SHORT-TERM DEBT IN SPANISH SMEs

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ABSTRACT

This paper analyses the debt maturity structure of small and medium-sized firms in terms of the risk and return *trade-off* associated with the use of short-term loans. The sample covers 11,533 small and medium-sized Spanish manufacturing firms over the period from 1997 to 2001. The results show that short-term loans are more common in firms with greater financial strength, greater financial flexibility, and major growth options, and when the interest cost differential between short and long term loans is more pronounced. Additionally, the size of the firm seems to have an influence on the level of short-term loans; short-term borrowing levels are higher in the smaller firms.

KEYWORDS: SMEs, debt maturity, financial solvency, financial flexibility.

JEL Classification: G3, G32.

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1- INTRODUCTION

Until recently, the study of financial decisions in firms had concentrated on the differential use of equity and debt to establish an optimum financial structure. In more recent studies interest has moved towards the characteristics of debt, particularly its maturity structure. It has generally been considered that the distribution between long-term and short-term debt maturities should correspond to the cash generation life of the assets that are financed.

Ever since Stiglitz (1974) suggested that the terms of debt were irrelevant, researchers have tried to explain the debt maturity structure by imperfections in markets such as agency conflicts, information asymmetry, and taxes. Agency conflicts, for example, might be mitigated by the use of short-term loans. With regard to growth opportunities, managers can reject profitable projects when most of the benefits go to the creditor (the underinvestment problem). Myers (1977) argues that debt that matures before investment opportunities can be exercised could mitigate the problem of underinvestment. With regard to assets-in-place, Myers (1977) also observes that a firm can reduce agency costs if it matches the maturity of its debt to the life of its assets. Moreover, Barnea, Haugen, and Senbet (1980) argue that risk incentives for shareholders can be reduced as short-term debt is less sensitive to changes in the assets risk levels of the firm.

Consider also that in the presence of asymmetric information, the 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 and he establishes a non-monotonic relation 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.

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 expected tax deduction values of debt depend on maturity. Specifically, when the yield curve[i] 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 the value of a firm.

The empirical evidence confirms that firms can use short-term loans to solve the problem of underinvestment[ii]. These results are also consistent with Diamond's (1991) predictions. There is not sufficient evidence in the literature to reach firm conclusions about the effect of taxes in the choice of debt maturity.

Jun and Jen (2003) argue that the debt maturity choice is also affected by the *trade-off* between reward and risk presented by short-term loans. At the same time as short-term loans may reduce interest costs, both the refinancing risk and the interest risk increase, because the firm might encounter difficulties in renewing its short-term loans or it might have to pay higher interest rates on new loans. The choice of short-term loans will also depend on factors other than agency conflicts, information asymmetry,

or taxability, such as the firm's financial strength and flexibility, or the advantage of lower interest rates on short-term debt.

All these problems are aggravated in the case of small and medium-sized firms. The most representative characteristic of smaller firms, and the greatest difference between them and larger firms, is their greater information opacity (Berger and Udell, 1998). When we combine this with the coincidence of ownership and control and their greater operational flexibility, we see that small firms present more agency problems associated with debt (Pettit and Singer, 1985). In this way, underinvestment can be a particularly severe problem in SMEs (MacMahon, 2003). In addition, as Peel, Wilson and Howorth (2000) point out, small firms, in comparison to large firms, are less liquid, exhibit more volatile cash flows and profits and rely more heavily on short-term debt finance. Moreover, it is the smaller firms that are most likely to be subject to financial distress (Titman and Wessels, 1988) and financial restrictions (Whited, 1992; Fazzari and Petersen, 1993). In particular, new firms belonging to R&D intensive and high growth industries have the lowest likelihood of survival (Ausdresch, Houweling and Thurik, 2004).

The empirical evidence for small and medium-sized firms shows that the choice of debt maturity is influenced very little by agency problems, information asymmetry, or taxability. Rather, the main explanatory factors are the probability of bankruptcy and maturity-matching (see Scherr and Hulburt, 2001, for the US market and Heyman, Deloof, and Ooghe, 2003 for Belgium).

This paper contributes to the literature in a number of different ways. First, we provide additional evidence on the determinants of debt maturity structures of small and medium-sized enterprises (SMEs) with data from a country with a bank-based system, in which most resources are channelled through financial intermediaries. Second, our

study focuses on the risk reward *trade-off* in the use of short-term debt. Moreover, in order to examine the strength of the results we test for possible endogeneity problems.

The results show that levels of short-term debt are higher when a firm is stronger and more flexible, when there is a greater differential between short and long-term rates, and when the firm has more growth options. The size of the firm also seems to influence the level of short-term debt; smaller firms are more likely to use more short-term financing.

The paper proceeds as follows: In Section 2, the effects of short-term debt on the firm's risk and returns are analysed. Section 3 describes the data and variables. In Section 4 our results are discussed. Concluding comments are in the final section.

2- CHARACTERISTICS OF SHORT TERM DEBT AND HYPOTHESES

The importance attributed to debt maturity structure in the financial decisions of a firm is related to the relevant characteristics of various loan structures, and these differ according to debt maturity. Although short-term debt conveys important cost benefits, which are greater as the slope of the term structure of interest rates increases, it also exposes the firm to greater risk. Thus, Jun and Jen (2003) argue that the debt maturity choice can be explained by a *trade-off* between reward and risk in the holding of short-term debt.

Jun and Jen (2003) summarize those benefits of short-term debt that make it an attractive financing instrument for firms, such as: a) zero interest rate in some short-term debt, as is usually the case in trade credits, b) easy adaptation to a firm's financial needs; c) generally lower nominal interest rates than for long-term loans; and d) lower flotation costs for short-term loans than for long-term loans. The covenants treating prepayment are also usually less strict.

Short-term debt is also an efficient tool to address the underinvestment problem (Myers, 1977) and the incentives for shareholders to assume risk (Barnea et al., 1980). It facilitates bank relationships, due to the contact between the firm and the lender during frequent renewals, with corresponding credit condition benefits (Petersen and Rajan, 1994). Short-term debt also helps to enhance a firm's production and earnings, as it allows production and product sales to be linked more closely to demand patterns (Emery, 2001).

A prime disadvantage of short-term debt is an increase in risk. Increased risk is attributable mainly to two sources: refinancing and interest rate risks. Refinancing risk refers to difficulties a firm may face at the time of loan renewal. Jun and Jen (2003) show that the refinancing risk grows exponentially with the amount of short-term borrowing. Thus, firms with more short-term loans will be more vulnerable to negative macroeconomic or microeconomic shocks. During financial downturns, firms with more short-term debt will experience more problems in renewing their loans. Interest risk is associated with interest rate fluctuations. Interest rate risk is higher for short-term debt as credit renewals must be made at market interest rates.

The attitude of banks to lending to SMEs may also affect the debt maturity chosen. There are essentially two approaches of banks to lending (Berry, Faulkner, Hughes, and Jarvis 1993, Berry, Grant and Jarvis, 2004): a) *Going concern* approach. The banker can collect information about the future prospects of the SMEs (interviews, business plans, accounting information, sectorial analysis), although, as pointed out by Mason and Stark (2004), bankers stress the financial aspects of the business plan and give little emphasis to market, entrepreneur or other issues; and b) *Gone concern* approach. The banker collects creditable signals from the SME, concerned with taking securities (guarantees, restrictive covenants, etc.). With regard to the approach of

Spanish banks, Anson, Arcas and Labrador (1997) point out that Spanish bank are more concerned with future cash-generation ability, and they place less emphasis on security and loan covenants.

The attitude of banks to lending to SMEs is especially important in non-Anglo-Saxon countries where SMEs have limited access to capital markets (Holmes and Kent, 1991). This lack of market access limits financing choices for an SME to retained earnings and bank debt. In the Spanish case, the financial system is dominated by credit institutions, where retail banking predominates and savings banks play an important and ever growing role (Jiménez and Saurina, 2004). Thus, the lack of quality information about SMEs forces lenders to demand higher returns. In this situation small firms use more short term debt, which carries lower cost but increases risk for the firm (Chittenden, Hall and Hutchinson, 1996).

As a consequence, short-term debt decisions are influenced by the benefits and disadvantages associated with its use. Assuming that such decisions are influenced by the particular circumstances of a firm, the assumption of short-term debt will depend on the financial strength and flexibility of the firm and the differential between short-term and long-term interest rates.

2.1 Financial strength.

Given that short-term debt implies greater risk, it would be expected that firms with greater financial strength will resort more to this type of loan. It will not be as hard for strong firms to refinance, and characteristics such as default premiums will affect them to a lesser extent because of their lower probability of insolvency. Moreover, successive credit renewals can benefit from growing strength within the firm.

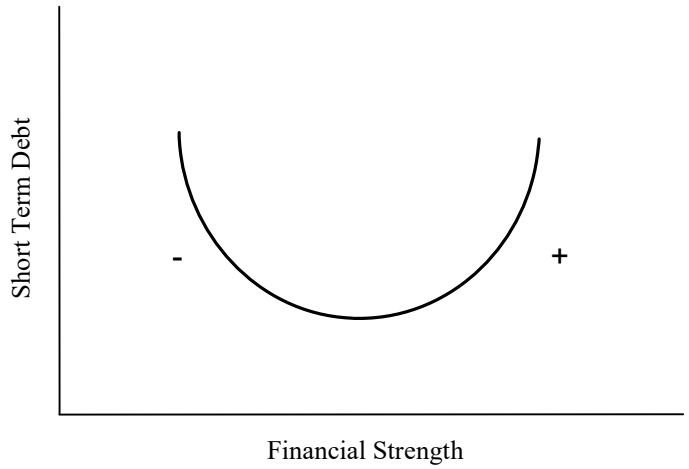
Thus, firms in good financial condition will be able to enjoy the benefits of

short-term loans, without having to incur excessive refinancing risks. Financially weak firms however, will not find that the benefits of short-term debt offset its additional risk. Thus, they should prefer long-term debt. Their characteristics and financial weakness, though, make these firms high risk, complicating the issuance of long-term loans. Therefore, in many cases, short-term debt will be a weak firm's only feasible borrowing solution (Diamond, 1991).

Firms of intermediate financial risk, neither clearly strong nor clearly weak, will not be affected by the cost advantages of short-term loans. Neither will they face overwhelming difficulties in financing this type of debt. Thus, they will borrow short-term, more or less on the basis of their assessment of the risk-reward trade-off.

Thus, we posit a positive relation between short-term debt and strength for financially strong firms; for weaker firms this relation may be expected to be negative. Therefore, a nonmonotonic (convex) relation between short-term debt and financial strength is to be expected. This can be seen in Graph 1.

Graph 1



2.2- Asset liquidity.

Asset liquidity must be considered in the structuring of debt maturity in a firm. Taking on short-term debt requires positive cash flow in the short term, in order to meet

the periodic repayments of the principal. Thus, firms with more capacity to generate cash flows short term will be more able to assume short-term loans. Moreover, there is less risk of insolvency or default, and such firms will have fewer refinancing problems. Firms with higher asset liquidity are considered more flexible from a financial point of view, as they can adapt more easily to the type of debt assumed.

We expect firms with higher asset liquidity to prefer to choose short-term debt, which allows them to enjoy the cost savings of this type of loan.

2.3- Interest rates differentials

Guedes and Opler (1996) and Stohs and Mauer (1996) were unable to confirm the tax hypotheses traditionally used to explain the determinants of debt maturity (Brick and Ravid, 1985, 1991). Rather, they observe a negative relation between long-term debt and the interest rate differential. 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. Thus, they enjoy a cost differential. Moreover, we have to take account that small business taxpayers have lower levels of competence and independence in dealing with tax matters (Ahmed and Braithwaite, 2005).

As a result of these considerations, we expect more interest in short-term loans when short-term interest rates are significantly lower than long-term interest rates. In this case, the choice of short-term debt will be more beneficial for the firms.

3- SAMPLE AND VARIABLES

We test our hypothesis, in terms of several variables using a sample of Spanish firms.

3.1- Sample and database

We selected manufacturing firms that for the period of analysis (1997-2001) met the following criteria: a) fewer than 250 employees, b) a yearly turnover under 40 million €, and c) under 27 million € in total assets. [iii]

In order to avoid anomalies in accounting data, we required that firms had information on numbers of employees, sales and assets, equities, depreciation, current assets, current liabilities, tangible fixed assets, and investments, and that all of these variables had positive values.

Companies showing extreme values for certain variables (proxies for financial strength and flexibility and debt), might alter the results, and were excluded. Specifically, we excluded observations that were below the 0.1% and above the 99.9% percentile.

After application of filters, the result is an unbalanced panel of 11,533 firms with 31,825 observations.

Information on interest rates comes from publications by the Public Debt Book-Entry Market maintained by the Bank of Spain.

3.2- Variables

The dependent variable is *short-term debt* (STDEBT), defined as the ratio of short-term debt to total debt. We do not consider the firm's choice between equity and debt, but, given the firm's financial structure, we consider the composition of debt in terms of its maturity.

The first independent variable, used to contrast the determinants of short-term debt, is the firm's *financial strength (Z)*, measured with models used to predict firm insolvency. A bankruptcy model attempts to measure the financial capacity and degree

of solvency of a firm. The result can be considered a *proxy* for their financial situation. At no time do we use models for their original purpose, the prediction of bankruptcy of the firms.

We use two models to estimate this variable. The first is that developed by García, Calvo-Flores, and Arqués (1997) with a sample of small and medium-sized firms in the Spanish manufacturing sector. The second model, which we use to check the consistency of the analysis, is a re-estimation of Altman's (1968) model that Begley, Ming, and Watts (1996) apply to data for a sample of firms quoted on the *NYSE, AMEX,* and *NASDAQ*.

Under each model, the values taken as proxies of the financial strength are defined as follows.

- García et al.'s model (1997):

$$Z_A = -0{,}835 + 0{,}950 \times R_1 + 0{,}272 \times R_2 - 11{,}848 \times R_3 + 2{,}422 \times R_4 + 6{,}976 \times R_5$$

where

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

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

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

- Re-estimation of Altman's (1968) model by Begley et al. (1996):

$$Z_B = 0{,}104 \times X_1 + 1{,}010 \times X_2 + 0{,}106 \times X_3 + 0{,}003 \times X_4 + 0{,}169 \times X_5$$

$$X_1 = \frac{\text{Working capital}}{\text{Total assets}} \quad ; \quad X_2 = \frac{\text{Retained earnings}}{\text{Total assets}} \quad ;$$

$$X_3=\frac{\text{Earnings before interest and taxes}}{\text{Total assets}};\ X_4=\frac{\text{Market value of equity}}{\text{Total debt}};\ X_5=\frac{\text{Sales}}{\text{Total assets}}$$

Without access to capital market values, we use book value instead to calculate X_4 , as in Scherr and Hulburt (2001).

The variable calculated using the García et al. (1996) model has a maximum value of 2,182.76 and a minimum value of –114.92 in the initial sample. As 99.8% of the observations fall between –3.70 and 29.15 (0.1% and 99.9% percentiles), we delete the extreme values above and below this interval.

Financial flexibility (FF) is another variable explaining a firm's short-term debt choice. We use asset liquidity to measure the degree of financial flexibility. To the extent to which assets can be transformed into cash in the short run, a firm can finance using short-term loans without too much liquidity risk.

To measure financial flexibility we measure the firm's weighted average asset maturity using the following expression (Jun and Jen, 2003):

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

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 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. A higher FF value implies less financial flexibility. Therefore, we expect it to relate negatively to the level of short-term debt.

Again we eliminate those observations outside the 99.9 and 0.1 percentiles.

To measure the term structure of interest rates (TERM), we subtract the mean of the month-end yield on one year Spanish Treasury bills from the month-end yield on ten-year Spanish government bonds.

We expect a positive relationship between short-term debt and the rate differential (TERM), indicating that the more economical short-term loans are compared to long-term loans, the more firms will choose the more beneficial financing. From a tax perspective, the expected relation would be the inverse (Brick and Ravid, 1985, 1991).

The control variables are the firm growth opportunities, size and debt ratio.

Agency conflicts between shareholders and debtholders can be mitigated using short-term loans (Myers, 1977). 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. This is the case for SMEs which have greater growth options than larger firms (Pettit and Singer, 1985). Such a relationship has been confirmed in several studies for large companies (Barclay and Smith, 1995; Guedes and Opler, 1996; Stohs and Mauer, 1996; Cuñat, 1999; Ozkan, 2000; Bevan and Danbolt, 2002), but not for small and medium-sized firms (Scherr and Hulburt, 2001; Heyman et al., 2003).This evidence could be explained by the bank financing employed by SMEs. Banks are better in monitoring firms than other lenders (Berlin y Loeys, 1988) reducing the information asymmetries that lead the agency conflicts. Thus SMEs could be less interested in using short term debt.

To measure growth options (GROWP) we cannot use the usual market-to-book ratio, as SMEs are not publicly traded and they do not have market prices. So, we use two alternative proxies: depreciation/total assets, and the rate of change in sales[iv]. The

first approach for growth opportunities ($GROWP_1$) measures the investment in tangible assets. We expect that firms with more depreciation expenses will have more tangible assets and fewer growth options in their investment opportunity sets, and consequently will use less short-term debt (see Barclays and Smith, 1995, and Scherr and Hulburt, 2001). The second approach ($GROWP_2$) measures past growth, and the assumption is that firms that have grown well so far are better prepared to continue to grow in the future (Scherr and Hulburt, 2001). Thus, firms with more growth options (less tangible assets or more sales growth in the past) will use more short term debt. Accordingly, we expect the dependent variable to relate negatively to the first proxy and positively to the second.

With regard to the size variable (SIZE), small firms present higher levels of asymmetric information (Berger and Udell, 1998), more debt-related agency conflicts (Smith and Warner, 1979), 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 negative relation between the level of short-term debt and the firm's size. As a proxy for size (SIZE) we use the log of assets.

The level of debt (LEV) is measured as the average between total debt and shareholder equity. This is to control for bias that may occur when financing decisions and maturity decisions are considered independently of one another (Cuñat, 1999, Stohs and Mauer, 1996). We delete the extreme data observations to analyse the remaining 99.8%.

Table I reports descriptive statistics for the variables for the pooled time series cross-sectional data covering 11,533 manufacturing firms from 1997 to 2001. The number of observations for each variable ranges from 25,950 to 31,884 because we use unbalanced panel data. The sample consists mainly of small firms, with assets below

26.98 million euros. Leverage of the sample firms is high because debt is 79.76% of total assets. The maturity structure of the debt is mainly short-term; in fact, 80.81% of total debt is short-term debt. This confirms the point that SMEs rely heavily on short-term financing (Kotey, 1999).

(INSERT TABLE I HERE)

Panel B of Table I reports correlations for the pooled time series cross-sectional data. All significant correlation coefficients between *STDEBT* and explanatory factors have the expected signs, with the exception of size. It is worth noting that the study took place when the term structure of interest rates had a positive slope, producing an average short-term/long-term rate differential of 1.08%.

4- DETERMINANTS OF SHORT TERM DEBT

The determinants of short-term debt according to the initial hypothesis are explained according to this model of the panel data:

$$STDEBT_{it} = \beta_0 + \beta_1 Z_{it} + \beta_2 Z_{it}^{2} + \beta_3 FF_{it} + \beta_4 TERM_{it} + \beta_5 GROWP_{it} + \beta_6 SIZE_{it} + \beta_7 LEV_{it} + \eta_i + \lambda_t + \upsilon_{it}$$

where $STDEBT_{it}$ measures short-term debt; Z_{it} financial strength; FF_{it} financial flexibility; $TERM_{it}$ the interest rate differential; $GROWP_{it}$ growth options; $SIZE_{it}$ firm size; LEV_{it} firm debt level; η_i individual unobservable effects of each particular firm; λ_t temporary effects; and υ_{it} random disturbances.

The η_i (unobservable heterogeneity) is intended reflect the particularities of each firm, which may include the characteristics of their sector. The parameters λ_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 account for the economic variables which firms cannot control (e.g., interest rates, prices), but which can affect their short-term debt decisions.

This methodology presents important benefits. These include the fact that the panel data can accommodate individuals, firms, states or countries being heterogeneous. Time-series and cross-section data studies not controlling 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)

The nonmonotonic (convex) relation we expect between short-term debt and financial strength is tested by including Z_{it} and Z_{it}^2 in the model. For the expected relation to be confirmed, the signs associated with the variables should be negative for the linear term and positive for the coefficient of the squared term, if the independent variable Z_{it} were defined exclusively as positive. If it could take on a negative value, as in this situation, it would suffice for the squared term to be positive.

Our strategy is to test first whether individual effects exist, and, if so, to identify which is the best model to estimate them. We use the Breusch-Pagan (1980) test to identify the existence of individual effects. If we reject the null hypothesis of no unobserved heterogeneity, then a model capturing individual heterogeneity is appropriate. In this way, the estimation takes into account the possibility that the individual effects might be correlated with the independent variables (fixed effects), as well as the possibility that they are not (random effects). In the first case, we use within-group estimation. In the second case, the equation is estimated in levels using ordinary least squares (OLS) (see Arellano and Bover, 1990). To choose one estimation or the other, we apply the Hausman (1978) contrast.

There are a variety of reasons why the variables financial strength and flexibility could be subject to endogeneity. The first is because of the impact of short-term debt on financial strength. The level of short-term financing in a firm's liabilities is usually taken as a relevant variable in models used to assess their financial solvency. It is possible that short-term debt is affected by a firm's financial strength, and at the same time that the financial strength depends on the short-term debt incurred. The second reason is the result of the effect of a firm's financial policy on its investment decisions. Thus, a preference towards short-term debt could motivate the search for more liquid investments.

To confirm whether endogeneity exists, we correct the model, by taking first differences and we compare the estimation's coefficients made by instrumental variables[v] and by ordinary least squares using Hausman (1978) test, under the null hypothesis of exogeneity of the explanatory variables. The Hausman (1978) tests of the different estimations show there are no endogeneity problems and that the within-group estimator is consistent.

Table II shows the results after measuring financial strength using the model proposed by García et al. (1997). The signs in Regression 1 are contrary to those expected, indicating that the relation between short-term debt and financial strength is, in principle, concave. This is consistent with the evidence in North-American (Scherr and Hulburt, 2001) and Belgian (Heyman et al., 2003) small and medium-sized firms, where Diamond's (1991) predictions do not seem to be fulfilled either.

The maximum of the estimated function (less the quotient between the linear term and twice the squared term) is at an extreme of the values for financial strength, and over 99% of the cases fall below it. Therefore, we accept that the variables are related in a linear way. This is shown in Figure 1, where we can see that short-term debt

is on average more important in firms with greater financial strength.

(INSERT TABLE II HERE)

While we can confirm that financially strong firms looking for savings on their financing costs use more short-term debt, it does not seem to be confirmed that the less financially strong small and medium-sized firms, motivated by credit restrictions, use more short-term debt. This result contrasts with the result in Heyman et al. (2003), who, when accepting a linear relation, found that Belgian firms with worse credit status use short-term debt to a greater extent. Nevertheless, our results do partially support the predictions made by Diamond (1991), since it is precisely those financially strong firms which favour short-term financing.

(INSERT FIGURE I HERE)

Second, the negative sign in relation to the financial flexibility proxy indicates that the use of short-term debt is higher when the average asset maturity is shorter. This would be consistent with the usual practice of adapting asset liquidity to the time it takes to settle liabilities. The more firms dispose of liquid assets and are able to meet more frequent payments, the more they will take advantage of lower-cost debt. These results are consistent with previous evidence for SMEs (Scherr and Hulburt, 2001 in the USA and Heyman et al., 2003 in Belgium) as well as for large firms (Guedes and Opler, 1996; Stohs and Mauer, 1996; Danisevská, 2002 in the USA; Ozkan, 2000 and Bevan and Danboldt, 2002 in the UK and Cuñat, 1999 in Spain). Moreover, as Howorth (2001) found, the choice between short and long term sources of debt tended to be dependent on the type of asset being financed.

Firms issue more short-term debt as the term structure of interest rates rises. In the present case, it seems that cost savings compensate for the higher risk associated

with short-term debt. This is consistent with the Emery (2001) model and also supports the results found by Guedes and Opler (1996), and Stohs and Mauer (1996), who contradict Brick and Ravid's (1985) tax hypothesis on debt maturity structure.

The control variable $GROWP_1$, *annual depreciation/total assets*, is used as a proxy for growth opportunities. Firms with less depreciation expenses will have less tangible assets and higher growth options, and it is expected that they will use more short term debt. The results show that the level of depreciation expenses over total assets is significant and negatively related to the dependent variable. Therefore, as posited by Myers (1997), firms that have more conflicts between shareholders and debtholders use a higher proportion of short-term debt in order to mitigate these conflicts.

Size is significantly and negatively related to short-term debt structure in Regression 1. This result indicates that smaller firms use more short-term debt. This differs from what is found in SMEs in North-America (Scherr and Hulburt, 2001) and in Belgium (Heyman et al. 2003), but is consistent with the evidence shown by Hall, Hutchinson and Michaelas (2000), who also found that firm size is negatively related with short-term debt. This is also the case in larger American firms (Barclay and Smith, 1995; Stohs and Mauer, 1996; Jun and Jen, 2003), Spanish firms (Cuñat, 1999), and British firms (Ozkan, 2000).This result can be explained by the reduced capacity these firms have to assume the higher fixed costs involved in the holding of long-term debt (Titman and Wessels, 1988; Chittenden, Hall, and Hutchinson, 1996). Moreover, information asymmetry and agency conflicts associated with debt are greater for smaller firms, which leads lenders to demand a higher return. In order to avoid the higher cost of capital, smaller firms are forced to use more short-term debt, which carries lower costs but which also increases risks (Chittenden, Hall and Hutchinson, 1996; Gregory,

Rutherford, Oswald and Gardiner, 2005).

Finally, leverage is negatively associated with the level of short-term debt. This implies that current liabilities decline as the firm's global debt level grows. This result could be explained as follows: more indebted firms, which have the greatest financial risk, try to control risk by lengthening the average maturity of their debt. This result is also consistent with the argument of Diamond (1993) that firms with a high level of debt are likely to prefer longer maturity debt in order to avoid liquidating the firm too frequently. The economic impact of this variable is minimal, however, because the coefficient obtained is very small (-0.0003).

In Table II, Column 2, the regression uses sales growth ($GROWP_2$) as proxy for investment opportunities. The results are similar to those in Regression 1, with the sole exception of debt, which is not significant. The positive sign of the coefficient of this measure of growth opportunities is consistent with a preference for short-term debt in firms with more agency conflicts.

In Regression 3, we examine the linearity of the relationship between financial strength and short-term debt. We eliminate Z_{it} and Z_{it}^2 from the initial regression, and introduce dummy variables that group different strength levels instead. The three dummy variables, Dum L_A, Dum M_A, and Dum H_A, classify firms on the basis of financial strength (low-medium-high). The variable Dum L_A takes a value of 1 if the firm has financial strength between 0 and the 33rd percentile; this type of firm is considered weak. Dum M_A takes a value of 1 for firms between the 33rd and 66th percentiles, or medium to strong. Finally, Dum H_A, which groups the most solvent firms, will have a value of 1 for financial strength above the 66th percentile.

Only two of these variables can be included in the regression at the same time. Columns 3 and 4 of Table II show the results after introducing the dummy variables,

Dum M_A and Dum H_A. Their coefficients are significant, and Dum H_A's are higher, which confirms the linear relation already found. Thus we conclude that the stronger firms are, the more they issue short-term debt. The other coefficient values are all consistent with those in Columns 1 and 2. The results do not change when we use Dum L_A and Dum M_A.

In Table III we repeat the analysis calculating the financial strength proxy using re-estimation of Altman's (1968) model by Begley et al. (1996). As before, the signs for financial strength as well as its square are (respectively) positive and negative (Columns 1 and 2, Table III). Thus, there is again a concave relation between financial strength and short-term debt. As in the first model, more than 99% of the observations of financial strength are below the maximum, so we could accept the first stretch of the curve as representative, meaning the relationship is linear and growing. This idea is confirmed by Figure 2, which represents in graphical terms the average short-term debt levels of firms in accordance with their degree of financial strength.

The other explanatory factors of the regressions shown in Columns 1 and 2 of Table III maintain the sign, and the statistical significance that they had in the first-model, except for the variables *TERM* and *LEV*. The interest rate differential between short and long-term debt is not significant, although in Column 2 under a one-tailed test, we could accept either a positive or zero value, but not a negative value. Thus debt has no statistical relevance.

(INSERT TABLE III HERE)

(INSERT FIGURE II HERE)

Finally, in Columns 3 and 4 of Table III we replace the variable Z_B and Z_B^2 by the dummies Dum M_B and Dum H_B. Dum M_B takes a value of 1 when firms have a

financial strength, measured using Begley et al.'s (1996) method, between the 33rd and 66th percentiles, Dum H_B does the same when the financial strength is above the 66th percentile. The results are consistent with those obtained using the first model.

As firms become more solvent, they also increase their use of short-term debt. We also notice that firms issue more short-term debt as they have more liquid assets, and as the differential between short and long-term debt interest rates widens. Firms with greater growth potential also show more shorter-term debt. Finally, we observe that smaller firms choose shorter-term debt.

5- CONCLUSIONS

Traditionally the study of financial decisions has concentrated on the choice between equity or debt in financing a firm. In the case of small and medium-sized companies the Pecking Order Theory (POT) has been found particularly relevant. SMEs experience a more intense version of POT because of their limited access to external capital (Holmes and Kent, 1991). More recently interest has moved towards the characteristics of debt, particularly its maturity structure. Thus, in this paper we study the maturity structure of debt in SMEs. Specifically, the aim is to study the determinants of short-term debt in a sample of small and medium-sized Spanish manufacturing firms. Our focus is on the relationship between the benefit and risk offered by short-term debt in order to see whether the solvency and financial flexibility of a firm and the cost advantages of short-term debt can affect their debt maturity choice.

Estimations were made using an unbalanced panel of 11,533 Spanish firms over the period from 1997 to 2001. A panel data methodology allows us to check the specific characteristics of each firm. We also consider possible endogeneity problems.

The evidence shows that small Spanish manufacturing firms use a high proportion of short-term debt (80.81%). This is consistent with the small business finance literature which shows that SMEs rely heavily on short-term financing. Moreover, in the Spanish case, the relatively higher proportion of short term debt is also explained by the fact that the financial system is dominated by credit institutions, where retail banking predominates and savings banks play an important and increasing role.

Results also show a linear relation between the level of short-term debt and the financial strength of small and medium-sized Spanish manufacturing firms. The more solvent firms use higher proportions of short-term debt. So too do firms with more liquid assets. Yet the results also seem to indicate that the issuance of short-term debt could also be motivated by its lower cost compared to long-term debt, as we observe that firms shorten their debt maturity as the differential between short and long-term interest rates becomes greater.

On the other hand, firms with more growth opportunities, and therefore more agency conflicts, resort mainly to short-term debt. Smaller firms also use short-term debt to a greater extent. Finally, firm debt levels do not seem to affect the decision on debt maturity, as its statistical relevance depends on the estimation, and, in any case, the coefficients are small.

Our results show the importance of short-term debt for Spanish SMEs. Its use is, moreover, is accentuated in the case of firms of greater financial strength and capacity to generate cash flow, which means that they could more easily access long-term financing. This seems to indicate that such firms opt for more aggressive, short-term debt financing strategies which lower their costs.

Elsewhere, the results found for the debt maturity structure are in line with the financial hierarchicy established by the Pecking Order Theory. Indeed, when there is

information asymmetry, executives favour internal over external financing, short-term over long-term debt, and debt over issue of shares. In the case in question, the more solvent firms with greater capacity to generate resources favour short-term debt financing.

On the whole, the evidence found on the risk and return *trade-off* associated with the use of short-term debt may be of interest for SMEs operating within a bank-based financial system in which most resources are channelled through financial intermediaries. This helps to explain factors affecting short-term debt decisions, and also to examine the differences between bank-based and market-based financial systems.

Finally, the high proportion of short term debt in small Spanish manufacturing firms suggests that it could be of interest, in further research, to evaluate whether loan guarantee associations in Spain are achieving their objective of encouraging financial institutions to lend on a medium and long term basis to SMEs with viable projects (Bookock and Shariff, 2005; Camino y Cardone, 1999). In addition, the fact that our model explains a small proportion of the variation in short-term debt indicates that there are other determinants yet to be studied in the future.

NOTES

[i] The yield curve, which plots a set of interest rates of bonds of different maturities, describes the relationship between short-term, medium-term, and long-term rates at a given point in time.

[ii] These studies include Barclay and Smith (1995) and (1996), Guedes and Opler (1996), Stohs and Mauer (1996) and Danisevská (2002) in the US market; Ozkan (2000) and Bevan and Danboldt (2002) in the UK market; Cuñat (1999) and García-Teruel y Martínez-Solano (2006) in Spain.

[iii] Recommendation 96/280/EC of the Commission of the European Communities of 3 April 1996 defines small and medium-sized enterprises.
[iv] Scherr and Hulburt (2001) use the ratio current sales over prior sales.
[v] We use as instruments the second lag of the variables financial strength and financial flexibility.

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Table I: Descriptive statistics and correlation matrix

$STDEBT_{it}$ is the short-term debt/total debt ratio. Z_{Ait} is financial solvency according to García et al.'s (1997) model. Z_{Bit} is financial solvency according to Begley et al.'s (1996) model. FF_{fit} is the average maturity of the firm's assets. $TERM_{it}$ is the period average of monthly differences between one year and six to ten-year Treasury bonds, $GROWP_{1it}$ is the annual depreciation over total asset. $GROWP_{2it}$ is log of current sales over prior sales. $SIZE_{it}$ is the firm's asset value in euros. LEV_{it} is total debt over shareholder equity.

Panel A: Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Percentil 10	Mediana	Percentil 90
$STDEBT_{it}$	31874	0.8081	0.1893	0.5306	0.8517	1.0000
Z_{Ait}	29717	1.6011	1.9600	-0.0765	1.1548	3.6944
Z_{Ait}^2	29717	6.4051	24.4383	0.0451	1.3958	13.6503
Z_{Bit}	31831	0.5142	0.2559	0.2245	0.4349	0.8381
Z_{Bit}^2	31831	0.3299	0.4069	0.0513	0.2450	0.7041
FF_{it}	31884	4.1009	6.7110	0.611	2.4808	8.2542
$TERM_{it}$	31884	1.0800	0.2400	0.8200	1.0000	1.5100
$GROWP_{1it}$	31878	0.0495	0.0385	0.0132	0.0409	0.0950
$GROWP_{2it}$	25950	0.0958	0.2719	-0.1286	0.0798	0.3316
$SIZE_{it}$	31884	3285180.24	4281276.67	370118.47	1513317.53	8886000.63
LEV_{it}	31884	3.9425	8.7919	0.4439	1.8589	7.9179

Panel B: Correlations matrix

	STDEBT	Z_{Ait}	Z_{Ait}^2	Z_{Bit}	Z_{Bit}^2	FF_{it}	$TERM_{it}$	$GROWP_{1it}$	$GROWP_{2it}$	$SIZE_{it}$
STDEBT	1									
Z_{Ait}	0.1416***	1								
Z_{Ait}^2	0.0514***	0.7891***	1							
Z_{Bit}	0.2882***	0.4971***	0.2414**	1						
Z_{Bit}^2	0.1822***	0.4604***	0.2548***	0.7549***	1					
FF_{it}	-0.2415***	-0.127***	-0.0149**	-0.174***	-0.0975**	1				
$TERM_{it}$	-0.0119**	0.0046	-0.0014	-0.0147***	-0.0084	-0.0017	1			
$GROWP_{1it}$	-0.2314***	0.0145**	-0.0133**	-0.0212***	-0.0179***	-0.1508***	0.0026	1		
$GROWP_{2it}$	-0.0107	-0.0233**	-0.0329***	-0.101***	-0.0754***	-0.0028	-0.0338***	-0.0165***	1	
$SIZE_{it}$	0.0497***	0.0713***	0.0306***	-0.0624***	-0.0442***	0.0535***	-0.0236***	-0.0693***	0.0016	1
LEV_{it}	-0.0469***	-0.2504***	-0.0884***	-0.2615***	-0.1673***	0.038***	0.0114**	-0.0666***	0.0744***	-0.1057***

* significant at 10%; ** significant at 5%, *** significant at 1%.

Table II: Determinants of short-term debt (I)

$STDEBT_{it}$ is the short-term debt/total debt ratio. Za_{it} is the financial solvency according to García et al.'s (1997) model. FF_{fit} is the average maturity of the firm's assets. $TERM_{it}$ is the period average of monthly difference between one year and six to ten-year Treasury bonds, $GROWP_{1it}$ is the annual depreciation over total asset. $GROWP_{2it}$ is log of current sales over prior sales. $SIZE_{it}$ is the log of the firm's asset value. LEV_{it} is total debt over shareholder equity. Dum M is a dummy variable with a value of 1 if firm financial strength is between the 33th and 66th percentile. Dum H is a dummy with a value of 1 if firm financial strength is above the 66th precentile.

	Fixed-effects estimation (1)	**Fixed-effects estimation (2)**	**Fixed-effects estimation (3)**	**Fixed-effects estimation (4)**
Z_A	0.0120***	0.0067***	-	-
	(10.1)	(4.82)	-	-
Z_A^2	-0.0006***	-0.0004***	-	-
	(-9.12)	(-5.66)	-	-
FF	-0.0038***	-0.0032***	-0.0039***	-0.0032***
	(-21.62)	(-16.17)	(-22.3)	(-16.5)
TERM	0.0104***	0.0128***	0.0107***	0.0130***
	(2.99)	(3.72)	(3.07)	(3.79)
$GROWP_1$	-0.5087***	-	-0.5036***	-
	(-12.33)	-	(-12.21)	-
$GROWP_2$	-	0.0241***	-	0.0249***
	-	(7.52)	-	(7.77)
SIZE	-0.0829***	-0.0887***	-0.0821***	-0.0884***
	(-24.77)	(-20.19)	(-24.49)	(-20.08)
LEV	-0.0003***	-0.0001	-0.0004***	-0.0001
	(-2.95)	(-0.75)	(-3.42)	(-1.06)
Dum M	-	-	0.0136***	0.0062**
	-	-	(5.52)	(2.21)
Dum H	-	-	0.0283***	0.0138***
	-	-	(8.59)	(3.66
C	1.8539***	1.9004***	1.8454***	1.8987***
	(44.73)	(35.17)	(44.36)	(35.01)
R^2	0.0697	0.0622	0.0681	0.0609
P-Breusch-Pagan	0.00	0.00	0.00	0.00
P-Hausman$_1$	0.00	0.00	0.00	0.00
P-Hausman$_2$	0.1327	0.1444	0.4390	0.1054
Núm. Obs.	29714	24291	29714	24291

t statistics are in parentheses.

* Significant at 10%; ** significant at 5%, *** significant at 1%.

P-Breusch-Pagan is the p-value in Breusch-Pagan's (1980) test. If the null hypothesis is rejected individual effects are present in the data.

P-Hausman$_1$ is the p-value in Hausman's (1978) test. If the null hypothesis is rejected, only the within-group estimation will be consistent. If it is accepted, the estimation for random effects will be the best alternative, not only because it is consistent, but because it is also more efficient than the within-group estimator.

P-Hausman$_2$ is the p-value in Hausman's (1978) test. In this case, the estimations for instrumental variables and OLS are compared. Acceptance of the null hypotheses implies no endogeneity problems.

Table III: Determinants of short-term debt (II)

$STDEBT_{it}$ is the short-term debt/total debt ratio. Za_{it} is the financial solvency according to Begley et al.'s (1996) model. FF_{fit} is the average maturity of the firm's assets. $TERM_{it}$ is the period average of monthly difference between one year and six to ten-year Treasury bonds. $GROWP_{1it}$ is the annual depreciation over total asset. $GROWP_{2it}$ is log of current sales over prior sales. $SIZE_{it}$ is the log of the firm's asset value. LEV_{it} is total debt over shareholder equity. Dum M is a dummy variable with a value of 1 if firm financial strength is between the 33th and 66th percentile. Dum H is a dummy with a value of 1 if firm financial strength is above the 66th precentile.

	Fixed-effects estimation (1)	**Fixed-effects estimation (2)**	**Fixed-effects estimation (3)**	**Fixed-effects estimation (4)**
Z_B	0.2242***	0.1732***	-	-
	(22.09)	(14.22)	-	-
Z_B^2	-0.0451***	-0.0365***	-	-
	(-12.54)	(-10.02)	-	-
FF	-0.0037***	-0.0031***	-0.0038***	-0.0032***
	(-23.00)	(-16.91)	(-23.85)	(-17.40)
TERM	0.0030	0.0052	0.0070**	0.0087***
	(0.89)	(1.54)	(2.04)	(2.56)
$GROWP_1$	-0.5684***	-	-0.5357***	-
	(-14.61)	-	(-13.71)	-
$GROWP_2$	-	0.0212***	-	0.0226***
	-	(7.01)	-	(7.47)
SIZE	-0.0534***	-0.0529***	-0.0648***	-0.0653***
	(-15.40)	(-10.89)	(-19.18)	(-14.21)
LEV	-0.0001	-0.0000	-0.0003***	-0.0001
	(-0.98)	(-0.18)	(-2.72)	(-1.00)
Dum M	-	-	0.0282***	0.0196***
	-	-	(10.42)	(6.24)
Dum H	-	-	0.0606***	0.0475***
	-	-	(16.04)	(10.67)
C	1.4131***	1.3947***	1.6193***	1.5993***
	(31.87)	(22.41)	(38.45)	(28.03)
R^2	0.0835	0.0668	0.0728	0.0615
P-Breusch-Pagan	0.00	0.00	0.00	0.00
P-Hausman$_1$	0.00	0.00	0.00	0.00
P-Hausman$_2$	0.4514	0.9980	0.5856	0.2320
Núm. Obs.	31825	25936	31825	25936

t statistic are in parentheses

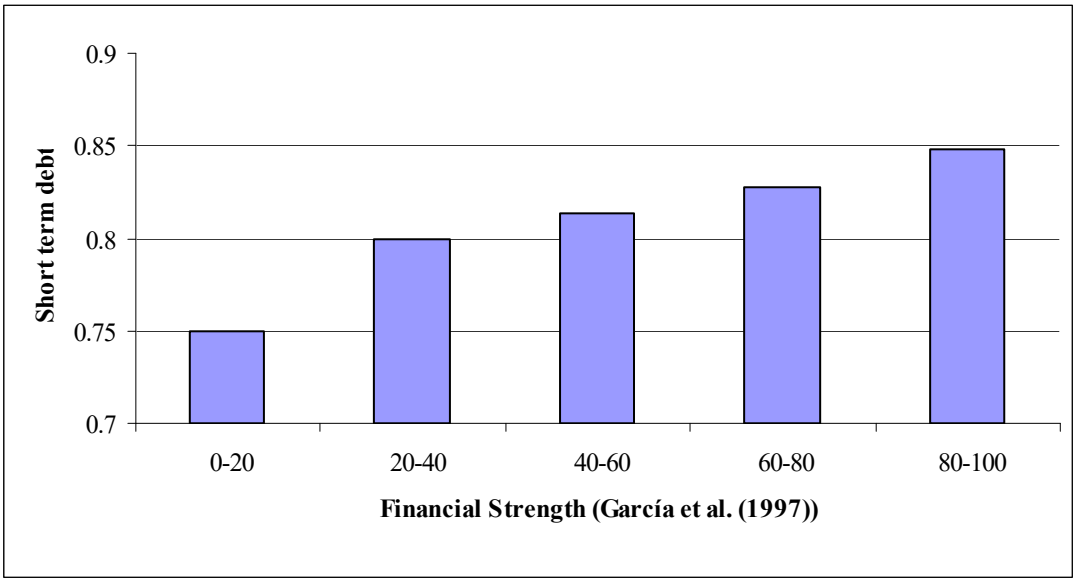
* Significant at 10%; ** significant at 5%, *** significant at 1%.

P-Breusch-Pagan is the p-value in Breusch-Pagan's (1980) test. If the null hypothesis is rejected individual effects are present in the data.

P-Hausman$_1$ is the p-value in Hausman's (1978) test. If the null hypothesis is rejected, only the within-group estimation will be consistent. If it is accepted, the estimation for random effects will be the best alternative, not only because it i consistent, but also because it is more efficient than the within-group estimator.

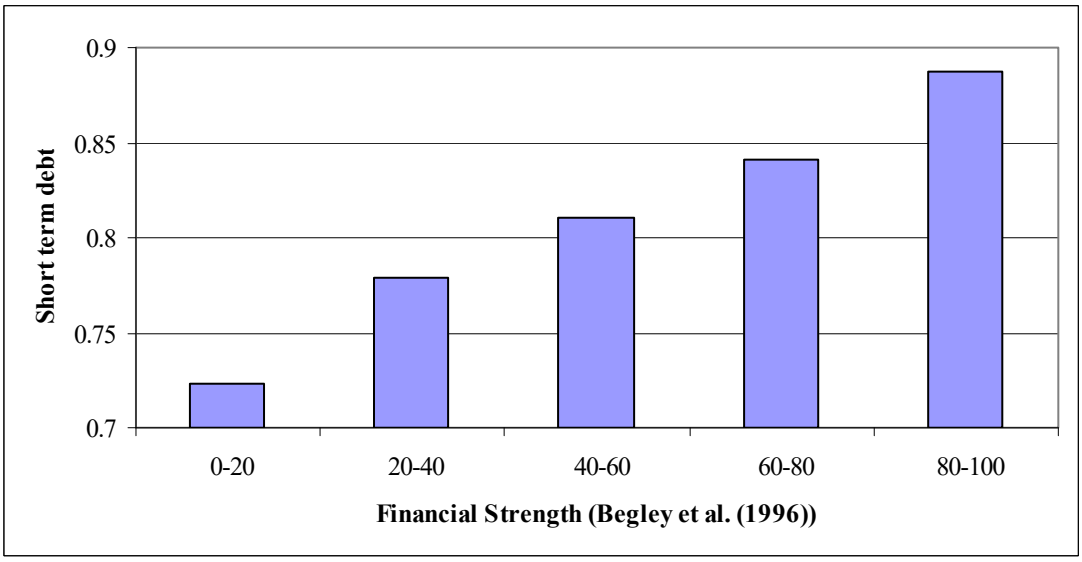
P-Hausman$_2$ is the p-value in Hausman's (1978) test. In this case, the estimations for instrumentals variables and OLS are compared. Acceptance of the null hypotheses implies no endogeneity problems.

Figure 1. Short-term debt and financial strength (I)



Average short-term debt according to the distribution of financial strength values in quintiles. Financial strength measured according to García et al.'s (1997) model.

Figure 2. Short-term debt and financial strength (II)



Average short-term debt according to the distribution of financial strength values in quintiles. Financial strength measured according to Begley et al.'s (1996) model.