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The Financial Structure of Private Held Belgian Firms

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ABSTRACT. We examine the determinants of the debt-equity choice and the debt maturity choice for a sample of small, privately held firms in a creditor oriented environment. Our results, which are based on 4,706 firm-year observations for 1132 Belgian firms in the period 1996–2000, generally confirm the role of asymmetric information and agency costs of debt as major determinants of the financial structure of privately held firms. High growth firms and firms with less tangible assets have a lower debt ratio. We also find that more profitable firms have less debt. Firms tend to match the maturity of debt with the maturity of their assets. Growth options do not seem to influence debt maturity, which would suggest that the underinvestment problem is resolved by lowering leverage and by bank monitoring, not by reducing debt maturity. Credit risk is also an important determinant of debt maturity: firms with higher credit risk borrow more on the short term. Finally, in contrast to most studies on the financial structure of companies, we find that larger firms tend to have a higher debt ratio and a shorter debt maturity.

KEY WORDS: debt maturity, capital structure, small firms, privately held firms.

JEL CLASSIFICATION: G32.

1. Introduction

Modigliani and Miller (1958) demonstrated that in a so-called ''perfect'' world, debt-equity choices and debt maturity choices are irrelevant. In other words, capital structure decisions can not affect the value of a firm. Since the publication of the famous Modigliani and Miller article, an overwhelming amount of research has added taxes, costs of financial distress, agency conflicts, governance problems, asymmetric information and interactions between real and financial decisions to this perfect world, in ever so many attempts to explain why capital structure choice does seem to matter. A number of papers have discussed the influence of these imperfections on the debt-maturity structure. Myers (1977) demonstrated the importance of growth opportunities. Other important theoretical contributions have been those of Brick and Ravid (1985, 1991), Diamond (1991, 1993), and Flannery (1986). Empirical evidence has been provided by Guedes and Opler (1996), Barclay and Smith (1995), Stohs and Mauer (1996), Demirgüc-Kunt and Maksimovic (1999), Ozkan (2000), Scherr and Hulburt (2001), Berger et al. (2005) and Ortiz-Molian and Penas (2006).

In this paper, we empirically investigate the financial structure of small, privately held firms in a creditor-oriented system. The main focus of the paper lies on debt maturity choices, but we also examine the leverage decision, which is closely related to the debt maturity decision. Our study adds to the existing literature in two ways. First, while most studies on debt maturity choices are based on large, publicly listed firms, this is a study of debt maturity choices by small, privately held firms.[1] Because small firms differ from large firms in several respects, their financing options and methods are also quite different. Second, we focus on firms in a country with a creditor-oriented financial system. This is a significant issue because it is often argued that banks are better monitors of debt, and they can mitigate agency problems.

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These factors may affect debt maturity. Other authors have focused on listed firms in a market-oriented system,[2] but to our knowledge, the only other study also focusing on debt maturity choices in a creditor-oriented system is Cai et al. (1999) who investigate the determinants of the maturity of public debt issues in Japan. However, their sample also includes larger firms.

We investigate the determinants of the debt-equity choice and the debt maturity choice for a sample of 4,706 firm-year observations for 1,132 small, privately held Belgian firms for the period 1996–2000. We estimate fixed effects, cross-sectional OLS and two stage least squares models. Our results suggest that firms with more tangible assets have a higher debt ratio, and that firms tend to match the maturity of debt with the maturity of their assets. Growth options reduce leverage, but they do not seem to influence debt maturity, which suggests that the underinvestment problem as described by Myers (1977) is resolved by lowering leverage and by bank monitoring, not by reducing debt maturity. Consistent with the Pecking Order theory of Myers and Majluf (1984), we find that more profitable firms have less debt. We also find that credit risk is an important determinant of debt maturity: firms with higher credit risk tend to have shorter debt maturities. Our results do not confirm the prediction of Diamond (1991) that firms with low credit risk also have shorter debt maturities. Finally, we find that in our sample, larger firms tend to have a higher debt ratio and a shorter debt maturity than smaller firms.

The remainder of the present paper is structured as follows. In Section 2, a concise literature review is provided and hypotheses are proposed. Section 3 provides information on the sample. Section 4 discusses the variables. The estimation methods used in the empirical analysis are discussed in Section 5. The empirical results are presented in Section 6. Section 7 concludes.

2. Literature review and research hypotheses

2.1. *The debt-equity choice*

The main capital structure theories are based on the idea that firms have information that investors do not have, and that the interests of managers, equityholders and debtholders may not coincide. In the Static Trade-off model, capital structure moves towards an optimal debt ratio which is determined by balancing the corporate tax savings advantage of debt and the costs of financial distress. This idea has been developed in many papers, including Brennan and Schwartz (1978), DeAngelo and Masulis (1980) and Bradley et al. (1984). A related literature focuses on the role of agency conflicts between managers, shareholders and debtholders. Managers are agents of the shareholders, but the interests of managers and shareholders may be in conflict. According to e.g. Jensen (1986), managers may pursue personal interests at the expense of shareholders by overinvesting free cash flow (the excess of cash earnings over profitable investments) in perquisites and bad projects (the overinvestment problem). There are also agency conflicts between debtholders and shareholders. Myers (1977) shows that a highly debt-financed firm may forego good investment opportunities because debtholders can share in profitable future investment returns, thereby extracting some wealth of the shareholders. This wealth extraction may cause the shareholders to turn down profitable investment projects (the underinvestment problem). Moreover, equity can be seen as a call option on the firm, and call values increase with the volatility of the underlying asset. This creates incentives for the shareholders to shift the firm's investments in high risk projects, at the expense of the debtholders (the risk-shifting problem). Shareholders of highly indebted firms may even select investment projects with a negative present value, because the increase in risk leads to a wealth transfer from debtholders to shareholders that exceeds the net present value of the project.

Myers and Majluf (1984) provided a theoretical foundation for the proposition of Donaldson (1961) that there is a financing hierarchy, where firms prefer internal finance, and if external finance is required firms issue the safest security first. In the Pecking Order model of Myers and Majluf, raising external finance is costly because insiders have more information about the firm's prospects than outside investors, and outside investors know this. From the

perspective of outside investors, equity is riskier than debt. They will rationally demand a higher adverse selection risk premium for equity than for debt. From the point of view of the insiders, debt is therefore a better source of funds than equity is, and internal funding is even better. Debt financing will only be used when there is an inadequate amount of internal funding available, and equity will only be used as a last resort. As a consequence, there is no optimal debt ratio. The observed debt ratio is simply the sum of past financing events.

From these theories, a number of predictions regarding the determinants of the debt-equity choice can be derived. First, asset tangibility is commonly assumed to be positively correlated with debt. Tangible assets are easy to collateralize and thus they reduce the agency costs of debt. If assets cannot be collateralized, creditors may require more favourable terms, which may lead firms to use equity rather than debt financing. Smith and Warner (1979) and Pettit and Singer (1985) argue that the agency costs of debt are generally higher in smaller, non-listed firms, as the small business owner/manager is likely to put his own and his venture's interest first. In a small firm, the manager usually holds a large proportion of the equity. Actions that benefit the shareholders will therefore also benefit the manager. Because the manager controls the actions of the firm, managers of small firms could be more likely to take risks than managers in large firms. Moreover, the monitoring of small non-listed firms could be more difficult and expensive because they are allowed to disclose less information to outsiders. The available information could also be less reliable: small firms typically do not have audited financial statements, and therefore the quality of their financial statements will vary (Pettit and Singer, 1985; Ortez-Molina and Penas, 2006). While outsiders may prefer audited financial statements, small firms may find the costs of an audited financial statement too high, and alternative sources of information may be inadequate (Michaelas et al., 1999). We therefore hypothesize a positive relation between the proportion of tangible assets and the debt ratio of small firms:

Hypothesis 1: Firms with a higher proportion of tangible assets have a higher debt ratio.

The agency costs of debt also suggest a negative relationship between *growth opportunities* and debt levels. As shown by Myers (1977), highly levered firms are more likely to pass up profitable growth opportunities. Moreover, the expected costs of financial distress are higher for firms with good growth opportunities. Therefore, it is expected that firms with good investment opportunities will use a greater amount of equity finance. This leads to the following hypothesis:

Hypothesis 2: Firms with high growth opportunities have a lower debt ratio.

The Pecking Order Theory predicts that firms with high profitability will need less external financing and will therefore have lower debt ratios. On the other hand, if firms use debt as a means of reducing tax payments as suggested by the trade-off theory, firms with higher profits should have higher debt ratios. Higher profits allow the firm more corporate tax deductions, and they reduce bankruptcy risk. However, empirical studies on capital structure determinants almost invariably find a negative relationship between profitability and the debt ratio (see e.g. Van der Wijst and Thurik, 1993; Chittenden et al., 1996; Michaelas et al., 1999; Pindado et al., 2006, for evidence on small firms). As discussed by Pettit and Singer (1985), small firms generally have higher levels of asymmetric information as the quality of their financial statements tends to be lower. We therefore expect a negative relationship between profitability and the debt ratio:

Hypothesis 3: More profitable firms have a lower debt ratio.

Firm size is often considered as a proxy for the probability of default: larger firms tend to be more diversified and to have less volatile assets, and are therefore less likely to fail and to be

liquidated. This should lead to a positive relation between size and leverage. Pettit and Singer (1985) on the other hand point out that while it can be expected that the agency costs of debt are higher for small firms, the agency costs of equity may even be higher. The net result could be a higher debt ratio for smaller firms. However, empirical studies on the capital structure of small firms tend to find a positive relationship between firm size and the debt ratio (e.g. Van der Wijst and Thurik, 1993; Chittenden et al., 1996; Michaelas et al., 1999; Pindado et al., 2006). We therefore hypothesize:

Hypothesis 4: Larger firms have a higher debt ratio.

2.2. *The debt maturity choice*

We consider four hypotheses on the determinants of debt maturity, with regard to (a) maturity matching, (b) growth opportunities, (c) credit worthiness and (d) size.

(a) Maturity matching

Morris (1976) argues that firms try to match the maturity of assets and liabilities because this reduces the risk that incoming cash flows might be insufficient to cover interest payments and capital outlays. Debt with a maturity shorter than the maturity of assets is risky because the assets might not have yielded enough profit to repay the debt. Debt with a maturity longer than the maturity of the assets is also risky because debt might have to be repaid after the assets have ceased to yield income. Consequently, firms try to match the maturities of assets and debt. This is known as 'maturity matching'. This leads to the following hypothesis:

Hypothesis 5: Firms match the maturity of debt with the maturity of their assets.

Small firms are more common in the wholesale, retail, and service sectors, whereas large firms are more common in manufacturing. Because manufacturing involves more fixed investments, the maturity of assets in these (larger) firms is likely to be quite different from that of non-manufacturing (smaller) firms. However, the motive for matching maturity of assets and liabilities continues to be relevant for small firms.

(b) Growth opportunities

Myers (1977) suggests that reducing debt maturity may solve the underinvestment problem. When leverage is high, residual claims will be very low and profits from investments will benefit only creditors. Because shareholders will not earn a fair return, they will be reluctant to pursue valuable investment opportunities. The underinvestment problem is more severe when a firm has more growth opportunities. According to Myers, underinvestment can be avoided by issuing debt that matures before an investment opportunity can be carried out. Long-term debt financing is thus best achieved by rolling over short-term debt.

An alternative solution to the underinvestment problem could be to include restrictive covenants in the debt agreement. When detailed debt covenants can be written, a borrower is forced to renegotiate with the lender if a covenant is violated. This gives the lender flexibility and control. However, Berger and Udell (1998) argue that effective covenants generally cannot be imposed on the small firms which do not have audited financial statements, so short maturities must be used in place of formal covenants to control the behaviour of these firms. According to Berger and Udell, debt maturity can be viewed as a particularly strong type of covenant. With a sequence of short-maturity credits, a lender can force renegotiation frequently, while with covenants renegotiation can only be triggered by those covenants enumerated in the loan agreement. We therefore hypothesize:

Hypothesis 6: Firms with high growth opportunities borrow on the short term.

(c) Credit worthiness

Credit worthiness is another factor that can influence debt maturity choice. First, it can be expected that firms with low credit worthiness must borrow short-term, because no one will

lend to them long-term, due to the resulting adverse selection problem (e.g. Diamond, 1991; Scherr and Hulburt, 2001). Lenders put risky firms on a short string and this short string is a short debt maturity. Diamond (1991) argues that also firms with *high* credit worthiness will borrow short-term. A key concept in his theory is liquidity risk, which is the risk that a debtor will lose control rents because creditors do not want to refinance, and therefore choose to liquidate the firm. Control rents are the difference between the profits of a project and the payments to the creditor. In the model of Diamond, short-term debt matures before the profits of an investment are received. It is therefore necessary to refinance short-term debt. The possibility of refinancing depends on the willingness of the creditors, which, in turn, depends on the new credit worthiness of the debtor. If refinancing is impossible, assets have to be sold to meet obligations. As a consequence, the debtor looses part of the control rents. Of course, this has a negative influence on profitability. For firms with high credit worthiness, the liquidity risk is not relevant: a decrease of their credit worthiness does not lead to a 'crunch' of credit to the firm. For this reason, firms with a high credit rating are expected to borrow on the short term. For firms with a medium credit rating on the other hand, the liquidity risk may be important. If their credit worthiness decreases, creditors could refuse to extend the loan. They might take control of the firm and, perhaps, liquidate it. Firms which are afraid that this might happen borrow on the long term. The model of Diamond (1991) therefore leads to the following hypothesis:

Hypothesis 7: Firms with low and high credit worthiness borrow on the short term, whereas firm with medium credit worthiness borrow on the long term.

Liquidity risk is a key concept in the model of Diamond (1991). To avoid liquidation, firms with a medium creditworthiness will contract long-term debt. However, it can be argued that banks are more willing to renegotiate on contracts than are non-bank lenders (e.g. Hoshi et al., 1990). If so, liquidity risk decreases for bank borrowers. This induces bank borrowers who have a medium credit worthiness to borrow on a shorter term than non-bank borrowers, for whom liquidity risk is still an important concern.

(d) Size

As argued by e.g. Smith and Warner (1979) and Pettit and Singer (1985), the agency costs of debt are likely to be higher in smaller firms. Because these problems can be reduced by issuing short-term debt, a positive relation between firm size and debt maturity is to be expected.[3] Moreover, ownership/manager succession problems may be worse in a small firm with only one or two owner-managers than in a large firm with multiple owner-managers. In this case, banks may be willing to lend for a longer term to firms with multiple owner-managers than single proprietors.[4] We therefore predict a positive relationship between firm size and debt maturity:

Hypothesis 8: There is a positive relationship between firm size and debt maturity.

Because the sample in this study consists entirely of small firms, most of these firms are likely to be managed by their owners. It is therefore possible that for the firms in our sample, there is no relationship between firm size and debt maturity.

3. Sample

The data used to construct the sample for the present study were gathered from the Belfirst DVD of Bureau Van Dijk. This DVD is the repository of the annual accounts of the firms that deposit their accounts with the central reserve bank of Belgium. In Belgium, firms with limited liability (irrespective of their size), have a legal duty to deposit their annual accounts in a prescribed format. A distinction is made between firms that have to deposit their annual accounts in a complete format and firms that are allowed to deposit their annual accounts in an abbreviated format. A firm has to use the complete format if it has more than 100 employees or if it satisfies at least two of the following criteria: number of employees (yearly average) of at least 50, turnover (value-added

tax excluded) of at least 6.250.000 Euro (EUR)) and total assets of at least 3.125.000 EUR.

The firms in our population had to satisfy the following conditions: (i) be allowed to deposit an abbreviated account; (ii) have submitted an account in every year from 1996 until 2000; (iii) have at least one employee (because the existence of firms without employees is merely driven by fiscal motivations); and (iv) not belong to the financial sector or governmental sector. Financial firms were excluded because, due to capital requirements, decisions concerning capital and maturity structure could be affected by other factors. Governmental firms were also excluded because, as Smith (1986) has argued, managers in governmental firms have less discretion concerning investments than do managers in non-governmental, and thus, less regulated firms.

From this population, we drew a random sample of 1,200 firms. Observations with missing values were discarded. Outliers were filtered in the following way: (i) the percentage of long-term debt over total debt and the percentage of fixed assets over total assets could not exceed 100%; and (ii) the short-term default indicator could not exceed 1. The proxies for growth opportunities were filtered by removing the upper and lower 0.5% percentile. Thus, a sample of 4,706 firm-year observations for 1,132 firms in the period from 1996 to 2000 was obtained.

4. Variables

Guedes and Opler (1996) note that there are two empirical approaches to investigate the determinants of debt maturity. The first is to investigate the maturity of individual debt issues. However, we could not use this approach for the sample of small firms used in this study, as none of these firms made use of public debt issues, and databases of bank debt issues were not accessible. The second approach involves the use of cumulative data from the annual account, and this was the approach followed here.

Debt Maturity is the percent of a firm's total debt that originally matured in more than one year. Debt that matured within one year but that had an original maturity of more than one year was also included in the measure of long-term debt, because it was issued with a long-term intention. An alternative dependent variable was also specified, in which only financial debt was considered. However, results were very similar using this alternative specification. *Leverage* is measured by total debt over total assets.[5]

Asset tangibility and *Asset maturity* are both measured by the percentage of fixed assets in total assets. Regarding growth opportunities, studies on listed firms generally use Tobin's Q as a proxy for growth opportunities, but this measure could not be used here as the firms in the present sample were not listed. Growth opportunities therefore had to be proxied in other ways. Following Scherr and Hulburt (2001), we use past growth in total assets. *Asset growth* is thus calculated as the geometric average of the yearly growth in total assets over the three preceding years. In this approach, it is assumed that firms that grew faster in the past also have greater opportunities for future growth. Secondly, we use the ratio of capital expenditures over total assets. Kallapur and Trombley (1999) conclude that, for non-listed firms, this measure best captures ex post realised growth. *Capital expenditures* are new investments in fixed assets over total assets.

The credit worthiness of a firm is often proxied by ratings offered by agencies such as Standard & Poor's (S&P) and Moody's. However, none of the firms in the present sample had such a rating. We therefore use a short-term default risk indicator, based on the OJD score, which is a multivariate logit score for failure prediction. This score was developed for Belgian firms as an alternative to the linear Altman's Z score (Ooghe et al., 1995). *Stdefault* equals one minus the short-term OJD score and ranges between 0 (financially healthy firm), and 1 (financially distressed firm). The non-monotonous relation between debt maturity and credit worthiness is tested in two ways. First, both Stdefault and the square of the Stdefault are included as variables. If the relationship between default risk and debt maturity is parabolic, as proposed by Diamond (1991), the coefficient of the default risk should be positive and the coefficient of the square should be negative. In

the second approach, dummies are used to classify the firms into three categories according to their default risk. Firms with a low default risk (high credit worthiness) were taken to be those situated below the 33rd percentile (*Dumsthi*), firms with a medium default risk (and medium credit worthiness) were taken to be those between the 33rd and 66th percentile (*Dumstme*). The upper 33% of the firms were viewed as firms with a high default risk (dumstlo). *Profitability* is the ratio of earnings before intrest and taxes over total assets. Finally, we measure *Size* by the natural logarithm of total assets. Table I presents an overview of the variables, and the expected signs.

Table II presents descriptive statistics of the variables. The mean leverage is 68.7% (median is 72.3%), while on average 47.7 % of the debt issued is long-term debt (median is 46.0%).

TABLE I
Expected sign for the explanatory variables

Variable	Leverage	Debt Maturity
Asset tangibility	+ (H1)	
Asset maturity		+ (H5)
Asset growth	– (H2)	– (H6)
Capital Expenditures		– (H6)
Profitability	– (H3)	
Stdefault		– (H7)
Stdefault^2		+ (H7)
Size	+ (H4)	+ (H8)

Average asset maturity is 46.1% (median is 43.7%). The firms in our sample tend to have a substantially higher debt ratio than the debt ratios found in most other empirical studies. However, it should be taken into account that our measure of leverage not only includes financial debt, but also other debt categories (such as trade debt). Moreover, the present sample was drawn from a banking-oriented environment, in which bank debt is used more frequently.

The mean asset growth (which is a measure of growth opportunities) is fairly high at 5.8%, and is higher than the median of 3.8%. This suggests that our sample includes some high-growth firms. Indeed, the maximum asset growth is 99.2%. The same picture emerges when capital expenditures are used as a proxy for growth opportunities. On average, capital expenditures accounted for 7.6% of total assets, while median capital expenditures are only 3.4%. The average size of the firms in the present sample, measured by total assets, is 759,400 EUR, but again the median is much smaller at 385.000 EUR. The firms in our sample are somewhat smaller than those in the sample of Scherr and Hulburt (2001). They used four subsamples, in which the mean total assets ranged from $1 million to $2 million.

Table III shows Pearson correlations among the dependent and independent variables.

TABLE II
Descriptive statistics

Variable	Mean	Std Dev	Median	Minimum	Maximum
Leverage	68.7%	21.7%	72.3%	1.2%	99.6%
Debt maturity	47.7%	26.2%	46.0%	0.0%	99.8%
Asset maturity	46.1%	27.2%	43.7%	0.0%	100.0%
Asset growth	5.8%	21.8%	3.8%	−85.5%	99.2%
Capital expenditures	7.6%	21.7%	3.4%	0.0%	98.8%
Profitability	12.7%	46.6%	3.0%	−313.4%	1,073.3%
Stdefault	0.2	0.2	0.1	0.0	1.0
Total assets[a]	759.4	1324.0	385.0	13.0	32,849.0

Leverage is the ratio between total debt and total assets (in percentage terms). Debt maturity is the percentage of total debt that originally matured in more than one year. Asset maturity is the percentage of total assets that are fixed assets. Asset growth is the geometric average of growth in total assets for the three preceding years (in percentage terms). Capital expenditures is the ratio of capital expenditures over total assets (in percentage terms). Profitability is the ratio of earnings before interest and taxes over total assets (in percentage terms). Stdefault is one minus the OJD score (between 0 and 1), stdefault^2 is the square of stdefault. Size is measured by the natural logarithm of total assets.
[a]Thousands of EUR.

Leverage is positively correlated with asset tangibility (H1), and is negatively correlated with asset growth (H2) and profitability (H3) (all correlations statistically significant at the 1% level). However, leverage does not seem to be related to firm size, which is inconsistent with Hypothesis 4. Consistent with the matching principle (H5) there is a strong correlation between debt maturity and asset maturity of assets (statistically significant at the 1% level). Debt maturity is also significantly negatively correlated with asset growth (H6) (at the 5% level), but it is not significantly correlated with either Stdefault (H7) or firm size (H8).

5. Methodology

Because the present data included observations of firms over five years, panel data analysis techniques can be used. Baltagi (1995) has argued that panel data have several benefits. The greatest advantage of panel data to the present study is that they allow control for individual heterogeneity. Panel data suggest that firms are heterogeneous. Because time series and cross-section studies do not control for this heterogeneity, the estimation results could be biased. Panel data analysis allows the consideration of a firm-specific time-invariant effect. The analysis can be run by either a fixed-effects model or a random-effects model. The fixed-effects model can, in general terms, be described by the following equation:

$$y_{it} = \alpha_i + \underline{x}'_{it}\,\underline{B} + \varepsilon_{it}$$

in which α_i represents an unknown firm-specific constant, which is referred to as a 'fixed effect'.

The alternative, the random-effects model, is described as follows:

$$y_{it} = \alpha + \underline{x}'_{it}\,\underline{B} + \varepsilon_{it}$$

To determine which of these regressions should be run, the Hausman test can be used, which examines whether the difference between the estimators generated by random-effects regression and the estimators generated by fixed-effects regression approximates zero. In other words: H_0 = random effects and H_A = fixed effects. (In the present analysis H_0 was rejected ($p < 0.0001$), which means that the fixed-effects model was to be preferred.)

As a robustness check, we also run cross-sectional OLS-regressions (in which the observations are the time-series means of the different firms). Furthermore, to take into account the fact that decisions on leverage and debt maturity are simultaneous decisions, we will also estimate

TABLE III
Pearson correlation coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Leverage	1.00						
(2) Debt maturity	−0.03**	1.00					
(3) Asset maturity	0.06***	0.61***	1.00				
(4) Asset growth	−0.06***	−0.03**	−0.06***	1.00			
(5) Capital expenditures	0.06***	0.03**	0.04***	0.01	1.00		
(6) Profitability	−0.09***	0.00	−0.01	0.00	−0.02	1.00	
(7) Stdefault	0.35***	0.01	0.34***	−0.08**	0.00	−0.04***	1.00
(8) Size	0.00	0.00	0.11***	−0.05***	0.02	−0.10***	0.10***

Leverage is the ratio between total debt and total assets (in percentage terms). Debt maturity is the percentage of total debt that originally matured in more than one year. Asset maturity is the percentage of total assets that are fixed assets. Asset growth is the geometric average of growth in total assets for the three preceding years (in percentage terms). Capital expenditures is the ratio of capital expenditures over total assets (in percentage terms). Profitability is the ratio of earnings before interest and taxes over total assets. Stdefault is one minus the OJD score (between 0 and 1), stdefault^2 is the square of stdefault. Size is measured by the natural logarithm of total assets.

* denotes statistical significance at the 10% level.

** denotes statistical significance at the 5% level respectively.

*** denotes statistical significance at the 1% level.

two stage least squares (2SLS) regressions (see Greene (1997)), in which leverage and debt maturity are the endogenous variables.[6]

6. Empirical results

6.1. *The debt-equity choice*

While our prime interest lies in the determinants of debt maturity, we first investigate the determinants of leverage. Results are reported in Table IV. Regression (1) is estimated with the fixed effects model, and regression (2) is estimated with cross-sectional ordinary least squares. The results in Table IV are consistent with the first three hypotheses: leverage is positively related to asset tangibility (H1), and it is negatively related to asset growth (H2) and to profitability (H3). The coefficients of leverage and profitability are statistically significant at the 1% level in both regression (1) and regression (2), but the coefficient of asset growth is statistically significant only in regression (1). We find that leverage is negatively related to size (again statistically significant at the 1% level), which contradicts hypothesis 4, and which is inconsistent with the results of other studies on the capital structure of small firms (e.g. Van der Wijst en Thurik, 1993; Chittenden et al., 1996; Michaelas et al., 1999; Pindado et al., 2006). However, as noted in Section 2.1, Pettit and Singer (1985) argue that leverage may be negatively related to firm size, because the negative relation between firm size and the agency costs of equity may be stronger than the negative relation between firm size and the agency costs of debt.

TABLE IV
The Determinants of Leverage

Regression:	(1)	(2)
Estimation Method:	Fixed Effects	Cross-sectional OLS
Intercept	–	0.76(21.53)***
Asset tangibility	0.20 (13.10)***	0.06(2.41)**
Asset growth	−0.09 (−15.65)***	0.03 (0.53)
Profitability	−0.01 (−2.67)***	−0.06 (−4.01)***
Size	−0.01 (−3.59)***	−0.02 (−3.41)***
Adjusted R^2	90.29%	3.06%

Leverage is the ratio between total debt and total assets (in percentage terms). Asset tangibility is the percentage of total assets that are fixed assets. Asset growth is the geometric average of growth in total assets for the three preceding years (in percentage terms). Profitability is the ratio of earnings before interest and taxes over total assets. Stdefault is one minus the OJD score (between 0 and 1), stdefault^2 is the square of stdefault. Size is measured by the natural logarithm of total assets. The cross-sectional regression also includes four industry dummies. *T*-values (robust for heteroscedasticity) are reported in parentheses. * denotes statistical significance at the 10% level. ** denotes statistical significance at the 5% level. *** denotes statistical significance at the 1% level.

6.2. *The debt maturity choice*

We now take a closer look at the determinants of debt maturity. The results are reported in Table V. Regressions (3)–(5) are estimated with the fixed effects model, and regressions (6) to (8) are estimated with cross-sectional ordinary least squares. The regressions include leverage and industry affiliation as control variables.

Hypothesis 1, which proposes that firms seek to match the maturities of assets and liabilities, is strongly confirmed. In every regression, the coefficient of asset maturity is large and significant at the 1% level. Maturity matching is an important factor in choosing between short-term and long-term debt.

The hypothesis that firms with significant growth opportunities borrow on the short term, is not confirmed. The coefficients of past growth in assets (regressions (3), (5), (6), (8)) and capital expenditures (regressions (4), (7)) are never significant, which suggests that the under-investment problem does not affect corporate debt maturity. However, caution is required here, as past growth may not be a good measure of future growth options.

The coefficient of Stdefault, which is the measure of credit worthiness in this study, is significantly negative, whereas the square of this variable has a significant positive coefficient. The negative coefficient of stdefault is consistent with the prediction that firms with lower credit worthiness (higher stdefault) tend to have a shorter debt maturity. However, combined the coefficients of stdefault and stdefault^2 imply a U-shaped relation between debt maturity and credit worthiness. This seems to contradict Hypothesis 3, which predicts an inverse U-shape: good and bad firms have a low debt

TABLE V
The Determinants of debt maturity

Regression:	(3)	(4)	(5)	(6)	(7)	(8)
Estimation Method:	Fixed effects	Fixed effects	Fixed effects	Cross-ectional OLS	Cross-sectional OLS	Cross-sectional OLS
Intercept	–	–	–	0.91(22.18)***	0.91(22.24)***	−0.01 (−0.25)
Asset maturity	0.60 (25.62)***	0.60 (25.63)***	0.56 (25.85)***	0.45 (17.53)***	0.45 (17.53)***	0.63(28.51)***
Asset growth	−0.00 (−0.43)	-	−0.01 (−1.35)	0.02 (0.31)	-	−0.01(−0.26)
Capital expenditures	–	0.00 (0.09)	–	–	−0.03 (−0.69)	–
Stdefault	−0.30 (−6.87)***	−0.30 (−6.87)***	–	−1.26 (−9.77)***	−1.27 (−9.84)***	–
Stdefault^2	0.17(3.10)***	0.18 (3.11)***	–	0.95 (5.00)***	0.95 (5.04)***	–
Dumstme	–	–	0.04 (7.58)***	–	–	0.08(4.55)***
Dumsthi	–	–	0.07 (8.48)***	–	–	0.15 (7.41)***
Size	−0.01	−0.01 (−2.94)***	−0.01 (−2.40)**	−0.03(−4.80)***	−0.02 (4.80)***	−0.01(−1.65)*
Leverage	0.10 (3.95)***	0.10 (3.95)***	0.09 (3.76)***	0.02 (0.66)	0.02 (0.68)	0.10(3.30)***
Adjusted R^2	77.0%	77.4%	87.2%	45.2%	45.0%	43.2%

Debt maturity is the percentage of total debt that originally matured in more than one year. Asset maturity is the percentage of total assets that are fixed assets. Asset growth is the geometric average of growth in total assets for the three preceding years (in percentage terms). Capital expenditures is the ratio of capital expenditures over total assets (in percentage terms). Stdefault is one minus the OJD score (between 0 and 1), stdefault^2 is the square of stdefault. Dumstme is a dummy variable which equals 1 when stdefault score is between 0.0425 and 0.1672, and 0 otherwise. Dumsthi is a dummy variable which equals 1 when stdefault score is below 0.0425, and 0 otherwise. Size is measured by the natural logarithm of total assets. Leverage is the ratio between total debt and total assets (in percentage terms). The cross-sectional regressions also include four industry dummies. T-values (robust for heteroscedasticity) are reported in parentheses. * denotes statistical significance at the 10% level. ** denotes statistical significance at the 5% level. *** denotes statistical significance at the 1% level.

maturity, whereas firms of medium quality borrow on the long term. However, the lowest value on the parabolic curve is approximately −0.88 for the fixed effect regressions, and approximately −0.66 for the cross-sectional regressions. As almost all the observations in our sample are below these levels (the 95% percentile stdefault value is 0.55), it can be concluded that debt maturity is an increasing function of credit worthiness. This is confirmed by the coefficients of the dummy variables used to classify the firms according to their credit rating (regressions (5) and (8)). The firms belonging to the category with the highest credit score clearly borrowed on a longer term. The firms with a low credit score borrowed more on the short term. Either way, there was no evidence for a non monotomous relation between credit score and debt maturity, as proposed by Diamond (1991).

Hypothesis 8 proposes a positive relation between size and debt-maturity structure, but in all the regressions in Table V, size has a significant negative coefficient, which is significant at the 1% level. This result contradicts hypothesis 8, but it is consistent with findings of Scherr and Hulburt (2001) for small U.S. firms and Guedes and Opler (1996) for large U.S. firms. Of course, firm size is a difficult variable to interpret, as it may capture different effects. One possible explanation for the negative relation between size and debt maturity, as suggested by Guedes and Opler, is that size actually is a proxy for credit risk (cf. hypothesis 7).

Finally, leverage, as a control variable, has a significant positive impact on debt maturity. Higher indebted firms might have borrowed on the longer term to ensure that they had earned enough money to be able to repay the creditors.

To take into account the fact that the debt-equity choice and the debt maturity choice are likely to be simultaneous decisions, we also estimate the leverage equation and the debt maturity equation with two stage least squares estimation. Debt maturity and leverage are the endogenous variables. The results, which are reported in Table VI, are fully consistent with those for the single equation estimation results.

TABLE VI
The determinants of leverage and debt maturity: two stage least squares regression

Regression:	(9)	
Dependent variable:	Leverage	Debt maturity
Intercept	0.96 (21.20)***	−0.17 (−2.59)***
Asset tangibility	0.15 (8.80)***	–
Asset maturity	–	0.57 (26.83)***
Asset growth	−0.09 (−15.32)***	−0.01 (−1.23)
Stdefault	–	−0.30 (−7.40)***
Stdefault^2	–	0.16(3.15)***
Profitability	−0.01 (−2.32)**	–
Size	−0.01 (−3.34)***	−0.01 (−3.01)***
Leverage	–	0.25 (10.89)***
Debt maturity	0.10 (7.92)***	–
-2Log Likelihood	−6,695.7	−4,616.5

Leverage is the ratio between total debt and total assets (in percentage terms). Debt maturity is the percentage of total debt that originally matured in more than one year. Asset tangibility and Asset maturity are measured by the percentage of total assets that are fixed assets. Asset growth is the geometric average of growth in total assets for the three preceding years (in percentage terms). Stdefault is one minus the OJD score (between 0 and 1), stdefault^2 is the square of stdefault. Profitability is the ratio of earnings before interest and taxes over total assets. Size is measured by the natural logarithm of total assets. *T*-values (robust for heteroscedasticity) are reported in parentheses. *denotes statistical significance at the 10% level. ** denotes statistical significance at the 5% level. *** denotes statistical significance at the 1% level.

Leverage increases with asset tangibility and decreases with asset growth, profitability and firm size. Debt maturity increases with asset maturity, credit worthiness and leverage, and decreases with size. In the debt maturity equation, asset growth has a negative coefficient, but this coefficient is not statistically significant.

Although comparison with earlier empirical studies is difficult, due to the different environments and samples involved, it is nevertheless worthwhile to consider similarities and dissimilarities with earlier empirical work. An important observation is that, no matter what kind of firm, or which environment, maturity matching is very important. All studies that we are aware of have found strong evidence for maturity matching. The evidence with respect to growth opportunities on the other hand is mixed, and seems to vary with the size of the firms that are studied. Consistent with Scherr and Hulburt (2001), we find no evidence in support of the growth opportunities hypothesis for small firms. This could be interpreted as evidence that because of bank monitoring, agency problems do not have to be solved by reducing debt maturity. This seems a plausible explanation in the Belgian context. Most small firms tend to make loan agreements with a local bank branch, so they are likely to be closely monitored by this local branch. Empirical evidence on large firms has been more supportive of the growth opportunities hypothesis. Barclay and Smith (1995), Guedes and Opler (1996), Stohs and Mauer (1996), and Ozkan (2000) all have found a negative relation between growth opportunities and debt maturity.

Most studies find that credit worthiness affects debt maturity. Barclay and Smith (1995) and Stohs and Mauer (1996) find support for Diamond's (1991) hypothesis for large firms, whereas Guedes and Opler (1996) conclude that large US firms with a high credit worthiness borrow on the short term. Scherr and Hulburt (2001) and Berger et al. (2005) find that small US firms with lower default risk have a shorter debt maturity. This contradicts our own findings, which suggest a positive relation between credit worthiness and debt maturity: banks do not provide long-term loans to weak debtors. The finding that good firms borrow on the long term is consistent with the survey results of Graham and Harvey (2001). In their survey of corporate financial policies, issuing long-term debt to minimise the risk of having to refinance in ''bad'' times is the second most important factor affecting a choice between short-term and long-term debt (with maturity matching being the most important factor).

Barclay and Smith (1995), Stohs and Mauer (1996) and Ortez-Molina and Penas (2006) report a positive relation between size and debt maturity, while Guedes and Opler (1996) and Scherr and Hulburt (2001) find a negative relation. Our results support the latter findings. As Scherr and Hulburt (2001) have argued, this mixed evidence on size could be caused by the fact that size proxies for several variables (such as agency problems, asymmetric information, etc.).

7. Conclusion

In this study, we have examined the financial structure of small, privately held firms in a creditor oriented environment. Our results generally confirm the role of asymmetric information and agency costs of debt as major determinants of the financial structure of privately held firms. High growth firms and firms with less tangible assets have a lower debt ratio. Consistent with the Pecking Order theory of Myers and Majluf (1984), we also find that more profitable firms have less debt. Firms tend to match the maturity of debt with the maturity of their assets. Growth options do not seem to influence debt maturity, which would suggest that the underinvestment problem as described by Myers (1977) is resolved by lowering leverage and by bank monitoring, not by reducing debt maturity. However, caution is required here as our measure of growth opportunities (past growth) may not be a good measure of growth options. Credit risk is also an important determinant of debt maturity: firms with low credit risk can borrow on the long term, whereas firms with high credit risk are apparently forced to borrow on the short term. Studies on US small firms on the other hand find that firms with lower credit risk have a shorter debt maturity. Finally, in contrast to most studies on the financial structure of companies, we find that larger firms tend to have a higher debt ratio and a shorter debt maturity.

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Notes

[1] Other studies focusing on small firms are Scherr and Hulburt (2001), Berger et al. (2005) and Ortiz-Molina and Penas (2006), who all investigate the debt maturity of small U.S. firms.

[2] See Guedes and Opler (1996), Barclay and Smith (1995), Stohs and Mauer (1996), Scherr and Hulburt (2001), Berger et al. (2005) and Ortiz-Molina and Penas (2006) for studies in the United States, and Ozkan (2000) for studies in the United Kingdom.

[3] The issuing costs of a public debt issue may also play a role. These costs are fixed, and are therefore independent of the magnitude of the debt. For this reason, larger firms are especially likely to issue public debt. Because public debt has a longer maturity than private debt, this should lead to a positive relation between firm size and debt maturity. However, this reasoning does not apply to the firms in our sample, because these firms are too small to issue public debt.

[4] We thank the referee for suggesting this idea.

[5] An alternative measure would be debt scaled by sales. However, for a significant number of firms in our sample we do not know sales, as small firms in Belgium are not obliged to report sales figures.

[6] We also ran pooled OLS-regressions. The results (not reported, available from the authors upon request) are qualitatively the same as the ones reported in the paper.

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