# OWNERSHIP STRUCTURE AND DEBT MATURITY: NEW EVIDENCE FROM SPAIN

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## ABSTRACT

This paper builds upon the scarce evidence about the relationship between ownership structure and debt maturity using a sample of listed Spanish firms. Our results suggest that there is a non monotonic (concave) relationship between long term debt and managerial ownership. Long term debt and managerial ownership relate positively at low levels of managerial ownership and negatively at higher levels. Moreover, the results offer support for the presence of a non-monotonic relationship (concave) between debt maturity and the presence of a large shareholder. The relationship between these variables is positive when the ownership of the large investors is low, and it becomes negative for higher levels of ownership. In addition, our evidence shows that firms use more short term debt when the main shareholder is a bank. We also find that firms use more long term debt when they are smaller and more indebted. In addition, firms take decisions about debt maturity without considering tax effects, but seeking to avoid the term premium on the interest rates. Finally, the results confirm the non-monotonic relationship between long term debt and credit risk identified by Diamond (1991).

**KEYWORDS:** Ownership structure, Debt maturity, Managerial ownership, Large shareholder.

**JEL Classification:** G3, G32.

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## INTRODUCTION

The study of financial decisions in firms has traditionally concentrated on the choice between the use of equity and the use of debt to establish an optimum financial structure. More recently, interest has moved towards the characteristics of debt, particularly its maturity structure. One line of development follows the suggestion of Stiglitz (1974) that the term of debt was of no significance. Theories following this line have tried to explain the debt maturity structure by imperfections in markets such as agency conflicts (Myers, 1977; Barnea, Haugen, and Senbet, 1980), information asymmetry (Flannery, 1986; Kale and Noe, 1990; Diamond, 1991), and taxes (Brick and Ravid, 1991; Mauer and Lewellen, 1987; Emery, Lewellen and Mauer, 1988).

Empirical evidence from the literature supports the idea that the choice of debt maturity is an important factor in reducing agency costs (Barclay and Smith 1995 and 1996, Guedes and Opler 1996, and Danisevská 2002 in the US market; Ozkan 2000, and Bevan and Danbolt 2002 in the UK market; Cuñat 1999 in Spain). However, Datta, Iskandar-Datta and Raman (2005) argue that these previous studies assume perfect alignment of the interests of managers and shareholders. Consequently, they studied the role played by managerial stock ownership in US corporate debt maturity and found a negative relationship as a result of the alignment of the interests of managers and shareholders. Following a similar line, Guney and Ozkan (2005) also found a negative relationship between managerial ownership and debt maturity for a sample of UK firms. In contrast with these results, a recent working paper by Marchica (2008) analysed the effects of insider ownership and large external shareholders in the UK. She used, as her dependent variable, short term debt and

found a significant negative coefficient for managerial ownership and a positive coefficient for the square of managerial ownership, and this provided strong evidence that the link with insider ownership is non-linear. Moreover, it provided evidence of a significant negative relationship for large external shareholders. Finally, Arslan and Karan (2006) focused on an emerging market, Turkey, to study the effects of ownership concentration and the presence of a large shareholder, and discovered a positive relationship with corporate debt maturity.

In this context, the aim of the present research is to provide empirical evidence of the effects of ownership characteristics on the debt maturity of a sample of non-financial, listed, Spanish firms for the period 1995-2001. This study contributes to the literature in a number of ways. First, as noted above, there is little empirical research studying the relationship between debt maturity and ownership structure. Second, in contrast with previous research by Datta et al. (2005) for the US and Marchica (2008) and Guney and Ozkan (2005) for the UK, which focused on Anglo-Saxon countries (common law), we present empirical evidence for the Spanish market classified as a continental model (civil law). Moreover, although Arslan and Karan (2006) focused their research on a civil law system like Spain, they did not study the effect of managerial ownership on debt maturity. In addition, in contrast to Spain, Turkey is an emerging market where a bond market for private corporations is not available, and consequently it is more difficult to access long term debt by issuing bonds through capital markets. Finally we build upon the previous literature by studying the possibility of a non-linear relationship, not only for insiders as in Marchica (2008) but also for the presence of a large shareholder.

Our results are different from those of Datta et al. (2005) and Guney and Ozkan (2005) in relation to the effect of managerial ownership on debt maturity.

While they found a negative relationship between debt maturity and managerial ownership for US and UK firms respectively, we found a positive relationship for low levels of managerial ownership and a negative relationship at high levels. Our results are consistent with the findings of Marchica (2008) for UK. These differences may be explained because in our study and in that of Marchica (2008) endogeneity was taken into account when estimating by GMM. Moreover, the results offer support for the presence of a non-monotonic relationship (concave) between debt maturity and the presence of a large shareholder. The relationship between these variables is positive when the ownership of the large investors is low, and it becomes negative for higher levels of ownership. In addition, our evidence shows that firms use more short term debt when the main shareholder is a bank. We also found that firms use more long term debt when they are smaller and more indebted. In addition, firms take decisions about debt maturity without considering tax effects, but seeking to avoid the term premium on interest rates. Finally, the results confirm the non-monotonic relationship between long term debt and credit risk identified by Diamond (1991).

The paper proceeds as follows: in the second section we present the theoretical foundations and hypotheses. In the third section we describe the data set and sample. The fourth section describes the model specification and variables used. Our results are discussed is the fifth section and concluding comments are in the final section.

## THEORETICAL FOUNDATIONS AND HYPOTHESES

Separation between ownership and control motivates managers to allocate resources to projects that do not clearly benefit the shareholders, or to pursue personal objectives (Jensen and Meckling, 1976). Thus, provided that managers have discretion to choose debt maturity, they will prefer using long term debt in order to avoid frequent monitoring by the debt market or lenders. In addition, managers are concerned with minimizing risk in order to prevent the firm getting into financial trouble that can imperil their jobs (Friend and Lang, 1988). In contrast, short term debt permits the reduction of the agency costs of managerial discretion because management is more frequently monitored due to periodic credit renewal (Rajan and Winton, 1995; Stulz, 2000), but there is an increase in liquidity risk.

There is little empirical research studying the relationship between debt maturity and agency conflicts between insiders and shareholders. Datta et al. (2005) analyse the degree of alignment of interest of managers and shareholders and its relationship with the debt maturity structure for a sample of listed US industrial firms. They found that managerial stock ownership is negatively related with debt maturity. Specifically, they established that managers with low equity ownership would prefer longer maturity in order to insulate them from external monitoring, although they will choose short maturity as their managerial stock ownership increases, as a result of a convergence of interests between managers and shareholders. Guney and Ozkan (2005) also found a negative relationship between managerial ownership and debt maturity. They argue that the results can be taken as evidence for the view that firms prefer more short term debt when the expected agency costs of managerial ownership are higher.

However, it might also be argued that the initial negative relationship would

become positive at high levels of ownership because the benefits of expropriation decline as managerial ownership increases (Jensen and Meckling, 1976). In addition, the risk-averse and underdiversified managers with a large proportion of shares might be expected to choose long-term debt to reduce the liquidity risks. In those circumstances a non linear (convex) relationship could be expected. Following this argument, Marchica (2008) tested for two different effects of insider ownership on debt maturity but she found the former non-linear relationship (concave). On the one hand, at lower levels of ownership, managers would prefer to lengthen debt maturity in order to avoid the expected costs from liquidity risk, such as losing their jobs and the wealth they have invested in the firm's shares. On the other hand, at higher levels of insider ownership, an entrenchment effect may prevail, and the adverse effects on firm value or on the capacity of managers to obtain debt, may persuade them to raise the proportion of short-term debt. Hence, managers signal to the market their commitment to keeping the risk of expropriation under control and mitigate potential agency costs. Thus, for a sample of UK non-financial companies, Marchica (2008) found a non-linear relationship between maturity of debt and insider ownership, positive for low levels of managerial ownership, and negative for high levels. Guney and Ozkan (2005) also studied a non-monotonic relationship between managerial ownership and debt maturity, although they found no meaningful non-linear effect. Drawing upon these considerations, in this work we test for the existence of a non-linear relationship between debt maturity and insider ownership for Spanish firms.

The presence of a large shareholder in firms also acts as a control mechanism to reduce the conflict of interest between insiders and outsiders. Effectively, shareholders can monitor managers through their voting power. However, for an average shareholder there may be little or no incentive to monitor managers, as they

bear all the cost related to their monitoring activities while benefiting from monitoring only in proportion to their shareholdings (Grossman and Hart, 1988). In contrast, a large shareholder, having claims on a large fraction of the firm's cash flow, can have a greater incentive to monitor managers. Thus, Shleifer and Vishny (1986) argue that the presence of a large shareholder plays an important role in monitoring managers. Moreover, the presence of a large shareholder acts as a signal for the market that managers are closely monitored (Friend and Lang, 1988). A large shareholder may acts as a substitute for monitoring connected with short term debt. Therefore, the presence of a large shareholder will be positively related to debt maturity. In fact, previous studies by Marchica (2008) for the UK and Arslan and Karan (2006) for Turkey confirm that the presence of large shareholders is negatively related to short term debt differences.

However, concentration of ownership may also provoke expropriation effects. Shleifer and Vishny (1986) argue that when conflicts arise between controlling owners and minority shareholders instead of between managers and dispersed shareholders, large shareholdings are costly, since majority owners can expropriate wealth from minority holders. This is the case in the Spanish market which belongs to the pattern for continental European countries and is characterised by lower levels of investor protection (La Porta, López-de-Silanes, Shleifer and Vishny, 1998), high ownership concentration (Faccio and Lang, 2002), and an important presence of *blockholders* (Becht and Roell, 1999) and major obstacles to hostile takeovers (Moerland, 1995). In this case a large shareholder does not act as a substitute for the monitoring associated with short term debt, and the expropriation effect can be significant. Therefore, at high levels of concentration of ownership, controlling owners may be interested in signalling to the market their intention to mitigate

potential agency costs by using short term debt.

Following from this discussion, we would expect a non-linear relationship between a large shareholder and debt maturity. Specifically, long term debt will increase with the presence of a large shareholder at low levels of ownership, and will decrease at high levels.

In addition, as Marchica (2008) pointed out, different categories of shareholders may also have different effects on debt maturity choice due to different incentives and abilities to monitor managers. In the present study we consider the possibility that the large shareholder may be a bank or a family. The analysis of banks and families as large shareholders is especially interesting in Spain. Spanish firms are in a bank-oriented financial system, where traditionally banks have had a significant presence in the ownership of firms, in contrast with the US and UK where bank-shareholders are less common. Moreover, the Spanish market exhibits a higher ownership concentration and the presence of family control is more important (Faccio and Lang, 2002, La Porta et al., 1999).

If the large shareholder is a bank the expected effect on debt maturity decisions is not clear. On the one hand, this kind of investor can exert greater control for reasons of economies of scale in corporate supervision (Diamond, 1984), and therefore less short term debt is needed. On the other hand, their investments are more diversified, and they could have fewer incentives to control a specific firm (Pound, 1988). In this case, firms could use more short term debt to signal to the market that effective control is being exercised. Conversely, where the large shareholder is a family with a high percentage of shares, there may be an increase in the monitoring of managerial behaviour, since they have a less diversified investment portfolio and could be more willing to intervene in the interests of the firm. Consequently, we

would expect a positive relationship with debt maturity.

Previous literature on debt maturity structure has also established other factors that can also have systematic effects on the choice of debt maturity. We will use these factors as control variables.

First, agency conflicts between debtholders and equityholders might be mitigated by the use of short-term loans. Myers (1977) argues that debt that matures before investment opportunities can be exercised could mitigate the problem of underinvestment. Assuming that firms with greater growth options usually have more conflicts between shareholders and debtholders, one might expect a positive relationship between growth opportunities and the use of short-term loans. Such a relationship has been confirmed in several studies (Barclay and Smith, 1995; Guedes and Opler, 1996; Stohs and Mauer, 1996; Cuñat, 1999; Ozkan, 2000; Bevan and Danbolt, 2002, Barclay, Marx, and Smith, 2003).

Myers (1977) also argues that a firm can reduce agency problems between shareholders and bondholders if it matches the maturity of its debt to the life of its assets. This would be consistent with the usual practice of adapting asset liquidity to the time it takes to settle liabilities. Previous evidence confirms this idea (Guedes and Opler, 1996; Stohs and Mauer, 1996; Danisevská, 2002; Barclay et al., 2003, in the USA; Ozkan, 2000 and Bevan and Danboldt, 2002 in the UK and Cuñat, 1999 in Spain). Thus, we expect a positive relationship between asset maturity and debt maturity.

On the other hand, smaller firms exhibit more debt-related agency conflicts (Smith and Warner, 1979), higher levels of asymmetric information (Berger and Udell, 1998), and higher bankruptcy risk and less access to capital markets (Titman

and Wessels, 1988). All this means these firms have more difficulty in obtaining long-term financing. We expect a positive relation between debt maturity and the firm's size. This is also supported in the case of US firms (Barclay and Smith, 1995; Stohs and Mauer, 1996; Jun and Jen, 2003, Barclay et al., 2003), British firms (Ozkan, 2000) or Spanish firms (Cuñat, 1999).

In addition, in the presence of asymmetric information, debt maturity structure can be used to transmit signals to the market about the quality of the firm. Flannery (1986) and Kale and Noe (1990) note that firms with high-quality investment projects use short-term loans to transmit their positive prospects to the market. Diamond (1991) extends the signalling model to credit risk. He establishes a non-monotonic relationship between credit risk and debt maturity in which long-term borrowing is mainly distributed among firms of intermediate credit risk. Low risk firms will be able to capitalise on the advantages of short-term borrowing and face up to the risks of project refinancing, while high risk firms will not be able to obtain long-term loans, because of the high costs of adverse selection. Therefore, a non-monotonic (concave) relationship between debt maturity and credit risk is to be expected.

The debt maturity choice may also be motivated by tax concerns. When the term structure of interest rates is not flat, Brick and Ravid (1985) show that the expected tax deduction values of debt depend on maturity. Specifically, when the yield curve is upward-sloping, the holding of long-term debt allows reduced tax rates. In other words, during the early years, the real value of tax reductions will be higher for long-term debt. Brick and Ravid (1991) note that a preference for long-term loans can also be found under flat or even negative term structures if there is uncertainty about interest rates. Mauer and Lewellen (1987) and Emery, Lewellen and Mauer (1988) also maintain long-term debt might have a positive effect on a firm's value.

Moreover, Kane, Marcus and McDonald (1985) argue that the optimal maturity is negatively associated with tax advantages of debt and the volatility of firm value and positively correlated with flotation costs. Thus, tax rates and debt maturity should be inversely related to ensure that the tax benefits of debts are not less than the amortised flotation costs. However, the empirical evidence is not as expected (Barclays and Smith, 1995; Guedes and Opler, 1996) or provides no support for the tax hypotheses (Stohs and Mauer, 1996). Emery (2001) theorizes that firms are not concerned with the tax aspects associated with loan maturity structures, but instead use short-term debt to avoid the term premium between short-term and long-term loans. Consequently, the expected relationship between debt maturity and the term structure of interest rates is not clear.

Finally, leverage can also be related to maturity of debt. Diamond (1993) establishes that firms with a high level of debt are likely to prefer longer maturity debt in order to avoid liquidating the firm too frequently. Thus, more indebted firms, which have the greatest financial risk, try to control risk by lengthening the average maturity of their debt. This is confirmed by Stohs and Mauer (1996) and Cuñat (1999). Accordingly, we expect a positive relationship between leverage and debt maturity.

## DATA AND SAMPLE

In our research we have used data from three different sources. First, from Spanish Securities and Exchange Commission (CNMV) we have collected balance sheets, loss and profit accounts and ownership data. Second, from the Daily Bulletin of the MSE (Madrid Stock Exchange) we have extracted data on the market value of the company shares. Finally, information on interest rates comes from publications by

the Public Debt Book-Entry Market maintained by the Bank of Spain.

Our analysis uses half-yearly data of 67 listed companies between 1995 and 2001. We have selected those non-financial firms for which complete information was available for the period. The sample firms represent more than 80% of the market value of the non-financial listed Spanish firms belonging to the different activity sectors.

## MODEL SPECIFICATION AND VARIABLE DESCRIPTION

Our principal aim is to provide evidence about the effects of ownership structure on debt maturity. To test this relationship we propose two panel data models. In the first one, we consider the non-linear relationship between debt maturity and managerial ownership (Equation 1), and, in the second, the non-linear relationship between debt maturity and the presence of a large shareholder (Equation 2).

*Equation 1:*

$$LTDEBT_{it} = \beta_1 MO_{it} + \beta_2 MO_{it}^{\ 2} + \beta_3 GROWP_{it} + \beta_4 AM_{it} + \beta_5 SIZE_{it} + \beta_6 Z_{it} + \beta_7 Z_{it}^{\ 2} + \beta_8 TERM_{it} + \beta_9 TAX + \beta_{10} LEV_{it} + \eta_i + \lambda_t + \upsilon_{it} \quad (1)$$

*Equation 2:*

$$LTDEBT_{it} = \beta_1 LS_{it} + \beta_2 LS_{it}^{\ 2} + \beta_3 GROWP_{it} + \beta_4 AM_{it} + \beta_5 SIZE_{it} + \beta_6 Z_{it} + \beta_7 Z_{it}^{\ 2} + \beta_8 TERM_{it} + \beta_9 TAX + \beta_{10} LEV_{it} + \eta_i + \lambda_t + \upsilon_{it} \quad (2)$$

where $LTDEBT_{it}$ measures long-term debt; $MO_{it}$ managerial ownership; $LS_{it}$ the presence of a large shareholder; $GROWP_{it}$ growth options; $AM_{it}$ asset maturity; $SIZE_{it}$ firm size; $Z_{it}$ financial strength, $TERM_{it}$ the interest rate differential; $TAX_{it}$ the corporate tax rate, $LEV_{it}$ the level of debt the firm has; $\eta_i$ individual unobservable

effects for each particular firm; $\lambda_t$ temporary effects; and $\upsilon_{it}$ random disturbances.

$\eta_i$ (unobservable heterogeneity) is designed to measure unobservable characteristics of the firms that have a significant impact on the firm's debt maturity. They vary across firms but are assumed constant for each firm. Examples include attributes of managers such an ability and motivation. They may also include industry-specific effects such as entry barriers or market conditions. The parameters $\lambda_t$ are temporary dummy variables that change over time, but are equal for all firms in each period considered. In this way, we have tried to incorporate the economic variables which firms cannot control (interest rates and prices, for example).

This methodology presents important benefits. These include panel data suggestions that individuals, firms, states or countries are heterogeneous. Time-series and cross-section data studies which do not control for this heterogeneity run the risk of obtaining biased results. Furthermore, panel data give more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency (Baltagi, 2001).

First differencing equations (1) and (2) removed the $\eta_i$ terms and then we estimated the models obtained. We estimated our models using the generalized method of moments (GMM) based on Arellano and Bond (1991), which allowed us to control for problems of endogeneity by using instruments. That GMM estimation is not only consistent, but also more efficient than other consistent estimators, such as the one proposed by Anderson and Hsiao (1982).

This methodology assumes that there is no second-order serial correlation in the errors in first differences. For this reason, in order to test the consistency of the estimations, we used the test for the absence of second-order serial correlation

proposed by Arellano and Bond (1991). Likewise, we employed the Sargan (1958) test for over-identifying restrictions, which tests for the absence of correlation between the instruments and the error term.

**Variables**

The dependent variable is *long-term debt* (LTDEBT), defined as the ratio of long-term debt to total debt. We consider long-term debt to be debt that matures in more than one year.

The variables used to capture the effects of ownership are manager ownership (MO) and large shareholder (LS). The first is the percentage of shares held by the managers, and the second the percentage of shares held by the major shareholder. In both cases, according to our hypotheses, we model a quadratic relationship. Hence we include in the Equations 1 and 2 the variables and their squares, respectively. Furthermore, to consider the effect of different categories of large shareholder we created two dummy variables: BANK and FAM. BANK takes value 1 if the large shareholder is a bank and 0 otherwise. FAM takes value 1 if the large shareholder is a family and 0 otherwise.

To measure growth options (GROWP) we use Tobin's q calculated, as the ratio between the firm's market value and its replacement value of capital.

Following Myers (1977) we control for asset maturity (AM). In this case, we measure the asset maturity using the following expression (Jun and Jen, 2003):

$$AM = p1 \times \frac{\text{Net Fixed Assets}}{\text{Annual depreciation}} + p2 \times \frac{\text{Receivables}}{\text{Sales}} + p3 \times \frac{\text{Inventories}}{\text{Sales}} + p4$$

where p1, p2, p3, and p4 are, respectively, the proportion of net fixed assets,

receivables, inventories, and other current assets, excluding cash, to total assets.

Net fixed asset maturity is measured by annual depreciation rates. Receivables and inventories are estimated by the length of time they take to be converted to cash. Cash and cash equivalents are considered to be liquid immediately and other current assets are assumed to have a one-year maturity.

As a proxy for size (SIZE) we use the log of market value of the firm. Moreover to control for the effect of credit quality we use the firm's *financial strength (Z)*, measured with one of the usual models used to predict firm insolvency[1]. A bankruptcy model attempts to measure the financial capacity and degree of solvency of a firm. The result can be considered as a *proxy* for their financial situation. At no time do we use the models for their original purpose, the prediction of bankruptcy of the firms. In particular, we use the model developed by García, Calvo-Flores, and Arqués (1997) for Spanish firms, where Z is defined as follow.

$$Z_A = -0.835 + 0.950 \times R_1 + 0.272 \times R_2 - 11.848 \times R_3 + 2.422 \times R_4 + 6.976 \times R_5$$

where

$$R_1 = \frac{\text{Receivables} + \text{Cash and equivalents}}{\text{Current liabilities}}; \qquad R_2 = \frac{\text{Fixed Assets} + \text{Current assets}}{\text{Fixed liabilities} + \text{Current liabilities}};$$

$$R_3 = \frac{\text{Financial expenses}}{\text{Sales}}; \qquad R_4 = \frac{\text{Annual depreciation}}{\text{Intangible fixed assets} + \text{Tangible fixed assets}};$$

$$R_5 = \frac{\text{Earnings before taxes}}{\text{Total liabilities}}$$

To capture the nonlinear relationship predicted by Diamond (1991) we introduce this variable and its square.

[1] In Spain there are only a few firms which have credit ratings. Because of this, and following previous papers about debt maturity (for example Scherr and Hulburt, 2001; Jun and Jen, 2003; or Garcia-Teruel and Martinez-Solano, 2007) we have used as a proxy for credit quality a bankruptcy prediction model.

To analyse the tax effects we used two proxies. First, to measure the term structure of interest rates (TERM), we subtracted the month-end yield on one year Spanish Treasury bills from the month-end yield on six to ten-year Spanish government bonds. Second, as a proxy of corporate tax rate we used the ratio total tax charge to total taxable income. From a tax perspective, the expected relationship would be positive (Brick and Ravid, 1985, 1991) for the first proxy and negative for the second one (Kane et al, 1985).

Finally, the level of debt (LEV) is measured as the ratio total debt over total assets.

In Table I we present the descriptive statistics of the variables. We observe long term leverage is on average nearly 30%, a level which is greater than that found by Arslan and Karan (2006) in Turkish firms, where a bond market for private corporations is not available, and lower than that found by Datta et al. (2005) in US and Marchica (2008) and Guney and Ozkan (2005) in UK. Moreover, in general, close to 50% of the assets are financed with debt. According to the ownership variables, the insider ownership is on average around 14%, although the median is 2.84%. These values are similar to those found in UK firms by Marchica (2008) and Guney and Ozkan (2005), but much higher than that found in US market by Datta et al. (2005). Moreover, the percentage of shares held by the main shareholder is very significant, taking a mean value of 31.60% (median 25.77%). This value reveals the high level of ownership concentration in the Spanish Market.

INSERT TABLE I

In Table II we present the matrix of Pearson correlations. Correlations between independent variables are not high, suggesting that multi-collinearity is not likely to be a problem in our study.

INSERT TABLE II

**RESULTS**

In Table III we present the results of our estimations. The explanatory variables have been assumed to be endogenous[2]. All the estimations have been carried out using the 2-stage GMM estimator, since the 1-stage estimation can present problems of heteroskedasticity, as is shown by the rejection of the null hypothesis of the Sargan (1958) test in these estimations. Furthermore, we do not detect any second-order serial correlation, which confirms the consistency of the estimations.

INSERT TABLE III

In Column 1, we estimate Equation 1, to test if there is a non-monotonic relationship between debt maturity and insider ownership. In Column 2, we present the results obtained in the estimation of Equation 2, which we have used to check whether there is a non-monotonic relationship between long-term debt and the existence of a large shareholder. In Column 3 we introduce the dummy variables BANK and FAM to analyse whether the type of the major shareholder also affects debt maturity decisions. In addition, in Column 4, we estimate the coefficients for the

[2] $E(x_{it}\ \varepsilon_{is}) \neq 0$ for $s \leq t$ and $E(x_{it}\ \varepsilon_{is})=0$ for all $s>t$.

MO and LS variables jointly in the same equation. In column 5, we add to the estimation presented in Column 4 by including the dummy variables BANK and FAM.

The results show that both of the coefficients for MO and $MO^2$ are significant. Their signs, positive for MO and negative for $MO^2$ indicate that the relationship between debt maturity and managerial ownership is concave, and shows that at low levels of managerial ownership the relationship is positive, though it become negative at high levels. Firms use more long term debt when the managers increase their percentage of shares, because, if they use more shore term debt, the higher liquidity risk that this kind of debt involves increases the possibility of losing not only their jobs but also their investment in shares. However, at higher level of managerial ownership, the increasing costs from expropriation encourage managers to increase the use of short term debt, in order to signal to the market that there is self-imposed monitoring. Furthermore, this variable has an important economic effect[3]. For instance, if variables MO and $MO^2$ increase by one standard deviation of MO, the dependent variable in Column 1 rises 20.16% over its mean value.

Our results are different from those of Datta et al. (2005) and Guney and Ozkan (2005), who found a negative relationship between debt maturity and managerial ownership for US and UK firms respectively, while we found a positive relationship for low levels of managerial ownership and a negative relationship at high levels. This is consistent with the findings of Marchica (2008). These differences may be explained by the fact that previous studies do not control for endogeneity[4],

[3] Economic impact of statistical significance of explanatory variables is measured as the percentage of change (over the mean value) in the dependent variable due to a one standard deviation change in the explanatory variable, all other things being equal.

[4] Datta et al. (2008) only consider leverage as an endogenous variable.

and this may influence the sign of the estimated coefficients, biasing the estimated relationship. In fact, Marchica (2008) found results in line with Datta et al. (2005) and Guney and Ozkan (2005) when endogeneity was not controlled in her study but the results changed when endogeneity was taken into account estimating by GMM.

With respect to the presence of a large shareholder, Columns 2 to 5 show that the effects of both LS and $LS^2$ are in general significant, with positive sign for the variable LS and negative for $LS^2$. With that result, we contribute to the literature by showing that the relationship between debt maturity and the presence of a large shareholder can be described as a non-monotonic relationship, which has not been considered in previous papers in this topic. In particular, we find a positive relationship between long-term debt and the presence of a large shareholder when that shareholder has a low level of equity. In this way, firms use more long-term debt when the main shareholder increases their percentage in equity since these shareholders have an incentive to monitor the managers and it is not necessary to use short-term debt as a control mechanism. This occurs until the percentage of shares held by the main investor reaches 4.09% (maximum of the estimated quadratic function in Column 2). Beyond this level, due to the expropriation effects, the relationship becomes negative, and increases in the ownership of the main shareholder are related with decreases in the use of long-term debt. When the level of equity owned by the large shareholder is high, the market could interpret this as meaning that the major shareholder can take decisions which can disadvantage minor shareholders. In this situation, firms use more short-term debt to mitigate potential agency costs. The economic impact of this variable is also important. An increase of one standard deviation in variable LS (and therefore in $LS^2$) implies an increase in long term debt by between 13.86% and 7.81%.

The coefficient of the variable BANK is negative and significant at the 1% level. Firms in which the major shareholder is a bank use less long-term debt in favour of short term-debt. This could indicate that these investors have a smaller supervisory role and firms have to use short-term debt to signal to the market that there is effective monitoring of managerial behaviour. This may be explained by the fact that Spanish banks try to use the private benefits of control for expropriating minority shareholders. This is supported by empirical evidence for the Spanish market. Specifically, while Zoido (1998) did not find a clear relationship, Giner and Salas (1997) showed a negative effect of the presence of bank ownership on a firm's return, and Casasola and Tribó (2005) found this negative effect when the bank is the main large blockholder. Moreover, these results show that firms whose major shareholder is a bank most probably get much of their financing from that bank, and therefore have less long-term debt than do other firms. On the other hand, the variable FAM is not significant, and we can conclude that the presence of a family as the main shareholder does not affect debt maturity decisions. This may be because the family as major investor may have more incentive to exercise control over the firm because they have a less diverse portfolio, but they do not have the scale economies of an institutional investor. Moreover, empirical evidence about the effects of family control on value are ambiguous (Renneboog, 2000; Demsetz and Villalonga, 2001; Cronqvist and Nilsson, 2003).

In relation to the control variables, in general, the significance and signs of estimated coefficients are very similar in the estimations carried out (from Columns 1 to 5). Firstly, the variable GROWP is not significant. So, although we expected that firms use more short-term debt (less long-term debt) when their growth opportunities rise as a mechanism to control the higher agency conflicts, the evidence found for our

sample do not justify such consideration. That non-significant relationship has also been found in some previous studies, such as those by Stohs and Mauer (1996), Scherr and Hulburt (2001) or Antoniou, Guney and Paudyal (2006).

The variable AM does not appear to affect debt maturity. Although it is significant in most of the estimations made, all the estimated coefficients are near to zero. So, we cannot accept that firms match the maturity of their assets and liabilities. Furthermore, if we calculate the possible economic impact of this variable, we notice that it is very little. This non-significant relationship is similar to that reported in the recent papers of Datta et al. (2005) and Marchica (2008). That result, together with the non significant relationship between debt maturity and the proxy for growth opportunities, could reveal the insignificance of suboptimal investment concerns. This result is in line with finding of Antoniou et al. (2006) for UK firms. It may be explained, following Chan-Lau (2001), by the fact that bank-based systems may play an important role in solving the underinvestment problem.

Contrary to what we would initially have expected, the variable SIZE is negatively related to the dependent variable (significant at the 1% level) in Columns 1 to 5. Our results show that larger firms use more short term debt. A similar result was found in Guedes and Opler (1996) and Scherr and Hulburt (2001). As Guedes and Opler (1996) indicated that effect is consistent with the liquidity risk explanation of debt because larger firms are less likely to default. Depending on the estimation, an increment in SIZE of one standard deviation causes a decrease (over the mean) in LTDEBT between 29.35% (Column 1) and 20.56% (Column 4).

The variable Z and its square ($Z^2$) are both significant at the 1% level, with positive and negative signs respectively. This indicates that the relationship between the dependent variable and credit quality is concave, and that it is the firms with more

and less credit quality which use more short-term debt[5]. This confirms the non-linear relationship between debt maturity and credit quality predicted by Diamond (1991). From an economic perspective, the effect of this variable over long-term debt is relevant. Long-term debt rises by an average of 7.97% when Z (and $Z^2$) rises by one standard deviation.

To analyze the tax effect on debt maturity we have included in the model the variables TERM and TAX. In the estimations carried out, both variables are significant, with a negative sign for variable TERM and a positive sign for the variable TAX. That result, which is contrary to the tax hypothesis, confirms Emery's argument. Emery (2001) thought that firms are not concerned with the tax aspects associated with debt maturity, but instead use short-term debt to avoid the term premium on long-term interest rates.

The estimated coefficients for leverage (LEV) are positive and significant at the 1% level. As expected, firms with more leverage, in order to control their risks, prefer long-term debt to short-term debt. The effect of this variable on debt maturity is very high, so that the economic impact is greater than 40% (from 44.58% in Column 1 to 45.89% in Column 5).

Finally in Columns 6 and 7 (Table III) we present the results of analyzing the possible interaction of the level of managerial ownership and large shareholder ownership. To do that, we estimated as in Columns 4 and 5 but included the interaction between variables MO and LS. In both estimations the coefficients for MOxLS are not significant. That result may indicate that the effect of MO on

[5] The results do not change if we use as a proxy of financial strength another model of bankruptcy prediction such as the re-estimation of Altman's (1968) model made by Begley, Ming, and Watts (1996).

LTDEBT is independent of the values that take LS, and vice versa.

The results are totally consistent even when we control specifically for possible sectorial effects. In our estimations, we cannot include dummy variables which take value 1 if the firm belongs to a specific sector and 0 otherwise, and where the variable is dropped if the firms do not change from one industry to another one. To solve this problem, we used two options. First, we consider that the asset maturity (AM) is a sectorial characteristic[6], and generate the variable IND as the difference between AM and the mean value that this variable has for the firms in this sector. Second, we calculate the mean value of LTDEBT by sector and subtract it from the variable LTDEBT. We do not present these estimations as they are similar to those that are presented.

## CONCLUSIONS

The aim of this paper is to build upon the scarce evidence in the previous literature about the effects of ownership structure on debt maturity decisions. In order to do that, we used a sample of Spanish firms, which belong to a market very different from the markets of the US, UK or Turkey, in which Datta et al. (2005), Marchica (2008) and Arslan and Karan (2006) respectively, have studied some aspects related to this topic. In particular, we studied how managerial ownership and the existence of a large shareholder can affect debt maturity structure.

Firstly, the results show that there is a non-monotonic (concave) relationship between debt maturity and manager ownership. This supports the idea that at lower

[6] Gupta and Huefner (1972) found correspondence between industry and fixed asset turnover. Also, Hawawini, Viallet and Vera (1986) found significant industry effect on firm's investment in working capital.

levels of ownership, managers would prefer to lengthen debt maturity in order to avoid the expected costs from liquidity risk. However, at higher levels of insider ownership, managers prefer to raise the proportion of short term debt to signal to the market that there is a control for the entrenched managers, and they are not resorting to expropriation.

Secondly, we find that the relationship between long-term debt and the presence of a large shareholder is non-monotonic (concave). This aspect, which has not been considered in previous papers, indicates that, when the ownership of the major shareholder is low, firms use more long-term debt when the major shareholder increases their participation in the equity, since they have enough incentive to monitor managers and it is not necessary use short term-debt. However, at high levels of ownership, this relation changes, and becomes negative. This occurs because, at that level, an expropriation effects appears, and firms use more short-term debt to signal to the market the intention to mitigate agency problems.

Moreover, the results also indicate that when the main shareholder is a bank, firms use less long-term debt (and more short-term debt), which could indicate that this type of large shareholder is less involved in monitoring and firms have to use more short-term debt. Nevertheless we do not find any particular effects when the main shareholder is a family.

In addition, we found that firms use more long-term debt when they are smaller, and have more debt. We also find support for the non-monotonic relationship between debt maturity structure and credit risk, which has previously been described in the literature. In addition, we find that firms take decisions about debt maturity without considering tax effects, but seeking to avoid the term premium on interest rates. However, we did not find that growth opportunities or asset maturity affect debt

maturity decisions.

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**Table I: Descriptive statistics**

$LTDEBT_{it}$ measures long-term debt; $MO_{it}$ managerial ownership; $LS_{it}$ ownership of the major shareholder; $GROWP_{it}$ growth options; $AM_{it}$ asset maturity; $SIZE_{it}$ firm size; $Z_{it}$ financial strength; $TERM_{it}$ the interest rate differential; TAX corporate tax rate, $LEV_{it}$ firm debt level.

| Variable | Obs | Mean | Std. Dev. | Perc. 10 | Median | Perc. 90 |
|---|---|---|---|---|---|---|
| **LTDEBT** | 804 | 0.2914 | 0.2245 | 0.0244 | 0.2384 | 0.6358 |
| **MO** | 804 | 0.1400 | 0.2170 | 0.0002 | 0.0284 | 0.5388 |
| **$MO^2$** | 804 | 0.0666 | 0.1507 | 0.0000 | 0.0008 | 0.2903 |
| **LS** | 804 | 0.3160 | 0.2296 | 0.0718 | 0.2577 | 0.6330 |
| **$LS^2$** | 804 | 0.1525 | 0.2004 | 0.0052 | 0.0664 | 0.4007 |
| **GROWP** | 804 | 1.4441 | 0.8033 | 0.9042 | 1.2258 | 2.1955 |
| **AM** | 804 | 41.1103 | 142.3641 | 2.4732 | 8.1687 | 36.6622 |
| **SIZE** | 804 | 11.6961 | 1.7263 | 9.5717 | 11.3577 | 13.9031 |
| **Z** | 804 | 0.7054 | 1.2217 | -0.5002 | 0.5784 | 1.9637 |
| **$Z^2$** | 804 | 1.9882 | 6.8269 | 0.0311 | 0.4453 | 3.9586 |
| **TERM** | 804 | 1.1502 | 0.3496 | 0.7010 | 1.1908 | 1.3734 |
| **TAX** | 804 | 0.1659 | 1.9652 | 0 | 0.2549 | 0.3735 |
| **LEV** | 804 | 0.4913 | 0.1719 | 0.2407 | 0.5024 | 0.7212 |

**Table II: Correlation Matrix**

$LTDEBT_{it}$ measures long-term; $MO_{it}$ measures managerial ownership; $LS_{it}$ ownership of the major shareholder; BANK takes value 1 if the large shareholder is a bank and 0 otherwise; FAM takes value 1 if the large shareholder is a family and 0 otherwise; $GROWP_{it}$ growth options; $AM_{it}$ asset maturity; $SIZE_{it}$ firm size; $Z_{it}$ financial strength; $TERM_{it}$ the interest rate differential; TAX corporate tax rate, $LEV_{it}$ firm debt level.

| | **LTDEBT** | **MO** | **MO²** | **LS** | **LS²** | **BANK** | **FAM** | **GROWP** | **AM** | **SIZE** | **Z** | **Z²** | **TERM** | **TAX** | **LEV** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LTDEBT** | 1 | | | | | | | | | | | | | | |
| **MO** | -0.0399 | 1 | | | | | | | | | | | | | |
| **MO²** | -0.0265 | 0.954*** | 1 | | | | | | | | | | | | |
| **LS** | -0.0357*** | 0.1998*** | 0.2651*** | 1 | | | | | | | | | | | |
| **LS²** | -0.1030*** | 0.1356*** | 0.1999*** | 0.9566*** | 1 | | | | | | | | | | |
| **BANK** | 0.0974*** | -0.1888*** | -0.1868*** | -0.3382*** | -0.2913*** | 1 | | | | | | | | | |
| **FAM** | -0.0894** | 0.1050*** | 0.0090 | -0.1622*** | -0.1291*** | -0.1090*** | 1 | | | | | | | | |
| **GROWP** | -0.2722*** | 0.0601* | 0.0376 | -0.0345 | -0.0345 | -0.0805*** | 0.1904*** | 1 | | | | | | | |
| **AM** | 0.1689*** | 0.0435 | -0.0009 | -0.1073*** | -0.1174*** | -0.0219 | -0.0519 | -0.0705** | 1 | | | | | | |
| **SIZE** | 0.3770*** | -0.2283*** | -0.1613*** | -0.0168 | -0.0127 | 0.1077*** | -0.1960*** | 0.16*** | 0.0855** | 1 | | | | | |
| **Z** | -0.3395*** | 0.0768** | 0.0585* | 0.0671* | 0.073** | -0.1629*** | 0.1247*** | 0.2603*** | 0.2634*** | -0.1722*** | 1 | | | | |
| **Z²** | -0.0899** | 0.0548 | 0.0192 | -0.0333 | -0.0255 | -0.0832** | 0.0214 | 0.1087*** | 0.3964*** | -0.0302 | 0.7437*** | 1 | | | |
| **TERM** | -0.0241 | 0.0128 | 0.02 | 0.0072 | -0.0031 | 0.0022 | -0.0236 | -0.0033 | 0.0033 | -0.0636* | 0.0143 | -0.0188 | 1 | | |
| **TAX** | 0.0314 | 0.0250 | 0.0147 | 0.0319 | 0.0143 | 0.0095 | 0.0023 | -0.0034 | 0.0172 | 0.0203 | 0.0043 | 0.0114 | 0.0311 | 1 | |
| **LEV** | -0.0269 | 0.0202 | 0.0092 | 0.0674* | 0.0414 | 0.0300 | -0.0675* | -0.0786** | -0.4325*** | 0.0609* | -0.5683*** | -0.4268*** | -0.0292 | -0.0146 | 1 |

***, **, * denotes significance at the 1%, 5%, and 10% level respectively.

**Table III: Ownership structure and debt maturity**

The dependent variable is $LTDEBT_{it}$. It is calculated as long-term debt over total debt. $MO_{it}$ measures managerial ownership; $LS_{it}$ ownership of the major shareholder; BANK takes value 1 if the large shareholder is a bank and 0 otherwise; FAM takes value 1 if the large shareholder is a family and 0 otherwise; $GROWP_{it}$ growth options; $AM_{it}$ asset maturity; $SIZE_{it}$ firm size; $Z_{it}$ financial strength; $TERM_{it}$ the interest rate differential; TAX corporate tax rate, $LEV_{it}$ firm debt level. All the estimations have been carried out using the 2-stage GMM estimator.

| | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
|---|---|---|---|---|---|---|---|
| **MO** | 0.4259*** | - | - | 0.2019*** | 0.1476** | 0.2672*** | 0.2422*** |
| | (7.74) | - | - | (3.22) | (1.98) | (3.87) | (3.48) |
| **$MO^2$** | -0.7154*** | - | - | -0.3971*** | -0.3635*** | -0.3524** | -0.3834** |
| | (-6.91) | - | - | (-3.15) | (-2.66) | (-2.45) | (-2.31) |
| **LS** | - | 0.2442** | 0.2085** | 0.1849 | 0.2922* | -0.0174 | -0.0792 |
| | - | (2.22) | (2.03) | (1.53) | (1.77) | (-0.12) | (-0.64) |
| **$LS^2$** | - | -0.3356** | -0.3770*** | -0.3736** | -0.5067*** | -0.1084 | -0.1526 |
| | - | (-2.48) | (-2.92) | (-2.25) | (-2.56) | (-0.61) | (-0.92) |
| **MOxLS** | - | - | - | - | - | -0.0964 | -0.1402 |
| | - | - | - | - | - | (-0.52) | (-0.65) |
| **BANK** | - | - | -0.0506*** | - | -0.0540*** | | -0.0529*** |
| | - | - | (-5.46) | - | (-5.78) | | (-3.85) |
| **FAM** | - | - | -0.0468 | - | -0.0295 | | -0.0333 |
| | - | - | (-1.56) | - | (-0.92) | | (-0.98) |
| **GROWP** | -0.0137 | 0.0073 | 0.0029 | -0.0110 | -0.0038 | -0.0090 | -0.0248* |
| | (-1.52) | (1.36) | (0.41) | (-1.42) | (-0.29) | (-0.91) | (-1.91) |
| **AM** | 0.0001*** | -0.0001 | 0.0001 | 0.0001*** | 0.0001*** | 0.0001*** | 0.0001*** |
| | (6.28) | (-0.7) | (0.86) | (5.18) | (4.34) | (7.23) | (7.83) |
| **SIZE** | -0.0495*** | -0.0459*** | -0.0384*** | -0.0347*** | -0.0371*** | -0.0066 | 0.0020 |
| | (-4.59) | (-5.33) | (-5.66) | (-3.72) | (-4.03) | (-0.64) | (0.17) |
| **Z** | 0.0228*** | 0.0235*** | 0.0246*** | 0.0200*** | 0.0226*** | 0.0259*** | 0.0278*** |
| | (15.8) | (17.69) | (17.06) | (13.74) | (13.10) | (19.74) | (15.82) |
| **$Z^2$** | -0.0031*** | -0.0030*** | -0.0032*** | -0.0028*** | -0.0030*** | -0.0032*** | -0.0035*** |
| | (-22.12) | (-23.55) | (-22.58) | (-18.77) | (-18.30) | (-28.06) | (-23.11) |
| **TERM** | -0.5910*** | -0.5692*** | -0.5443*** | -0.5967*** | -0.6658*** | -0.5247*** | -0.4538*** |
| | (-7.81) | (-8.18) | (-7.05) | (-7.00) | (-7.60) | (-6.38) | (-5.87) |
| **TAX** | 0.0057*** | 0.0047*** | 0.0040*** | 0.0047** | 0.0036** | 0.0031 | 0.0035* |
| | (3.39) | (2.96) | (2.61) | (2.15) | (2.03) | (1.36) | (1.69) |
| **LEV** | 0.7557*** | 0.7341*** | 0.7290*** | 0.7456*** | 0.7779*** | 0.7678*** | 0.7767*** |
| | (21.46) | (24.8) | (18.79) | (22.70) | (17.43) | (26.55) | (17.35) |
| **$m_2$** | 1.56 | 1.80 | 1.84 | 1.80 | 1.84 | 2.11 | 1.95 |
| **Sargan** | 48.80 (160) | 51.51 (160) | 53.62 (160) | 47.97 (196) | 44.86 (196) | 46.80 (214) | 48.88 (214) |
| **Observations** | 670 | 670 | 670 | 670 | 670 | 670 | 670 |

z statistic in brackets.

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

$m_2$ is test for second-order serial autocorrelation in residuals in first differences, distributed asymptotically as N(0,1) under null hypothesis of no serial correlation.

Sargan Test is test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.