420*** | 0.407*** | 0.408*** |
| | | (0.000) | (0.000) | (0.000) | (0.000) |
| ***Largest Institutional Ownership*** | +/- | -0.002* | -0.002* | -0.002 | -0.003** |
| | | (0.098) | (0.098) | (0.158) | (0.042) |
| ***Largest Non-Institutional Ownership*** | - | -0.001 | -0.002 | -0.001 | -0.002 |
| | | (0.714) | (0.331) | (0.487) | (0.170) |
| ***HLEV* Largest Institutional Ownership*** | | 0.003* | | | |
| | | (0.076) | | | |
| ***HLEV* Largest Non-Institutional Ownership*** | | -0.001 | | | |
| | | (0.513) | | | |
| ***HMTBV* Largest Institutional Ownership*** | | | 0 | | |
| | | | (0.995) | | |
| ***HMTBV* Largest Non-Institutional Ownership*** | | | -0.001 | | |
| | | | (0.438) | | |
| ***HVOL* Largest Institutional Ownership*** | | | | -0.001 | |
| | | | | (0.629) | |
| ***HVOL* Largest Non-Institutional Ownership*** | | | | -0.002 | |
| | | | | (0.147) | |
| ***LSIZE* Largest Institutional Ownership*** | | | | | 0.001 |
| | | | | | (0.750) |
| ***LSIZE* Largest Non-Institutional Ownership*** | | | | | -0.001 |
| | | | | | (0.838) |
| ***Executive Ownership*** | - | -0.009*** | -0.008*** | -0.009*** | -0.008*** |
| | | (0.003) | (0.004) | (0.001) | (0.005) |

| | | | | | |
|---|---|---|---|---|---|
| ***Executive Ownership²*** | + | 0.0001*** | 0.0001*** | 0.0001*** | 0.0001*** |
| | | (0.004) | (0.005) | (0.001) | (0.007) |
| ***SPLIT*** | - | -0.112*** | -0.077* | -0.085** | -0.070* |
| | | (0.008) | (0.061) | (0.041) | (0.091) |
| ***RATIO*** | - | 0.009 | -0.024 | -0.046 | -0.073 |
| | | (0.901) | (0.737) | (0.508) | (0.322) |
| ***Market-to-Book*** | +/- | -0.033* | -0.032* | -0.031* | -0.033** |
| | | (0.072) | (0.055) | (0.065) | (0.049) |
| ***Size*** | - | -0.159*** | -0.141*** | -0.142*** | -0.157*** |
| | | (0.001) | (0.002) | (0.004) | (0.001) |
| ***Asset Maturity*** | - | -0.001 | 0 | -0.001 | 0 |
| | | (0.663) | (0.922) | (0.579) | (0.911) |
| ***Leverage*** | - | -0.329** | -0.334** | -0.375*** | -0.297** |
| | | (0.028) | (0.013) | (0.010) | (0.048) |
| ***Volatility*** | - | -0.177* | -0.204** | -0.103 | -0.216** |
| | | (0.052) | (0.020) | (0.262) | (0.017) |
| ***Quality*** | + | -0.002 | -0.002 | -0.003 | -0.002 |
| | | (0.375) | (0.437) | (0.224) | (0.390) |
| ***Tax*** | + | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | | (0.000) | (0.003) | (0.008) | (0.003) |
| ***Term Structure*** | - | 0.001 | 0 | 0.002 | -0.001 |
| | | (0.940) | (0.963) | (0.832) | (0.908) |
| **No. of firms** | | 656 | 656 | 656 | 656 |
| **No. of obs** | | 5983 | 5983 | 5983 | 5983 |
| **Sargan test** | | 236.64 | 229.04 | 222.49 | 233.26 |
| | | (0.333) | (0.468) | (0.590) | (0.391) |
| **m1** | | -10.71 | -10.73*** | -10.70*** | -10.73*** |
| | | (0.000) | (0.000) | (0.000) | (0.000) |
| **m2** | | 0.94 | 0.91 | 0.87 | 0.90 |
| | | (0.345) | (0.361) | (0.382) | (0.370) |
| **Tp** | | 37.04 | 36.45 | 35.87 | 37.70 |

*** Indicate statistical significance at the 1% level.
** Indicate statistical significance at the 5% level.
* Indicate statistical significance at the 10% level.

## Table 8. Descriptive statistics for bank debt.

This table shows the characteristics of bank debt for 656 firms over the period 1991-2001. *STBK* is defined as the ratio of bank debt repayable within one year to total debt repayable within one year; *LTBK* is the ratio of bank debt due in more than one year to total debt repayable in more than one year; *Bank Debt* is equal to the ratio of bank debt to total debt.

| Variable | Mean | Std. Dev. | 25th Percentile | Median | 75th Percentile |
|---|---|---|---|---|---|
| ***STBK*** | 0.64 | 0.40 | 0.22 | 0.84 | 0.99 |
| ***LTBK*** | 0.38 | 0.43 | 0 | 0.05 | 0.90 |
| ***Bank Debt*** | 0.58 | 0.39 | 0.15 | 0.71 | 0.96 |

## Table 9. Two-step robust GMM results for creditors' identity.

This table includes GMM estimations for model (6) with a different definition of the dependent variable. In model (17) the dependent variable is *LGDEBT*, which is equal to the ratio of debt repayable after one year to total debt. In model (18) the dependent variable equal to previous estimations, that is, *MAT*, is defined as the ratio of loans repayable within one year to total debt. This model, however, is augmented with a new regressor, that is, *Bank Debt*, defined as the ratio of total bank debt to total debt. *Largest Non-Managerial Ownership* is the shares held by the largest non-managerial shareholder with at least 5% shares; *Executive Ownership* is the total share of ownership held by Executive Directors. As far as the independent variables are concerned, *Executive Ownership*$^2$ is the square of *Executive Ownership*; *Split* is a dummy equal to 1 if there is separation between CEO and Chairman; *Ratio* is equal to the proportion of non-executives to total number of directors; *Market-to-Book* is equal to the ratio of market value of total assets to book value of total assets, where market value of total assets is defined as the book value of firm's assets plus the difference between the market value and the book value of equities; *Size* is defined as the natural logarithm of total assets in 1991 prices; *Asset Maturity* is the ratio of total fixed assets to annual depreciation, where total fixed assets represent the net total of land and buildings, plant and machinery, construction in progress and other fixed assets; *Leverage* is the ratio of total debt to total assets; *Volatility* is equal to the standard deviation of the first differences of earnings before taxes and depreciation over the four years preceding the sample year, divided by average assets for that period; *Quality* is the growth rate of earnings, defined as the difference between the pre-tax profits in t+1 and the pre-tax profits in t divided by the pre-tax profits in t; *Tax* is the total tax ratio, defined as total tax charge divided by pre-tax profits; *Term Structure* is defined as the difference between the yields on 10-years government bonds and the three-months Treasury bills. GMM is the model in the first differences with levels dated (t-2) of the dependent variable, *Leverage*, *Bank Debt*, and *Size* and (t-1, t-2) of all other regressors as instruments. In all models time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in the estimations. Tp is inflexion points for the U-shaped relation of *Executive Ownership*.

| **Dependent variable** | | **LGDEBT** | | **MAT** |
|---|---|---|---|---|
| | | **(17)** | | **(18)** |
| | Predicted signs | Coeff. | Predicted signs | Coeff. |
| ***LGDEBT$_{t-1}$*** | + | 0.425*** | + | |
| | | (0.000) | | |
| ***MAT $_{t-1}$*** | + | | + | 0.421*** |
| | | | | (0.000) |
| ***Largest Non-Managerial Ownership*** | + | 0.003* | - | -0.002* |
| | | (0.064) | | (0.062) |
| ***Executive Ownership*** | + | 0.009*** | - | -0.007** |
| | | (0.004) | | (0.023) |
| ***Executive Ownership$^2$*** | - | -0.0001*** | + | 0.0001** |
| | | (0.006) | | (0.040) |
| ***Split*** | | 0.089** | | -0.085** |
| | | (0.036) | | (0.033) |
| ***Ratio*** | + | 0.045 | - | -0.044 |
| | | (0.540) | | (0.543) |
| ***Market-to-Book*** | -/+ | 0.041** | +/- | -0.029* |
| | | (0.034) | | (0.098) |
| ***Size*** | + | 0.349** | - | -0.428*** |
| | | (0.026) | | (0.004) |
| ***Asset Maturity*** | + | 0.166*** | - | -0.142*** |
| | | (0.001) | | (0.004) |
| ***Leverage*** | + | 0 | - | 0.001 |
| | | (0.950) | | (0.801) |
| ***Volatility*** | + | 0.003 | - | -0.002 |
| | | (0.311) | | (0.406) |
| ***Quality*** | - | 0.001*** | + | -0.001*** |
| | | (0.002) | | (0.003) |
| ***Tax*** | - | 0.198** | + | -0.182** |
| | | (0.040) | | (0.049) |
| ***Term Structure*** | + | -0.003 | - | 0.003 |
| | | (0.706) | | (0.734) |
| ***Bank Debt*** | | | + | 0.134*** |
| | | | | (0.000) |
| **No. of firms** | | 656 | | 656 |
| **No. of obs** | | 5983 | | 5983 |
| **Sargan test** | | 182.43 | | 204.13 |
| | | (0.374) | | (0.295) |
| **m1** | | -11.12*** | | -11.14*** |
| | | (0.000) | | (0.000) |
| **m2** | | 1.01 | | 0.90 |
| | | (0.311) | | (0.367) |
| **Tp** | | 38.08 | | 36.24 |

*** Indicate statistical significance at the 1% level.
** Indicate statistical significance at the 5% level.
* Indicate statistical significance at the 10% level.