Discussion paper

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By Hans Degryse, Peter de Goeij, Peter Kappert

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The Impact of Firm and Industry Characteristics on Small Firms' Capital Structure: Evidence from Dutch Panel Data*

Hans Degryse[1]
CentER, EBC, TILEC, Tilburg University

Peter de Goeij♦
CentER, TILEC[2], Tilburg University

Peter Kappert
Rabobank International

Abstract

We investigate small firms' capital structure, employing a proprietary database containing financial statements of Dutch small and medium-sized enterprises (SMEs) from 2003 to 2005. We find that the capital structure decision of Dutch SMEs is consistent with the pecking order theory: SMEs use profits to reduce their debt level, and growing firms increase their debt position since they need more funds. Furthermore, we document that profits reduce in particular short term debt, whereas growth increases long term debt. This implies that when internal funds are depleted, long term debt is next in the pecking order. We also find evidence for the maturity matching principle in SME capital structure: long term assets are financed with long term debt, while short term assets are financed with short tem debt. This implies that the maturity structure of debt is an instrument for lenders to deal with problems of asymmetric information. Finally, we find that SME capital structure varies across industries but firm characteristics are more important than industry characteristics.

Keywords: Capital Structure, SMEs, pecking order theory, trade-off theory
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[1] Hans Degryse is also a CESIfo research fellow and holds the TILEC-AFM Chair on Financial Market Regulation.

♦ Address for correspondence: Tilburg University, Department of Finance, Room K919, Warandelaan 2, 5037AB, Tilburg, The Netherlands. Email: p.c.degoeij@uvt.nl

[2] Peter de Goeij is a senior researcher for the TILEC-AFM research network on Financial Market Regulation.

1. Introduction

The capital structure decision is one of the most important decisions faced by firm management. While many studies tackle the capital structure decision, most empirical work deals with large publicly listed firms which often have several types of securities traded (see Fama and French, 2002 or Frank and Goyal, 2008 for a recent review). Small unlisted firms, however, make up for more than 90% of all existing firms, and are the engine of growth in most economies. In this paper we study the factors that determine the capital structure of small unlisted firms in the Netherlands and investigate the role of both industry and firm characteristics. The capital structure decision of small firms comes closest to the standard textbook case which considers the choice between debt and equity. Indeed, small Dutch firms typically only decide from which banks to borrow and do not face other complicating issues like the choice between private and public debt, or which type of securities to issue. While previous studies on industry effects focused on larger firms, studying industry characteristics for small firms is particularly important as small firms typically are less diversified and more likely to be single-line businesses.

We exploit a large and detailed database with financial statements of Dutch SMEs from 2003 to 2005. One of the unique features of the database is its sheer size. In our analysis, we use an unbalanced panel that contains 103,217 firm-year observations covering eight different industries over three years, which is much more compared with previous studies. The data set contains many very small firms, which distinguishes this study from earlier SME capital structure studies that have medium sized firms in their data (Michaelas et al., 1999; Sogorb-Mira, 2005). Data on the smallest firms is typically difficult to obtain and therefore this is an excellent opportunity to investigate the capital structure of small firms. SME capital structure has been investigated before for other European countries, for example the U.K. (Michaelas et al., 1999), Spain (Sogorb-Mira, 2005), and Belgium (Heyman et al., 2008). Dutch SMEs have been considered together with a number of other European countries in a study of Hall et al. (2004).

The Dutch case is particularly interesting, because compared to the U.S. and the U.K., financial markets are much less accessible for small businesses. Banks are the major financiers for SMEs while the banking sector in the Netherlands is among the most concentrated in the world (see e.g. Cetorelli and Gambera, 2001). Our data set enables us to

investigate whether the empirical results in the Netherlands are different from the results in other countries and from those of large firms. An additional interesting feature of our proprietary data set is that we can test whether the SME capital structure reflects industry differences (see also Michaelas et al., 1999). This allows us to study to what extent the impact of firm characteristics on capital structure varies across industries, so we can test whether the predictions of the pecking order theory or trade-off theory are equally important for all industries. Moreover, we test whether industry is more important for capital structure compared to firm characteristics. Previous studies such as Balakrishnan and Fox (1993), Bradley et al. (1984), and MacKay and Phillips (2005), amongst others, have found various impacts of inter-industry and intra-industry effects for large publically listed firms. In line with Michaelas et al. (1999), we study inter-industry effects of capital structure for unlisted SMEs, but link them closer to the importance of the pecking order theory and trade-off theory.

Our findings can be summarized as follows. First, we show using panel data techniques, that the capital structure decision for Dutch SMEs is consistent with the predictions made by the pecking order theory which is in line with previous findings for, for example, the Spanish market (see Sogorb-Mira, 2005). SMEs use profits to reduce their debt level since they prefer internal funds over external funds. However, if a firm is growing, it increases its debt position since it needs more funds. Furthermore, we document that profits affect in particular short term debt, whereas growth affects long term debt. This implies that when internal funds are depleted, long term debt is next in the pecking order. We also document that short term debt is more expensive and can be amortized easily.

Second, transaction costs play an important role for SMEs, along with the loss of control if external funds are used. However, for SME financing, information asymmetry between the firm and the lender is very important as well. This study confirms that both long term collateral (tangible fixed assets) and short term collateral (inventories) are the most important factors for SME capital structure. It is difficult for lenders to assess the level of risk attached to SMEs and therefore they require collateral to limit their losses in the event of borrower default. We do find that SMEs with collateral face few problems to attract external finance. Moreover, we document that intangible assets and net debtors, which are often considered poor collateral, have a positive effect on the long term debt level, suggesting that banks are able to employ these assets in their loan granting decisions. In addition, Dutch SMEs have a relatively large amount of long term debt which is more risky for lenders.

Third, we find evidence for the maturity matching principle (see e.g. Mitchell, 1991). Long term assets are financed with long term debt, while short term assets are financed with short tem debt. In addition, larger firms have relatively more long term debt and less short term debt. This implies that lenders use debt maturity as a way to mitigate risk. Smaller firms are often more risky and therefore they have more short term debt. This also implies that debt maturity is an instrument for lenders to deal with problems of asymmetric information (see for example Ortiz-Molina and Penas, 2006). The differences between the short term and long term debt coefficient are statistically significant and economically relevant. This is in contrast with previous studies (see for example Van der Wijst and Thurik, 1993) that find that if total debt is taken into account, most firm characteristics have insignificant effects, since the effects of long term debt and short term debt cancel out.

Finally, we document that SME capital structure varies across industries. Although all relationships discussed above are consistent for each industry separately, the economic impact differs across industries. We find that debt levels vary across industries which are partially rooted in industry characteristics that are not measured by the individual firm's financial characteristics. Furthermore, the impact of profitability on leverage differs substantially across industries showing that the pecking order theory is more at work in some industries (i.e. retail trade non-food and wholesale trade). We conclude however that firm characteristics are more important than industry characteristics in explaining SMEs capital structure.

The remainder of this paper is organised as follows. In Section 2, we review the literature and formulate hypotheses. Section 3 presents the data as well as the applied panel data methodology. We discuss the empirical results in Section 4. Finally, Section 5 concludes.

2. Literature Review and Hypotheses Formulation

Modigliani and Miller (1958) started the capital structure debate by showing that capital structure is irrelevant for firm value. In the vast stream of literature following Modigliani and Miller, the irrelevance proposition has been rejected, but a conclusive answer on what factors make capital structure relevant has not been provided yet. Several theories have emerged to explain capital structure (see Harris and Raviv, 1991 for a review). The first theory is the pecking order theory (Myers and Majluf, 1984; Myers, 1977) which builds upon asymmetric

information between managers and investors. Firms prefer funding from sources with the lowest degree of asymmetric information since borrowing costs increase when obtaining funds from outside lenders who do not have complete information on the borrowers. The implication of the pecking order theory is that firms opt for internally generated funds (a form of inside equity), then for debt, and only as a last resort, for outside equity. This theory also states that there is no optimal debt to equity ratio. The second theory is the trade-off theory which argues that firms balance the tax benefits of debt and the costs of financial distress (see e.g. Brennan and Schwartz, 1978; DeAngelo and Masulis, 1980, and Bradley et al., 1984). These costs increase in the degree of leverage. Firms then try to move towards the optimal ratio when taking decisions on their capital structure. Finally, the market timing theory of Baker and Wurgler (2002) states that management will raise equity in hot equity markets but issue debt in cold equity markets. However, for our research the trade-off theory and the pecking order theory are most relevant as SMEs are typically privately held. Our empirical tests will therefore focus on these two theories.

The trade-off theory and the pecking order theory have a number of predictions regarding the debt-equity choice (see also Heyman et al., 2008). The predictions related to the two theories are summarized in Table 1 and are further discussed below. Next, we formulate explicit hypotheses and also make a distinction between the impacts for short term debt and long term debt.

Table 1: Capital structure theory and expected sign on leverage for explanatory variables.

	Trade-off theory	Pecking order theory
Firm Size	+	+
Collateral	+	+
Profitability	+	−
Growth opportunities	−	+

Firm size is considered as an inverse proxy of bankruptcy costs. The trade-off theory predicts a positive relationship between firm size and leverage, because size is assumed as a proxy for earnings volatility and larger firms are generally more diversified and show less volatility (Fama and French, 2002). Less volatile earnings reduce indirect bankruptcy costs and therefore firms can take on more debt. The pecking order theory also predicts a positive

relationship between firm size and leverage, because more diversification and less volatile earnings mitigate information asymmetry problems. This decreases the costs of debt compared to other sources of finance and therefore it is more likely that debt will be used. Several empirical studies indeed find a positive relationship (Van Dijk, 1997; De Jong, 1999; Fama and French, 2002). Studies that investigate SMEs draw the same conclusion (Michaelas et al., 1999; Cassar and Holmes, 2003; Sogorb-Mira, 2005) and Hall et al. (2004) report this relationship for Dutch SMEs. Hence, the first hypothesis is:

Larger firms have a higher leverage (H1).

The effect of firm size for short term debt in particular has been pointed out by several authors. Michaelas et al. (1999) and Hall et al. (2004) report a significant negative effect of size on short term leverage, although the effect on total leverage is still positive. Sogorb-Mira (2005) finds the same effect, but the results for short term debt are not significant. Ortiz-Molina and Penas (2006) investigate the maturity structure of lines of credit and conclude that size has a positive impact on maturity. The high business risk and informational opacity increase if firms are smaller. Therefore small firms have to rely more on short term debt. Additionally, higher transactions costs (Michaelas et al., 1999) and the relatively weak bargaining position towards banks and other debt providers could explain the use of short term debt. We therefore formulate the following hypotheses:

Firm size is positively related to long term debt (H1a).
Firm size is negatively related to short term debt (H1b).

The firm's *asset structure* is a second factor that determines capital structure. Asset tangibility is assumed to be positively correlated with debt. One way to measure tangibility of assets is collateral. Collateral reduces agency problems with debtholders. It reduces bankruptcy costs and credit risk, because in case of bankruptcy the debtholders can sell off the collateral. Therefore, the trade-off theory predicts a positive relationship between collateral and the debt level. Collateral also reduces the problem of information asymmetry and therefore also the pecking order theory implies a positive influence. De Jong (1999) for example, confirms the positive relationship whereas Titman and Wessels (1988) report a negative relationship, although not statistically significant. The information asymmetry argument is particularly relevant for SMEs since they are more informationally opaque than large firms. For example,

small firms do not have to provide audited financial statements and these statements do not have to be published. Moreover, small businesses do not issue traded securities. For these reasons, collateralized lending is important for SMEs. This can be asset based lending, factoring, fixed-asset lending or leasing. All these types of lending have in common that the granted amount does not primarily depend on the creditworthiness of the entire firm, but on the value of the underlying asset. This decreases the problem of informational opacity, since the value of the collateral can be determined quite well by outsiders and stays relatively stable over time (Berger and Udell, 2006). Michaelas et al. (1999) and Sogorb-Mira (2005) find a positive effect of tangible assets on the debt ratio for SMEs. Hall et al. (2004) report a positive relationship for Dutch SMEs, although it is relatively small. Therefore, our hypothesis regarding asset structure is:

Collateral has a positive effect on the debt ratio (H2).

The impact of collateral on short term and long term debt has been studied before in the empirical literature. For short term debt a negative relationship is reported while for long term debt a positive relationship is found (Van der Wijst and Thurik, 1993; Michaelas, 1999; Hall et al. 2004; Sogorb-Mira, 2005). In the same line of reasoning Ortiz-Molina and Penas (2006) argue that collateral and maturity are substitutes in reducing agency problems. This is based on their result that collateral has a positive impact on loan maturity. Although collateral has a stronger impact on long term debt, it still has a positive effect on short term debt. We therefore supplement hypothesis 2 with:

Collateral has a stronger positive effect on long term debt than on short term debt (H2a).

Liquidity is a second dimension of the asset structure of a firm. Liquidity measures the potential to meet short term debt obligations. An illiquid firm will be restricted in attracting debt, since bankruptcy costs are high. The trade-off theory therefore predicts a positive relationship between liquidity and the debt level. We employ the variable ‘net debtors’ to test for the relationship between leverage and liquidity. It is particularly interesting for SME capital structure because small firms generally put less pressure on collecting payments from customers. These late payments are often offset by late payments to creditors (trade credit). Trade credit is an important way to finance late payments. In the pecking order, trade credit may be on top of the preference list. Suppliers are willing to allow trade credit since they have

a particular informational advantage compared to banks regarding the liquidity of their customers, which alleviates the information asymmetry problem (Berger and Udell, 2006). However, firms cannot delay their payments to creditors beyond a certain point so it can be expected that short term debt will be increased if a firm suffers from late payments. Short term debt comes next in the pecking order. Therefore net debtors has been used as a determinant by Michaelas et al. (1999) and they report positive coefficients for short term debt and long term debt, although the effect on long term debt is negligible. These results give rise to the next hypotheses:

Net debtors is positively related to the debt level (H3).
Net debtors has a stronger positive relationship with short term debt than with long term debt (H3a).

Agency theories and the pecking order theory model the influence of *profitability* on capital structure. The free cash flow theory of Jensen (1986) states that more debt should be used if profits increase: debt truncates the free cash flow and makes it less likely that a manager starts value destroying investment projects. Therefore a positive relationship between debt and profitability is expected. The pecking-order theory predicts the opposite effect of profits. Retained earnings are on top of the preference list to finance investments so profits reduce the necessity to raise debt. Studies using large company data confirm a negative relationship between debt and profitability (Titman and Wessels, 1988; Van Dijk, 1997; Fama and French, 2002) as predicted by the pecking order model. SME oriented studies also support the pecking order relationship (Van der Wijst and Thurik, 1993; Michaelas et al., 1999; Sogorb-Mira 2005). The pecking-order relationship applies to SMEs, because the agency conflict between managers and shareholders does not exist for most SMEs and therefore overinvestment is unlikely to happen. Therefore the next hypothesis is:

Profitability is negatively related to leverage (H4).

Since hypothesis 3a predicts that SMEs rely more on short term debt, it can be expected that profitability is related to the maturity structure of debt as well. Michaelas et al. (1999) find a bigger effect of probability on long term debt compared to short term debt. They argue this is because SMEs prefer short term financing and long term debt will be reduced if internal funding is available. On the other hand, long term debt cannot be amortized easily and short

term debt has higher interest rates. This implies a bigger influence on short term debt and this is validated by several SME studies (Van der Wijst and Thurik, 1993; Cassar and Holmes, 2003; Sogorb-Mira, 2005). Therefore, hypothesis 4 is supplemented with the following statement:

Profitability has a greater negative impact on short term debt than on long term debt (H4a).

According to Jensen and Meckling (1976) and Myers (1977) the agency problems between managers and debtholders particularly apply to firms with *growth opportunities*. Myers (1977), for example, argues that managers may neglect many value creating projects (underinvestment), because equityholders do not earn a profit from all projects if interest payments are high. Therefore the trade-off theory predicts a negative relationship between the debt level and growth opportunities. A different relationship with short term debt is suggested by Myers (1977). Short term debt could overcome the underinvestment problem and would therefore be positively affected by growth while the effect of total debt remains negative. The pecking-order theory predicts a positive effect of growth on leverage. Firms with plenty of growth opportunities are more likely to raise new funds than firms without growth possibilities (De Jong, 1999). Debt is preferred over equity so a positive relationship between growth and debt is predicted. Growth opportunities are often estimated with the amount of R&D expenses, the market-to-book ratio or the relative amount of intangible assets. Titman and Wessels (1988) are the first to consider growth opportunities and use several proxies to test it. They report a negative relationship for both long term debt and short term debt. Fama and French (2002) find a negative relationship between R&D expenses and leverage. Their explanation is that growing firms want to keep debt levels low such that they have a low risk debt capacity in the future. This financial flexibility argument is confirmed by Graham and Harvey (2001) in their CFO survey study. Another reason for a negative relationship of growth opportunities could be that assets needed for future growth are poor collateral. SME studies find evidence for a positive relationship of debt with expected future growth. Sogorb-Mira (2005) and Michaelas et al. (1999) use the amount of intangible assets as a proxy for growth opportunities and both studies find positive and significant coefficients. Sogorb-Mira (2005) reports a stronger positive effect of growth opportunities on long term debt, but a negative impact on short term debt. Michaelas et al. (1999) find a positive impact on short term debt. For growth, SMEs rely more on short term debt, because of severe information asymmetry problems. Past or current growth in sales or assets is often used as a proxy for

growth opportunities. De Jong (1999) argues that current growth signals that the firm is in an expanding market and has the ability to grow in the future.

Growth opportunities positively relate to leverage (H5).

We also briefly discuss expected impacts from taxation and industry effects (the expected effects are not included in Table 1, however). Miller and Modigliani (1963) have argued that firms prefer debt financing because of the tax shield so a positive relationship between the tax rate and leverage can be expected. Jordan et al. (1998), Michaelas et al. (1999) and Sogorb-Mira (2005), however, find the opposite relationship for SMEs. An explanation could be that the tax status of a company is not informative. Sogorb-Mira (2005) argues that SME managers chose other instruments to lower their tax payments. Jordan et al. (1998) argue that especially for SMEs, taxes negatively affect debt levels simply because taxes lower retained earnings. The total tax burden of a firm is not solely determined by the tax rate, but by taxable income as well. Some authors argue this is even more important than testing the tax rate itself (Van Dijk, 1997). Interest payments reduce taxable income, but other items can do the same. These non-debt tax shields could substitute the tax shield of debt (Titman and Wessels, 1988). Hence, a negative relationship with the debt ratio is expected. Titman and Wessels (1988) did not report a statistically significant impact. Fama and French (2002) report a significant negative relationship for large firms and other studies find the same result for SMEs (Van der Wijst and Thurik, 1993; Heshmati, 2001; Sogorb-Mira, 2005). Michaelas et al. (1999) find a positive relationship for SMEs, but their results were not statistically significant. In the empirical section below, we will also test for tax effects but do not formulate an explicit hypothesis.

The empirical investigation of industry effects deals with the question to what extent capital structure variation between firms is explained by industry characteristics compared to firm characteristics. In their study, Balakrishnan and Fox (1993) find that 52% of capital structure variation is explained by firm effects and 11% by inter-industry differences. MacKay and Phillips (2005) report similar percentages for firm and inter-industry effects. However, they also investigated intra-industry effects and these effects account for 33% of capital structure variation. Michaelas et al. (1999) use industry fixed effects to test a hypothesis whether industry effect have an influence on SME capital structure. They find significant coefficients for industry dummies but the impacts are primarily on short term debt. Many industry

attributes could be captured by the firm specific characteristics discussed earlier, but some are not. We will investigate whether industry effects are important in the capital structure choice of SMEs and link it back to the importance of the two capital structure theories for the different industries.

3. Description of the Data and Research Methodology

3.1 Description of the Data

The data we employ have been kindly provided by Rabobank, a large Dutch financial institution. The database, managed by an independent research institute, contains financial statements of the bank's SME clients. Many clients, particularly if they have a loan, have to provide their balance sheet and income statement every year. Rabobank is active in all industries, provinces, and grants loans to many small firms. The data set can therefore be considered as representative for the Dutch setting.

Firms are included in the data set when they have less than € 20 million annual sales over the period 2002-2005, and when they report at least two annual accounts within this period.[3] This implies the data is an unbalanced panel. While the bank is active in all industries, the data set does not contain firms active within the agricultural sector, and the energy and utilities sector. Additionally, we removed financial firms from the database as is commonly done in capital structure studies: financial institutions are imposed to capital requirements and may have inherently a different capital structure. Moreover, associations (e.g. sport clubs, political organizations, labour unions) are removed, because they do not have commercial activities and often rely on governmental funding. Finally, we remove all entries with data errors. Our data set contains 103,217 firm-year observations. We noticed that the number of observations in 2005 decreased substantially (with more than 30%) compared to 2003 and 2004, which is probably caused by the way the data was collected. Whether this decline in observations has an impact on the empirical results, is investigated in the robustness section 4.3 below.

[3] In the analysis, all observations for 2002 are lost because it was needed to calculate the growth variable as discussed below.

The dependent variable of the analysis is capital structure. The most commonly employed measure is the total debt ratio, i.e. the relative amount of debt (leverage), defined as total debt over total assets. We also consider the short term and long term debt ratio separately. Definitions and descriptive statistics are given in Table 2. Debt is measured by its book value. Market values are not known for SMEs and most entrepreneurs and most SME managers will base their financing decisions on book values. Table 2 shows that Dutch SMEs have much more long terms loans than short term loans (80% of total debt is long term debt). This is in contrast to Hall et al. (2004) who report an average long term debt level of just 2% for Dutch SMEs. The numbers in Table 2 are also different from statistics reported for other countries. Sogorb-Mira (2005) reports that for Spanish SMEs 15% of total debt is long term debt and Michaelas et al. (1999) find that for UK SMEs the ratio is 29% (in 1995). It is important to note that the maturity of debt does not tell anything about the flexibility of the interest rate. Although many loans of the SMEs in our data set are long term loans, interest rates are often flexible.

The following firm characteristics enter as determinants of capital structure: firm size, tangible fixed assets, net debtors, profitability, intangible assets, asset growth, effective corporate tax rate and depreciation. The inclusion of these variables is based on our hypotheses and past empirical studies, as documented in Section 2. Table 2 also provides descriptive statistics on our independent variables. Firm size is measured as the log of total assets. Total assets is the most common proxy for size in the empirical literature. A measure for asset structure is tangible assets. Tangible assets are all fixed assets except intangible fixed assets and excluding inventories (see Titman and Wessels, 1988; Sogorb-Mira, 2005). As opposed to real estate and equipment, inventories are short term assets and therefore expected to be poor collateral. Net debtors is measured by the difference between debtors and creditors, scaled by total assets (Michaelas et al. 1999). Table 2 shows that the firms in our sample can be characterised by having much more tangible than intangible assets. In addition, on average net debtors is small. Profitability is defined as earnings before interest, taxes and depreciation (EBITD). The profit numbers of non-incorporated business are corrected for an owner's wage.[4] Depreciation is not deducted in all empirical studies, but if the aim is to test how managers change their debt position with profits, managers will very likely take into account

[4] Net profit (before tax) of non-incorporated firms has been adjusted with a proxy for the average Dutch income for a small business director, which is € 40.000.

the cash position. Moreover, depreciation is already used as a measure for non-debt tax shield. To measure the effect of profitability, we use return on assets (ROA), which is defined as EBITD scaled by total assets. The proxy for growth opportunities is the relative amount of intangible assets (Michaelas, 1999; Sogorb-Mira, 2005). Intangible assets refer to assets that are expected pay off in the future, such as brand names, goodwill or research and development expenses. Current growth is measured by the relative yearly change in total assets. As a result, all observations for 2002 are lost, which implies that the first year of our analysis is 2003.

Table 2 Descriptive statistics

	Definition	Mean	Std. Dev.	Median	Maximum	Minimum
Total debt	short term debt/total assets	0.387	0.260	0.388	1.585	0
Long term debt	long term debt/total assets	0.307	0.252	0.284	1.452	0
Short term debt	total debt/total assets	0.080	0.116	0.027	1	0
Size (log)	log of total assets	6.075	1.351	6.078	11.382	0.693
Tangible assets	tangible fixed assets/total assets	0.485	0.287	0.494	1	0
Net debtors	(debtors - creditors)/total assets	0.046	0.146	0.018	0.587	-0.534
ROA	EBITD/total assets	0.158	0.320	0.133	7.286	-14.000
Intangible assets	intangible assets/total assets	0.017	0.067	0.000	1	-0.144
Growth (assets)	(tot.assets (t) - tot.assets (t-1))/total assets(t-1)	0.134	0.436	0.018	3.300	-0.600
Tax rate	Taxes paid/earnings before tax	0.095	0.265	0	4.054	-3.998
Depreciation	depreciation expense/total assets	0.080	0.071	0.061	3.500	0

Notes: The amount of taxes paid is not directly observed. The amount is derived by multiplying the return on equity (which is based on profits after tax) by the amount of equity. This gives the profits after taxes. Deducting this for the profits before tax, gives an implied measure of taxes paid.

The effective corporate tax is measured as the amount of company taxes divided by the profit before tax. This variable is not scaled by total assets, since the amount of taxes depends on profits. Non-debt tax shields lower taxable income and can therefore substitute for the tax benefits of debt. Titman and Wessels (1988) introduced depreciation as a proxy for non-debt tax shields, but did not find significant effects. A problem with depreciation as a proxy for non-debt tax shields is that it can also be an indicator for fixed assets. Van Dijk (1997) reports a high correlation (i.e. 0.495) between depreciation and fixed assets. Since he finds a significant negative relationship between depreciation and leverage he argues that it is unlikely that a firm's collateral value (for which depreciation can be a proxy as well) has a positive influence on leverage. Nevertheless, depreciation is used by many other empirical studies (e.g. Fama and French, 2002; Sogorb-Mira, 2005).

3.2 Econometric model

We employ panel data analysis to test the capital structure theories as our data set includes observations over several years. Some firms appear twice while others appear for all four years, which makes the dataset unbalanced.

We index all variables with an i for the individual[5] ($i = 1,...,N$) and a t for the time period ($t = 1,...,T$). The general static panel data regression model can then be written as

$$y_{it} = \beta_0 + x_{it}'\beta + \varepsilon_{it}, \quad i = 1,...,N \text{ and } t = 1,...,T, \tag{3.1}$$

Where x_{it} is a *K*-dimensional vector of explanatory variables, which does not contain an intercept term. This model imposes that the intercept β_0 and the slope coefficients in β are identical for all individuals and time periods.

A frequently employed panel data model assumes that $\varepsilon_{it} = \alpha_i + u_{it}$ where u_{it} is assumed to be homoskedastic and not correlated over time. The component α_i is time invariant and homoskedastic across individuals. In our empirical analysis however we use the fixed effects model because it is most appropriate for two reasons. First, the fixed effects model introduces an individual-specific intercept term that could capture specific entrepreneurial skills or many other factors that could make a small firm unique. Berger and Udell (2006) argue that the management capabilities of the entrepreneur are a crucial factor in SME financing. Banks take into account the track record of the entrepreneur and their personal relationship with the entrepreneur if they grant a loan. It is expected that these arguments are particularly relevant for the database used in this research, since this database contains many very small firms. These firms often have no or just a few employees and the entrepreneur does not devote much time to financial control. Furthermore, the data covers almost all sectors of the Dutch economy (see above). Hence, the sample cannot be considered a random sample from a much larger population of industries. Several SME capital structure studies use a fixed effects panel data model as well (Van der Wijst and Thurik, 1993; Michaelas et al. 1999; Sogorb-Mira,

[5] While we refer to the cross-sectional units as individuals, in our empirical section below they refer to firms and industries respectively.

2005). Second, in addition to an intuitive economic reasoning, the nature of the unobserved effects has been statistically verified with a (not reported) Hausman test. This test rejects the null hypothesis that the explanatory variables and the individual effects are uncorrelated. A fixed effects model can cope with correlation between explanatory variables and individual effects and therefore it is statistically preferred (see also Verbeek, 2008, pp. 367-369).

In a fixed effects regression model it is assumed that all x_{it} are independent of all u_{it}. The regression model includes *N* dummy variables for the individual intercepts. That is,

(3.2) $$y_{it} = \sum_{j=1}^{N} \alpha_j d_{ij} + x_{it}^{'} \beta + u_{it}, \quad i = 1,...,N \text{ and } t = 1,...,T,$$

where $d_{ij} = 1$ if $i = j$ and 0 elsewhere. We thus have a set of *N* dummy variables in the model. The implied estimator for β is referred as the least squares dummy variable (LSDV) estimator. A model like this will include many dummy variables which makes it computationally unattractive. However, the same β estimator is retrieved if the regression is performed in terms of deviations of individual means. Note that:

(3.3) $$\bar{y}_i = \alpha_i + \bar{x}_i^{'} \beta + \bar{u}_i, \quad i = 1,...,N.$$

Consequently it can be written that:

(3.4) $$y_{it} - \bar{y}_i = (x_{it} - \bar{x}_i)^{'} \beta + (u_{it} - \bar{u}_i), \quad i = 1,...,N \text{ and } t = 1,...,T.$$

This is a regression model in deviations from individual means and does not include the individual effects. The OLS estimator for β is called the within estimator since it concentrates on differences within a firm, not between firms and it is exactly identical to the LSDV estimator described in equation (3.2) above.

4. Empirical Results

Section 4.1 discusses the main results of our regressions using the full sample. For every firm characteristic the corresponding hypotheses are reviewed and the outcome is compared with earlier studies. The results of the industry tests are discussed in section 4.2. Section 4.3 provides the results of several robustness checks, while in Section 4.4 we summarize all findings.

4.1 Full Sample Estimates

The results of the firm fixed effects panel data regressions for total debt, long term debt and short term debt are reported in the second, fourth and sixth column of Table 3, respectively.

Table 3: Leverage: Fixed Effects Panel Regressions with Firm Characteristics

	Total debt			Long term debt			Short term debt		
	Estimate		t-value	Estimate		t-value	Estimate		t-value
Size (log)	0.099	*	29.803	0.105	*	34.116	-0.006	*	-3.293
Tangible assets	0.463	*	62.392	0.486	*	69.040	-0.023	*	-5.665
Intangible assets	0.412	*	16.521	0.457	*	19.929	-0.045	*	-4.764
Net debtors	0.200	*	28.325	0.080	*	13.051	0.120	*	24.685
ROA	-0.137	*	-22.840	-0.053	*	-11.703	-0.084	*	-22.433
Growth (assets)	0.018	*	12.642	0.017	*	13.170	0.000		0.124
Tax rate	-0.009	*	-6.302	-0.006	*	-4.186	-0.003	*	-4.071
Depreciation	0.165	*	8.129	0.072	*	4.069	0.093	*	7.224
adj. R^2	0.296			0.325			0.048		

Notes: This Table provided the estimation results for equation (3.4) using the complete sample. A '*' indicates the estimate is significant at the 1 % level. Variable definitions are presented in Table 2.

In all three models most of the individual parameters are statistically significant. The estimates presented in Table 3 confirm hypothesis H1. Larger firms have higher leverage. A one standard deviation change in log size implies a 13.4 percentage point increase in total debt. In addition, hypotheses H3a and H3b are confirmed as well. The coefficient for size in the long term debt regression is significantly positive, while for the short term debt regression it is significantly negative. This shows that larger firms rely more on long term finance and use less short term finance, although the increase in long term debt outweighs the decrease in short term debt. These results are in line with previous studies on SMEs (see for example Van der Wijst and Thurik, 1993 and Soborg-Mira, 2005). Larger firms are more aware of better financing methods since they employ more financial and administrative staff and may have a

stronger bargaining position towards lenders. It is not likely that larger firms have more debt because they have more collateral, since the correlation between size and tangible assets is very low (-0.01). Long term debt is more risky for a lender and therefore firm size is used as a proxy for this risk. Larger firms are often more diversified and have a known track record which enables a lender to make a better assessment of the risks involved.

Strong support is found for hypothesis H2 concerning the positive relationship between debt and collateral: a one standard deviation increase in tangible assets implies a 13.3 percentage point increase in total debt. Collateral is very important for SMEs since it helps to overcome informational problems. The positive effect on total debt is almost entirely explained by the effect on long term debt, as short term debt is just marginally affected by collateral. Since collateral appears to be the best way to mitigate risk of SMEs, these firms can fully use their collateral to attract long term debt. For the firm, the costs of long term debt are lower because banks are charging (relatively) higher interest rates on short term loans. These findings are in accordance with the maturity matching principle that long term assets are financed with long term financing and short term assets are financed with short term funds.

There is also strong support for hypotheses H3 and H3a. Net debtors, financed with both long term and short term debt, positively affect the debt level. The empirical results show that the effect is larger for short term debt. This also provides evidence for the maturity matching principle. The positive coefficient for long term debt probably relates to a fixed amount in the debtors level that is relatively stable over time. That fixed amount can be used to attract long term debt. Since net debtors affect both long term and short term debt, it can be argued that net debtors is a measure for liquidity of the firm and therefore a proxy for firm risk. Firms with a low net debtors ratio will have lower debt ratios (ceteris paribus): a one standard deviation decrease in net debtors lowers the debt ratio with about 3 percentage points.

Profitability is negatively related to the total debt ratio and this supports hypothesis H4. A one standard deviation increase in ROA lowers the total debt ratio with 4.4 percentage points. Debt levels are lower if a firm generates profits. This suggests that SME managers prefer internal financing first, as predicted by the pecking order theory. The most likely reason is that they want to stay in control and avoid debt as much as possible (Vos et al., 2007). This result shows that the agency problem of free cash flow is nonexistent in SMEs, because they do not have public equity and typically ownership is concentrated. The negative relationship

between profitability and debt applies both to long term debt and short term debt, but the effect on short term debt is larger. This provides support for hypothesis H4a and is consistent with previous studies by Van der Wijst and Thurik (1993), Cassar and Holmes (2003) and more recently Soborg-Mira (2005) for Spanish data. Short term debt can be amortized easily. Moreover, it implies that more profitable firms are allowed to take on more long term debt. Our findings are contrary to the result of Michaelas et al. (1999) who argue that small firms would prefer short term debt and would therefore use profits to reduce long term debt.

Support for the pecking order theory is also provided with the results of growth opportunities and asset growth. Firms with a lot of intangible assets have less short term debt. If intangible assets are considered to be a good proxy for growth opportunities, SMEs are very well able to finance their future growth with long term debt. It is however important to note that many firms in the database have no intangible assets on their balance sheet (see Table 2). Therefore, is has to be taken into account that although the coefficients for tangible and intangible assets are almost the same, in an economic sense tangible assets are more important.

The agency theory of Myers (1977) is not supported by the results for growth opportunities. The underinvestment theory argues that if the expected return does not reach a certain threshold level, the firm does not invest. This threshold level is more difficult to reach if interest payments are high. However, SME managers do not stick to a particular required return and sometimes invest in projects that are not very profitable for them. Firm continuity plays an important role in the investment decisions of SMEs and therefore the underinvestment problem of Myers (1977) does not apply to Dutch SMEs.

The results for asset growth do not change the conclusion drawn for hypothesis H5. The coefficients on asset growth are low, but a positive effect of asset growth on long term debt is found. Therefore, our empirical results support hypothesis H5, which is in line with Michaelas et al. (1999). In the period under investigation (2002-2005) the average total assets per firm has increased. The growth in total assets is mainly due to an increase in fixed assets which implies that firms invested more and could attract external financing for this. However, in the same period, interest rates have declined making it likely that firms used that opportunity to opt for long term loans. Unfortunately, the effect of loan rates can not be studied more in depth due to data availability.

The results in Table 3 indicate that the tax rate has a significant, but economically negligible effect on total debt and long term debt. Firms not exposed to corporate taxation have to pay the standard Dutch rate of 30%. Therefore the model implies that at this tax rate the long term debt ratio of SMEs will decrease by 0.18% (ceteris paribus) while the short term debt ratio decreases with 0.09% (ceteris paribus). This finding is in line with the results of Michaelas et al. (1999) who also report negative, but small effects of taxes. A possible explanation is that high taxes stem from high profits, which in turn decreases the need for debt (Jordan, et al., 1998). This effect is small since the Netherlands has a proportional tax system with an upper limit for the tax rate.

The second measure of the tax effect, depreciation, shows significant positive coefficients. This is in line with previous findings for large firms by Fama and French (2002) and SMEs by Sogorb-Mira (2005). However, Van Dijk (1997) mentions that depreciation is probably not a suitable measure for non-debt tax shields. He suggests depreciation is a measure for fixed assets and is positively correlated with collateral. This correlation is positive, but small (0.10). Therefore, depreciation is not a substitute for collateral. Another explanation could be that depreciation measures the amount of investments required to maintain the fixed assets in place. If depreciation is high, the assets have to be replaced quicker which requires financing.

Overall, we do not find that Dutch SMEs take into account corporate taxation in their capital structure decision. It is important to note that many firms in our database do not have to pay corporate taxes. The most likely reason for the nonexistence of a tax effect is the desire of SME owners to stay in control and avoid a bank's involvement in their business (Vos et al., 2007). A reduced tax bill probably does not outweigh the interest payments and loss of control.

Summarizing, the empirical evidence shows that economically the most relevant firm characteristics for both total debt and long term debt are firm size and tangible assets. Profitability and inventories are economically most relevant in explaining variation of short term debt.

4.2 Investigating industry effects

In this section we employ two approaches to show that there are capital structure differences across industries. First, we estimate the fixed effects model with firm characteristics for each industry separately and test whether there is significant cross-sectional variation in the estimated coefficient for each firm characteristic. This helps us to study which capital structure theories are most relevant for which industries. Second, equation (3.4) is estimated using industry fixed effects. This answers the question to what extent the industry classification itself does affect capital structure.

We confirm that all the conclusions regarding the hypotheses are the same for all industries individually**,** suggesting that the pecking order theory is most relevant for all industries studied. The industry sample regressions compute a coefficient for every firm characteristic per industry (see Table A1 in the Appendix). Variation in these coefficients implies whether the relationship between a firm characteristic and capital structure can differ in sign and magnitude across industries, providing insights on the relevancy of the capital structure theories for different industries. The standard deviation of the cross section of the individual estimates for the eight different industries is used as a measure for this variation. The results of the industry sample regressions are compared with the general model. Table 4 presents the estimates for the variation measure as well as the results for individual Wald tests. These tests investigate whether all the coefficients for a firm characteristic are equal across industries. If the Wald test hypothesis is rejected, the relationship is different for at least one industry.

The test results indicate that for most firm characteristics the relationship with the debt level varies significantly across industries. This variation (measured with the standard deviation) is particularly large for net debtors and intangible assets. Net debtors show high coefficients for both retail industries (food and non-food) (see the individual industry estimates in the appendix below). This implies that liquidity is relatively more important in these industries. On average, retail firms have negative net debtors, since most customers pay in the shop while suppliers are paid on credit. The differences in the estimates for intangible assets are difficult to explain as it not exactly clear what is captured with this variable. It is likely that in the manufacturing industry R&D represents a large part of the intangible assets whereas in the services industry it is represented by goodwill. The estimate for intangible assets, reported in Table A1 in the Appendix, is particularly large for wholesale trade. For the transport industry

the relationship is small, but this can be explained by the fact that firms in this industry have very low average intangible assets.

Table 4: Industry Effects and Leverage: Variation of Parameter Estimates across Industries

	Total debt			Long term debt			Short term debt		
	St. dev. of Estimates		Wald test	St. dev. of Estimates		Wald test	St. dev. of Estimates		Wald test
Size (log)	0.013	*	3.442	0.022	*	8.113	0.014	*	6.243
Tangible assets	0.045	*	4.269	0.053	*	5.539	0.036	*	13.291
Intangible assets	0.100	*	3.492	0.092	*	3.648	0.037	*	2.616
Net debtors	0.103	*	17.557	0.079	*	14.419	0.049	*	7.465
ROA	0.058	*	21.806	0.039	*	14.108	0.024	*	8.529
Growth (assets)	0.004		0.540	0.003		0.867	0.002		1.009
Tax rate	0.001		1.317	0.002	*	3.956	0.001		1.209
Depreciation	0.072		1.429	0.080	*	2.762	0.028		0.701

Notes: This table presents the standard deviation of the estimates for 8 industries in addition to Wald tests that indicate whether the individual estimates are the same across industries. A '*' indicates that the standard deviation of the industry cross section of estimates is significant at the 1% level. Definitions of all variables are presented in Table 2.

Tangible assets is the most important firm characteristic in all industries (see Table A1 in the Appendix). Leisure & catering has a much smaller estimate, because banks consider this sector as very risky. Collateral is often poor, since most restaurants and cafés do not own real estate and pay relatively high rents. The results show that manufacturing, construction and transportation firms have the strongest coefficients for tangible assets. This can be explained by the fact that, on average, these industries have good collateral.

The effect of profitability on leverage is particularly high in the wholesale trade, retail trade non-food and transport sectors, see Table A1 in the appendix, revealing that the pecking order theory is more at work in those industries. Also note that the catering and leisure industry is the only industry in which the effect on long term debt is larger than on short term debt. Profits reduce long term debt more than short term debt. This is possibly due to the high industry risk as discussed earlier. Interest rates on long term debt are higher compared to other industries, making short term debt relatively more attractive. Another reason could be that banks urge these firms to reduce their long term borrowing because of the high business risk.

While the effect of profitability is significantly different across industries, the effect of growth is not. This implies that the impact of the difference in relevancy of the pecking order theory across industries only stems from profitability and not growth.

The second part of our study on industry impacts investigates industry fixed effects, without adding other firm control variables. Table 5 shows the results of a regression of industry dummies only on firm debt levels, where the dummy for the manufacturing industry has been omitted. The estimates should be interpreted as the difference in the average debt level of a particular industry with the manufacturing industry.

Table 5: Industry Effects and Leverage: Dummy variable coefficient of average debt ratios for eight industries.

	Total debt		Long term debt		Short term debt	
	Estimate	t-value	Estimate	t-value	Estimate	t-value
Manufacturing	Omitted		Omitted		Omitted	
Construction	-0.057 *	-18.516	-0.049 *	-16.678	-0.008 *	-6.101
Wholesale trade	-0.026 *	-7.956	-0.056 *	-18.658	0.031 *	19.522
Retail trade food	0.080 *	16.568	0.082 *	17.445	-0.002 *	-1.163
Retail trade non-food	0.062 *	21.082	0.027 *	9.406	0.036 *	25.542
Catering & leisure	0.131 *	37.309	0.150 *	43.059	-0.018 *	-13.595
Transport	0.109 *	27.914	0.122 *	32.235	-0.013 *	-9.077
Services	-0.035 *	-11.866	-0.025 *	-8.745	-0.010 *	-8.140
adj. R^2	0.062		0.070		0.033	

Notes: This table presents estimates of a model with industry dummies only. The manufacturing industry is treated as the constant. The average total debt level in the manufacturing industry is 0.370, 0.296 for long term debt and 0.074 short term debt. A '*' indicates the estimate is significant at the 1 % level.

All differences in debt ratios across industries are statistically significant. The adjusted R^2 shows that 6.2% of the cross-sectional variance in total debt ratios is explained by industry classification only. For long term debt the explained variance is 7% and for short term debt 3.3%. Clearly, for all three debt measures this is less than the regression with firm characteristics (29.6%, 32.5% and 4.8% respectively such as presented in Table 3 above), but for the short term debt ratio the difference is very small. These results indicate that there is more variation in leverage ratios within the industry than across industries which is in contrast with earlier findings by Bradley et al. (1984). In their analysis, 54% of the variation in debt ratios is explained by the industry classification. Note however that their results are based on data from publicly listed firms.

Next, we run an industry fixed effects panel regression where we now also include firm characteristics. The results of Table 6 show that industry characteristics do have an effect on capital structure, but this effect could very well be explained by difference in the firm characteristics particular to that industry. Differences in industries are partially captured by differences in firm characteristics. For example, the transport industry is known for its high amount of fixed assets, whereas an average wholesale trade firm has relatively more liquid assets. The table provides the estimates for the industry fixed effects panel regressions with firm characteristics.

Table 6: Leverage: Fixed Effects Panel Regressions with Firm Characteristics and Industry Fixed Effects

	Total debt			Long term debt			Short term debt		
	Estimate		t-value	Estimate		t-value	Estimate		t-value
Manufacturing	Omitted			Omitted			Omitted		
Construction	-0.038	*	-14.714	-0.024	*	-10.582	-0.014	*	-10.100
Wholesale trade	0.032	*	11.452	0.003		1.351	0.028	*	18.277
Retail trade food	0.023	*	5.655	0.021	*	5.448	0.002		1.201
Retail trade non-food	0.091	*	34.143	0.058	*	24.767	0.032	*	22.795
Catering & leisure	0.006	**	2.056	0.016	*	5.603	-0.010	*	-7.186
Transport	0.015	*	4.551	0.022	*	7.149	-0.007	*	-4.593
Services	-0.032	*	-12.860	-0.021	*	-9.421	-0.011	*	-8.509
adj. R^2	0.338			0.424			0.070		

Notes: This table presents the results of a regressing including firm characteristics and industry characteristics. Only the estimates for the industry dummies are presented. A '*', '**' indicates the estimate is significant at the 1%, 5% level respectively.

From the estimates in Table 6, it is clear that differences in firm characteristics cannot explain the difference in industry fixed effects on SME capital structure. This is evidence that some other characteristics of an industry are important determinates of the SME debt ratio. For example, the competitive position of a firm within an industry could very well be an important factor for capital structure (see for example MacKay and Phillips, 2005).

The industry with the strongest fixed effect is retail trade non-food. This industry has a leverage ratio that is above average, while important firm characteristics such as profitability and collateral are below average. They retail food industry is known for its low equity ratio since it is an extremely competitive industry. This is probably the reason why higher debt ratios are observed.

4.3 Robustness checks

We now document the results of several robustness checks. When describing the data it has been mentioned that for reasons not known to us, for 2005 there are more than 30% fewer observations compared to 2004 and 2003. This decline in observations may lead to biased empirical results if there was a systematic drop of particular firms in the sample. Although there are much fewer observations, the distribution of firms across industries in 2005 is not different from the other years and the proportion of firms with negative equity is the same in all four years. Therefore, at first glance the 2005 data should not cause any problems. As a formal test, a fixed effects model has been estimated that includes interaction terms of all firm characteristics with a 2005 dummy. The results are reported in Table 7.

Table 7: Leverage: Fixed Effects Panel Regressions with Firm Characteristics and 2005 Interaction Dummies

	Total debt			Long term debt			Short term debt		
	Estimate		t-value	Estimate		t-value	Estimate		t-value
Size (log)	0.103	*	24.760	0.108	*	27.742	-0.005	**	-2.124
Tangible assets	0.459	*	52.657	0.479	*	58.052	-0.020	*	-4.241
Intangible assets	0.402	*	13.685	0.447	*	16.414	-0.045	*	-4.108
Net debtors	0.203	*	24.809	0.083	*	11.567	0.120	*	21.525
ROA	-0.135	*	-19.717	-0.051	*	-9.633	-0.085	*	-20.082
Growth (assets)	0.017	*	10.838	0.017	*	10.938	0.000		0.471
Tax rate	-0.008	*	-4.951	-0.005	*	-3.216	-0.003	*	-3.255
Depreciation	0.156	*	6.738	0.066	*	3.200	0.090	*	5.986
Size × 2005	-0.010		-1.420	-0.007		-1.146	-0.003		-0.661
Tangible assets × 2005	0.013		0.787	0.022		1.403	-0.009		-1.010
Intangible assets × 2005	0.030		0.550	0.029		0.578	0.001		0.061
Net Debtors × 2005	-0.012		-0.756	-0.010		-0.707	-0.002		-0.208
ROA × 2005	-0.009		-0.636	-0.011		-1.020	0.002		0.180
Growth × 2005	0.000		-0.103	0.001		0.440	-0.002		-1.030
Tax rate × 2005	-0.004		-1.146	-0.003		-0.868	-0.001		-0.577
Depreciation × 2005	0.034		0.716	0.023		0.590	0.010		0.356
adj. R^2	0.296			0.325			0.049		

Notes: Definitions of all variables are presented in Table 2. 2005 indicates a dummy variable equal to 1 when the observation stems from 2005, and 0 otherwise. A '*', '**' indicates the estimate is significant at the 1%, 5% level respectively.

All the interaction terms in Table 7 are insignificant. A Wald test to test if all 2005 interaction terms are jointly significant is rejected. Therefore we conclude that the results are robust in the time dimension.

A second robustness check is related to the tax effect. Only incorporated firms have to pay corporate taxes so for many firms no taxes are reported in the database. To ensure this does not bias the results, an interaction term has been added to the regressions. This interaction term consists of a dummy variable that is 1 for incorporated firms and 0 otherwise. This dummy is multiplied with the tax rate variable. The results of the firm fixed effects regressions with the tax interaction term are reported in Table 8.

Table 8: Leverage: Impact of Taxes and Incorporated firms

	Total debt		Long term debt		Short term debt		
	Estimate	t-value	Estimate	t-value	Estimate		t-value
Tax rate	-0.028 **	-2.018	-0.019	-1.392	-0.010 *		-2.852
Tax rate × Incorporated	0.018	1.435	0.013	0.999	0.007		1.948
adj. R^2	0.296		0.325		0.049		

Notes: Only the estimates for the tax rate effects are presented. A '*', '**' indicates the estimate is significant at the 1%, 5% level respectively. A definition of tax rate is presented in Table 2. Incorporated indicates a dummy variable that is 1 for incorporated firms and 0 otherwise.

The effect of tax on the debt level is not statistically significant for incorporated firms and the coefficients are economically negligible. Therefore, the conclusions drawn earlier regarding the relationship between tax and leverage are robust. Also for incorporated firms no tax effect has been found.

The final robustness check concerns the maturity matching principle. The results as discussed in section 4.1 indicate that this principle applies to SME capital structure. However, the results of the regression for short term debt show primarily negative estimates. The positive estimate for net debtors implies a very small economic impact. The maturity matching principle states that short term assets are financed with short term assets and therefore the variable inventories, another short term asset, is added to the regressions. Previous studies such as Titman and Wessels (1988) and Michaelas et al. (1999) consider inventories as tangible fixed assets, but if the maturity matching principle is true, inventories should positively relate to short term debt and have no significant relationship with long term debt since inventories are a short term asset. For tangible fixed assets this effect is reversed. The results for the firm fixed effects regressions with inventories are presented in Table 9.

The coefficients for inventories are significant for short term debt but insignificant for long term debt. In the short term model inventories are now the most important factor. This

provides more evidence for the maturity matching principle. Moreover, the adjusted R^2 for the short term debt model increased from 4.8% to 6.7% which implies that more of the variation in the short term debt ratio is explained by this extended model. The adjusted R^2 for long term debt is similar to the model which does not include inventories as explanatory variable.

Table 9: Leverage: Fixed Effects Panel Regressions with Firm Characteristics including Inventory

	Total debt			Long term debt			Short term debt		
	Estimate		t-value	Estimate		t-value	Estimate		t-value
Size (log)	0.105	*	31.459	0.106	*	33.943	0.000		-0.195
Tangible assets	0.495	*	66.044	0.488	*	67.254	0.008	**	1.974
Net debtors	0.219	*	30.847	0.081	*	13.081	0.137	*	28.409
ROA	-0.136	*	-23.002	-0.053	*	-11.693	-0.083	*	-22.543
Intangible assets	0.436	*	17.403	0.458	*	19.927	-0.022	**	-2.363
Inventories	0.206	*	14.378	0.011		0.851	0.195	*	20.110
Growth (assets)	0.020	*	14.160	0.018	*	13.210	0.002	*	2.830
Tax rate	-0.009	*	-6.217	-0.006	*	-4.182	-0.003	*	-3.987
Depreciation	0.163	*	8.071	0.072	*	4.076	0.092	*	7.125
adj. R^2	0.302			0.325			0.067		

Notes: A '*', '**' indicates the estimate is significant at the 1%, 5% level respectively. Definitions of all variables are presented in Table 2.

4.4 Summary of the Empirical Results

The hypotheses and the results of the regressions with firm characteristics have been summarized in Table 10.

Table 10: Overview of the Hypotheses and the Empirical Results

	Total debt		Long term debt		Short term debt	
	Hypothesis	Result	Hypothesis	Result	Hypothesis	Result
Size of the firm	+	+	+	+	-	-
Collateral	+	+	++	++	+	-
Net debtors	+	+	+	+	++	++
Profitability	-	-	-	-	--	--
Growth opportunities	+	+	+	+	+	-
Current growth	+	+	+	+	+	0 ns
Taxes rate	+	-		-		-
Non debt tax shield	-	+	-	+	--	+
Industry effects	$\neq 0$	+	$\neq 0$	++	$\neq 0$	+

Notes: This table provides an overview of the tested hypothesis, where 'ns' indicates not statistically significant. A double sign (-- or ++) indicates that if the signs for long term debt and short term debt are the same, the coefficient is more pronounced (in absolute values) compared to the other debt category.

Overall, the empirical results are in favour of the pecking order theory. The results show that firms prefer internal funding, because profits are negatively related to debt. Profitability has a stronger effect on short term debt, which implies long term debt is preferred over short term debt. In the pecking order retained earnings are on top of the preference list, followed by long term debt and finally short term debt. The results for growth also support the pecking order theory. The effect is relatively small, but growth has a positive effect on debt, particularly long term debt. These results contradict the predictions of the trade-off theory. Moreover, the trade-off theory is rejected since no evidence for the tax effect is found. The corporate tax rate has no significant effect on leverage and for depreciation positive coefficients are reported.

The results also demonstrate the importance of the maturity structure of debt. Except for taxes, all the remaining estimates differ significantly between short term debt and long term debt. This implies the maturity structure is an instrument for lenders to deal with information asymmetry problems (see for example Ortiz-Molina and Penas, 2006). This result is contradicting previous findings by Van der Wijst and Thurik (1993). They show that if total debt is taken into account, most firm characteristics have non-significant effects, since the effects of long term debt and short term debt cancel out.

5. Concluding Remarks

This paper provides empirical evidence on capital structure decisions of Dutch small firms using a large proprietary panel data set. We find empirical evidence that supports the predictions of the pecking order theory. SMEs use profits to reduce their debt level, since they prefer internal funds over external funds. However, if a firm is growing, it increases its debt position because it needs more funds and our results show that this happens according the pecking order theory. Furthermore, profits particularly affect short term debt, whereas asset growth only affects long term debt. Therefore, after internal funds, long term debt comes next in the pecking order for SMEs. Short term debt is more expensive and can be amortized easily.

The empirical results imply that industry does matter for capital structure. We find empirical evidence that the pecking order theory is more at work in the retail trade non-food and wholesale trade sectors. Moreover, industry classification has significant effect on capital structure as well. Hence, debt levels vary across industries and this is partially rooted in

particular industry features not measured by firm financial characteristics. Nevertheless, firm financial characteristics are much more important than industry characteristics.

The pecking order theory has been developed by Myers (1984) stemming from problems of asymmetric information between managers and shareholders, but this interpretation does not hold for SMEs. For unlisted firms, transaction costs play an important role, along with the loss of control if external funds are used. Instead, information asymmetry between the firm and its lender is very important for SME financing. This study shows that both long term collateral (tangible fixed assets) and short term collateral (inventories) are the most important factors. Lenders require collateral as it is difficult to assess the risk of an SME and collateral reduces their possible loss in case of default. If collateral is available, no evidence has been found that Dutch SMEs are confronted with problems to attract finance, since the effect of collateral on the debt level is large. Moreover, also intangible assets and net debtors, which are often considered as poor collateral, have a positive effect on the long term debt level. In addition, Dutch SMEs have a relatively large amount of long term debt which is more risky for lenders.

To conclude, our empirical results also imply that it is important to take into account the maturity of debt when investigating SME capital structure. An examination of total debt only, will not provide the whole picture. The maturity matching principle is essential for SME capital structure. If financed by debt, long term assets are financed with long term debt and short term assets are financed with short tem debt. We also document that firm size also affects the maturity structure. Larger firms have relatively more long term debt and less short term debt. This implies that lenders use the maturity of debt as a way to mitigate risk. Smaller firms are often more risky and therefore they have more short term debt.

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Appendix

Table A1: Results from the industry specific regressions

This Table presents the results of regression 3.4 for separate industry samples. The results are displayed per firm characteristic.

Panel A: Size Coefficients

	Total debt		Long term debt		Short term debt	
	Estimate	t-value	Estimate	t-value	Estimate	t-value
Manufacturing	0.106 *	11.431	0.104 *	11.851	0.002	0.499
Construction	0.12 *	15.681	0.116 *	17.332	0.004	0.855
Wholesale trade	0.069 *	8.333	0.076 *	10.245	-0.006	-1.193
Retail trade food	0.109 *	4.705	0.132 *	6.092	-0.023 **	-2.485
Retail trade non-food	0.101 *	12.193	0.099 *	12.619	0.002	0.399
Catering & leisure	0.14 *	11.303	0.17 *	14.399	-0.03 *	-5.683
Transport	0.101 *	10.453	0.109 *	11.01	-0.008	-1.657
Services	0.081 *	11.846	0.086 *	13.433	-0.005	-1.374

Panel B: Tangible Assets Coefficients

	Total debt		Long term debt		Short term debt	
	Estimate	t-value	Estimate	t-value	Estimate	t-value
Manufacturing	0.482 *	23.786	0.508 *	25.989	-0.026 **	-2.372
Construction	0.513 *	31.934	0.524 *	35.477	-0.012	-1.188
Wholesale trade	0.440 *	18.997	0.498 *	24.039	-0.058 *	-4.330
Retail trade food	0.456 *	12.900	0.479 *	12.485	-0.023	-1.242
Retail trade non-food	0.380 *	21.134	0.471 *	27.210	-0.091 *	-8.304
Catering & leisure	0.371 *	14.964	0.347 *	14.572	0.024 **	2.157
Transport	0.496 *	16.289	0.518 *	17.120	-0.022	-1.811
Services	0.498 *	32.039	0.493 *	32.703	0.006	0.719

Panel C: Net Debtors Coefficients

	Total debt		Long term debt		Short term debt	
	Estimate	t-value	Estimate	t-value	Estimate	t-value
Manufacturing	0.192 *	9.895	0.081 *	4.481	0.111 *	9.410
Construction	0.188 *	13.582	0.050 *	4.412	0.138 *	14.065
Wholesale trade	0.264 *	16.098	0.079 *	6.046	0.185 *	13.161
Retail trade food	0.384 *	8.130	0.177 *	3.862	0.206 *	6.506
Retail trade non-food	0.319 *	16.679	0.163 *	9.852	0.156 *	10.916
Catering & leisure	0.288 *	6.430	0.219 *	5.124	0.068 *	2.558
Transport	0.237 *	7.211	0.151 *	4.199	0.086 *	5.199
Services	0.118 *	8.073	0.037 *	2.942	0.081 *	8.697

Panel D: ROA Coefficients

	Total debt		Long term debt		Short term debt	
	Estimate	t-value	Estimate	t-value	Estimate	t-value
Manufacturing	-0.180 *	-12.665	-0.067 *	-4.833	-0.113 *	-11.096
Construction	-0.107 *	-10.181	-0.020 *	-2.704	-0.087 *	-11.574
Wholesale trade	-0.247 *	-15.614	-0.095 *	-7.937	-0.152 *	-13.031
Retail trade food	-0.142 *	-4.389	-0.044 *	-1.548	-0.097 *	-5.460
Retail trade non-food	-0.222 *	-12.981	-0.095 *	-7.405	-0.127 *	-10.383
Catering & leisure	-0.109 *	-6.094	-0.066 *	-4.798	-0.043 *	-3.771
Transport	-0.200 *	-7.729	-0.104 *	-4.547	-0.096 *	-6.131
Services	-0.095 *	-7.837	-0.039 *	-4.117	-0.055 *	-8.711

Table A1 (continued): Results from the industry specific regressions

Panel E: Intangible Assets Coefficients

	Total debt		Long term debt		Short term debt	
	Estimate	t-value	Estimate	t-value	Estimate	t-value
Manufacturing	0.469 *	5.357	0.524 *	7.022	-0.055 **	-2.044
Construction	0.492 *	6.936	0.519 *	7.800	-0.027	-1.282
Wholesale trade	0.690 *	11.846	0.697 *	13.231	-0.007	-0.210
Retail trade food	0.303 *	2.621	0.442 *	4.171	-0.139 *	-3.776
Retail trade non-food	0.399 *	5.369	0.525 *	7.884	-0.126 *	-4.337
Catering & leisure	0.322 *	4.987	0.352 *	5.703	-0.031	-1.113
Transport	0.135	0.930	0.100	0.705	0.035	0.453
Services	0.331 *	7.966	0.351 *	9.321	-0.020	-1.252

Panel F:Growth Coefficients

	Total debt		Long term debt		Short term debt	
	Estimate	t-value	Estimate	t-value	Estimate	t-value
Manufacturing	0.012 *	2.987	0.015 *	3.613	-0.002	-1.207
Construction	0.020 *	5.532	0.020 *	6.092	0.000	-0.168
Wholesale trade	0.013 *	3.358	0.013 *	3.901	-0.001	-0.330
Retail trade food	0.008	0.754	0.013	1.277	-0.005	-1.190
Retail trade non-food	0.024 *	7.237	0.026 *	7.895	-0.002	-0.732
Catering & leisure	0.016 *	4.158	0.016 *	4.160	0.000	0.283
Transport	0.016 *	3.896	0.016 *	3.545	0.000	0.108
Services	0.018 *	6.191	0.014 *	4.880	0.004 *	3.014

Panel G: Tax Rate Coefficients

	Total debt		Long term debt		Short term debt	
	Estimate	t-value	Estimate	t-value	Estimate	t-value
Manufacturing	-0.005	-1.364	-0.003	-0.738	-0.002	-1.399
Construction	-0.012 *	-2.935	-0.008 **	-2.183	-0.004	-1.600
Wholesale trade	0.001	0.366	0.005	1.332	-0.004	-1.649
Retail trade food	-0.009	-1.275	0.004	0.547	-0.012 *	-2.759
Retail trade non-food	-0.010 *	-2.721	-0.006 *	-1.884	-0.003	-1.434
Catering & leisure	-0.013 *	-2.933	-0.010 **	-2.220	-0.003	-1.248
Transport	-0.014 **	-2.503	-0.013 **	-2.246	-0.002	-0.539
Services	-0.012 *	-4.565	-0.009 *	-3.789	-0.003	-1.936

Panel H: Depreciation Coefficients

	Total debt		Long term debt		Short term debt	
	Estimate	t-value	Estimate	t-value	Estimate	t-value
Manufacturing	0.143 **	2.445	-0.011	-0.195	0.155 *	4.403
Construction	0.271 *	5.613	0.132 *	3.136	0.139 *	4.331
Wholesale trade	0.116	1.879	0.066	1.263	0.050	1.210
Retail trade food	0.140	1.316	0.130	1.246	0.010	0.248
Retail trade non-food	0.317 *	5.106	0.221 *	3.750	0.097 **	2.311
Catering & leisure	0.278 *	5.658	0.231 *	5.976	0.047	1.413
Transport	0.146	1.868	0.057	0.761	0.089 *	2.658
Services	0.018	0.454	-0.071 **	-2.079	0.089 *	3.793